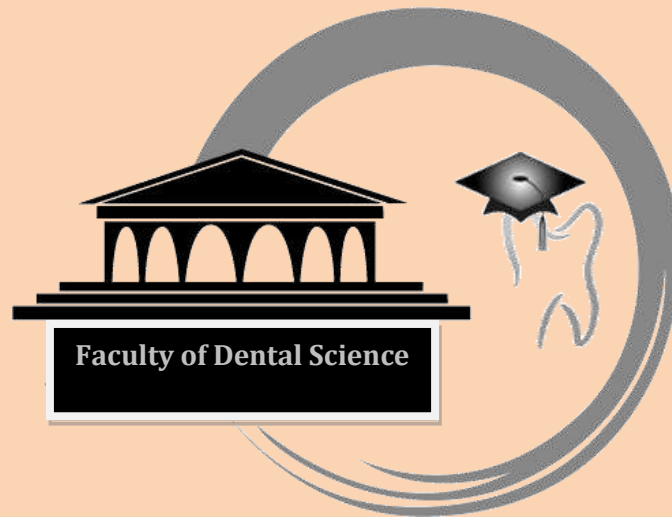


2010

KERALA UNIVERSITY OF HEALTH SCIENCES



MASTER OF DENTAL SURGERY COURSE AND CURRICULUM

AMENDMENT

[BASED ON THE MDS COURSE REGULATIONS 2007 FRAMED BY THE DENTAL COUNCIL OF INDIA AND APPROVED BY THE GOVERNMENT OF INDIA UNDER THE SECTION 20 DENTIST ACT 1948 VIDE GOVT. OF INDIA, MINISTRY OF HEALTH DCI NOTIFICATION NO: DE-22-2007 DTD 20TH NOVEMBER 2007.]



MASTER OF DENTAL SURGERY COURSE AND CURRICULUM

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KERALA UNIVERSITY OF HEALTH SCIENCES

**SECTION I**
RULES AND REGULATIONS

INTRODUCTION

This Section contains the rules and regulations for all the post graduate dental courses conducted under the **Kerala University of Health Sciences (KUHS)**. It is organized under the following headings–

1. SCOPE

2. COURSES OFFERED

- 2.1. Title of the course
- 2.2. Duration of the Course
- 2.3. Branches of Study

3. BASIC REQUIREMENTS

4. DEPARTMENTAL FACILITIES

5. SELECTION OF CANDIDATES

- 5.1. Eligibility
- 5.2. Criteria for Selection for Admission
- 5.3. Eligibility Certificate from KUHS
- 5.4. Validity of the Selection List
- 5.5. Date of Commencement of the Course

6. GENERAL RULES AND REGULATIONS

- 6.1. Leave, Attendance and Eligibility for appearing in the examinations
- 6.2. Condonation
- 6.3. Examination fees
- 6.4. Repetition of Course

7. TRAINING PROGRAMME

- 7.1. Method of Training
- 7.2. Monitoring Progress of Studies
- 7.3. Dissertation

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- 8.1 Eligibility
 - 8.1.1 Attendance
 - 8.1.2 Progress and Conduct
 - 8.1.3 Work Diary and Logbook
- 8.2 Schedule of Examination
- 8.3 Scheme of Examination
- 8.4 Number of Candidates
- 8.5 Examiners
- 8.6 Valuation of Answer Scripts of Written Examination.
- 8.7 Promotion to subsequent years
- 8.8 Reappearance of failed candidates
- 8.9 Criteria for Declaration as Pass
- 8.10 Classification of Results
- 8.11 Revaluation and Retotaling of theory papers

9 ACADEMIC CALENDAR



1. SCOPE

- 1.1. These regulations amended herein shall apply to all postgraduate programmes under the Faculty of Dentistry conducted in the affiliated colleges/institutions of KUHS.
- 1.2. These regulations shall come into immediate effect from the date of notification.

2. COURSES OFFERED

The under mentioned Postgraduate Degrees awarded by KUHS have been approved by the Dental Council of India (DCI) after these have been duly recognized by the Council.

2.1. Title of the course - It shall be called the **Master of Dental Surgery (MDS)**

2.2. Duration of the Course - The course shall be of **three years** duration. All the candidates for the degree of MDS are required to pursue the recommended course for at least three academic years as full time candidates in an institution affiliated to and approved for Postgraduate studies by KUHS, observing the norms put forward by the DCI.

2.2.1. There will be no reduction for the course duration for any of the students including service candidates, diploma holders and those who have done senior house surgeoncy or equivalent research experience.

2.2.2. No student shall be permitted to complete the course by attending more than 6 continuous years.

2.2.3. A candidate selected for admission in a Dental College is obliged to follow the curriculum, rules and regulations as approved by the Dental Council of India and the University. Curriculum, rules or regulations are subject to changes from time to time.

2.3. Revision of Regulations - The University may from time to time revise, amend or change the regulations, curriculum, scheme of examinations and syllabi. These changes unless specified otherwise, will have effect from the beginning of the academic year / semester following the notification of the University.

2.4. Branches of Study - The following are the subjects of Specialty for the MDS degree


- 2.1.1. Branch 1 - Prosthodontics and Crown & Bridge
- 2.1.2. Branch 2 - Periodontology
- 2.1.3. Branch 3 - Oral and Maxillofacial Surgery
- 2.1.4. Branch 4 - Conservative Dentistry and Endodontics
- 2.1.5. Branch 5 - Orthodontics and Dentofacial Orthopedics
- 2.1.6. Branch 6 - Oral Pathology and Microbiology
- 2.1.7. Branch 7 - Pedodontics and Preventive Dentistry
- 2.1.8. Branch 8 - Oral Medicine and Radiology
- 2.1.9. Branch 9 - Public Health Dentistry

2.5. Medium of Instruction and Assessment will be in the English language.



3. BASIC REQUIREMENTS

- 3.1. The selection of the candidates should be done on the basis of merit as per the stipulation of the Dental Council of India and the existing rules/guidelines of the University.
- 3.2. All candidates selected for admission to the postgraduate course must possess recognized BDS degree or equivalent qualification approved by the DCI and permanent registration of the Dental Council of India or the State Dental Councils.
- 3.3. Undergraduate institutions desirous to undertake postgraduate teaching must make up the deficiencies pointed out by the Dental Council of India in respect of undergraduate teaching and in addition fulfill the minimum requirements for postgraduate training as prescribed by the DCI before such permission is granted.
- 3.4. The maximum number of postgraduate candidates who can be registered in any recognized department for training for the award of postgraduate degree under KUHS shall be determined by the facilities available in the department as prescribed by the DCI. Besides these, no additional candidates for postgraduate training shall be registered in the department without the approval of the DCI and the University.
- 3.5. The qualifications for the Professor and Head of the department, Professor and Reader should adhere to the norms framed by DCI.
- 3.6. Only those faculty who possess a total of nine years teaching experience after obtaining MDS, out of which at least five years teaching experience as Assistant Professor/Reader shall be recognized as postgraduate teachers. In Govt. Dental Colleges where the post of senior lecturer has been re-designated as Assistant Professor and the entry to service is Assistant Professor, they shall be recognized as postgraduate teachers only after possessing nine years of teaching experience as Assistant Professor/Reader. To be recognized as postgraduate teachers they should also satisfy the requirements pertaining to research work and publications as defined by DCI.
- 3.7. The number of admissions to MDS courses in each specialty shall not be more than 2 students per professor per year.
- 3.8. At any one time there shall be not more than 6 regular students under one professor.
- 3.9. No postgraduate teacher shall enroll candidates for a discipline other than the subject of his specialty for postgraduate programme and no postgraduate teacher shall be a postgraduate teacher for more than one specialty.
- 3.10. When the Department is **headed** by a recognized postgraduate Professor (as per DCI norms), the Associate Professor/Reader/Assistant Professor of the department, who is in possession of the requisite qualification and teaching experience to be a postgraduate teacher (ref: Clause 3.5), may be permitted to enroll one student per year under him and be a



postgraduate teacher and guide. At any one time there shall be not more than 3 regular students under him.

4. DEPARTMENTAL FACILITIES

Only the departments having the following minimum facilities shall be recognized for postgraduate training

4.1. Faculty

- 4.1.1. In each department there should be a minimum required full time faculty members belonging to the disciplines concerned with requisite postgraduate qualification and experience for being a PG teacher as prescribed by the DCI. The requirements of the faculty should follow the norms framed by the DCI.
- 4.1.2. To strengthen and maintain the standards of postgraduate training, DCI recommends the following minimum faculty requirements for starting and continuation of postgraduate training programmes. Department with adequate PG teachers consisting of one professor, two readers, one senior lecturer will make one unit and permitted to have three MDS admissions. Any increase of admissions will also be based on the same pattern.
- 4.1.3. In addition to the faculty staff mentioned above there should be adequate strength of Senior Lecturers / Lecturers available in the department. The department should also have an adequate number of technical and other paramedical staff as prescribed by the Dental Council of India.
- 4.1.4. A department which does not have a Professor and an Assistant Professor with requisite qualifications and experience as laid down by the DCI, shall not start a postgraduate course in that specialty.
- 4.1.5. Faculty who is accepted as Postgraduate teacher in a dental institute starting MDS course will not be accepted for the next one year in any other dental institute.
- 4.1.6. Dental faculty with MDS shifting from the dental department of a Medical College, who possess a minimum of nine years of teaching experience in the Medical College, should complete minimum of 3 years of teaching experience in a dental college before being accepted as PG faculty.

4.2. Clinical / Laboratory Facilities and Equipments

There should be adequate clinical material, space and sufficient number of dental chairs and units, adequate laboratory facilities and should regularly be updated keeping in view the advancement of knowledge and technology and research requirements. The department should have the minimum number of all equipments including the latest ones necessary for the training and as recommended by the Council for each specialty from time to time.



5. SELECTION OF CANDIDATES

5.1 Eligibility

A candidate for admission to the MDS course must have a degree of BDS (Bachelor of Dental Surgery) from a Dental College and University recognized by the Dental Council of India and KUHS.

5.2 Criteria for Selection for Admission

Students for postgraduate training shall be selected strictly on the basis of the rules pertaining to selection. Selection of students to the management quota in Self Financing institutions will be strictly based on the rules framed by the Govt. of Kerala and KUHS. The number of seats shall be as per the provisions contained in the notification of the DCI against each affiliated institution.

5.3 Eligibility Certificate from KUHS

Where applicable, the candidate has to make an application to the university with the following documents along with the prescribed fee:

- i. BDS degree certificate issued by the University / another recognized university / equivalent dental degree recognized by DCI.
- ii. Permanent Registration Certificate from State Dental Council.
- iii. Certificate of Recognition/Equivalency certificate of the qualifying examination in case of candidates who have passed BDS/equivalent degree from universities outside Kerala.
- iv. Transfer Certificate
- v. Any other certificate required along with the application.

5.4 Registration

A candidate who has been admitted to postgraduate course should register his/her name in the University **within a month of admission**. A candidate on admission to the MDS course shall apply to the University for registration

- i. By making a formal application in the prescribed format.
- ii. Original degree certificate and mark lists of qualifying examination.
- iii. Original Council registration certificate.
- iv. Allotment letter from the competent authority who conducted the Entrance
- v. Examination/ allotment letter from the Principal in the case of NRI / management quota candidates.
- vi. Equivalency certificate wherever needed.
- vii. Original SSLC/equivalent certificate.
- viii. The fees prescribed for the course.



5.5 Physical Fitness Certificate:

Every candidate before admission to the course shall submit to the Principal of the Institution a Certificate of Medical Fitness from an authorized Medical Officer certifying that the candidate is **physically and mentally fit** to undergo the M.D.S course.

5.6 Validity of the Selection List

Any postgraduate seats left unfilled in any specialty cannot be carried forward to the next or subsequent years.

5.7 Date of Commencement of the Course

The course will be deemed to have commenced on 1st June as decided by KUHS or DCI. This date will be considered as the date of joining in the Postgraduate register maintained in the University.

5.8 Migration and Transfer from one college to another

Request for Migration/Transfer of candidates during the course of study from one recognized college to another recognized college of this University or from another University shall not be granted under any circumstances.

6. GENERAL RULES AND REGULATIONS

6.1. Leave, Attendance and Eligibility for appearing in the examinations

A candidate pursuing MDS course should work in the concerned department of the Institution for the full period as a resident. All the 365 days of the year are working days for the postgraduate students. The student will be permitted to avail casual leave for 20 days, but not more than 10 days at a stretch. All PG students are eligible for a weekly-off of one day. If Sundays are holidays for the institution, no other weekly-offs are allowed. All public holidays are working days for the postgraduate students. **The students are not entitled to any seasonal holidays/study leave.** Hence for calculation of attendance percent, the effective no: of working days in an academic year would be 313 days (365 days – 52 weekly-off days).

No postgraduate student including service candidates is permitted to run a clinic or work in a clinic / hospital / laboratory/ nursing home and shall not engage in private practice of any sort during the course of study. Any violation in this respect will be viewed seriously warranting termination of the course.

Each year shall be taken as a unit for the purpose of calculating attendance. The student should earn 80% attendance (250 days) for each year of the course separately. The candidate will also be eligible for leave supported by medical certificates (subject to verification by medical board) and other “leave under exceptional circumstances” recommended by the Head of Department and sanctioned by the Head of



the Institution concerned subject to a maximum of 63 days including casual leaves (20% of 313 days) per year exclusive of Sundays / weekly offs. Casual leave not availed in a year cannot be carried over to the next year. Any type of leave including maternity and medical leave and casual leaves taken during the P. G. course will not be considered for calculating attendance for that calendar year (from date of joining to corresponding date of next year). CDEs, workshops and other academic programmes conducted by recognized academic bodies are essential aspects of PG training programme. All PG students may be permitted to attend such programmes without affecting the routine working of the department concerned. The Heads of the Departments shall sanction duty leave to PG students provided they apply before the CDE programme and the Head of the department is convinced about the genuinity of the programme and utility of the particular programme. There shall be a limit of 10 days for such duty leave in a year.

6.2. Condonation of Attendance

In case of unaccounted illness or other contingencies if a candidate cannot satisfy the condition specified in Clause 6.1 and if the attendance percent is not less than 70%, then he/she can apply for condonation, **once during the entire course of study** (i.e. once in 3 years). The Principals of the affiliated colleges in consultation with the college governing council if any are authorised to grant condonation after verifying the genuinity of the request and the list of such students stating the reasons for the same should be intimated to the university. Condonation of attendance may be granted to a maximum of 10% of the total number of working days (10% of 313 days) in the respective academic year subject to a **maximum of one time during the whole PG programme**. For appearing in the M.D.S. Part I examination, the student should require a minimum 80% attendance in the first year (70% for students who are granted condonation) and for appearing in the M.D.S. Part II examination, the student should require a **minimum of 80% attendance in the second and third academic years separately**.

6.3. Examination fees

The examination fees should be remitted for each examination appeared for.

6.4. Repetition of Course

In case of unfulfilling the requirements for the course and or shortage of attendance for appearing in the final examination, the candidate should satisfactorily fulfill the requirements and repeat the course for the deficit number of days after remitting the tuition fees. **No student shall be permitted to complete the course by attending more than six continuous years.**

6.5. Re-admission to the course after discontinuation of course

A Candidate who discontinues the course is eligible for re-admission as per norms of Kerala University of Health Sciences.



7. TRAINING PROGRAMME

7.1 Method of Training

The training of a postgraduate student shall be full time but graded responsibilities in the management and treatment of patients entrusted to his/her care. The participation of the students in all facets of educational process is essential. Every candidate should take part in seminars, group discussions, case demonstrations, clinics, journal review meetings, and clinical meetings. Every candidate shall be required to participate in the teaching and training programme of undergraduate students and interns. Training should include involvement in laboratory and experimental work, and research studies.

Every Institution undertaking Post Graduate training programme shall set up an Academic cell or a Curriculum Committee, under the chairmanship of a Senior faculty member, which shall work out the details of the training programme in each speciality in consultation with other Department faculty staff and also coordinate and monitor the implementation of these training Programmes.

Based on the above guidelines for a structured training programme for postgraduate courses, the basic tenets of a successful postgraduate teaching programme, are detailed under the following heads.

- **Formal Lectures** by the faculty on varied subjects including general areas and systems. Both senior and junior faculty can do this. However, the number of these classes should be maintained of low levels to encourage self-learning.
- **Symposia / Seminars** form an integral part of PG learning. A monthly symposium will generate approximate 30-35 symposia / course. These symposia can include department faculty and HODs as chairpersons and maximum involvement of both students and faculty should be ensured.
- **Clinical Discussions** form the core of PG training and can be assigned to various clinical units on rotating basis. However other faculty could also actively participate in the discussion. The discussions must be 3-4/week. One suggestion is to score the performance of the candidate by a small panel of faculty and convey the scores to the candidate / PG at the end of the session.
- **Journal Club /Clinical Club** should be conducted at least once in a week in each postgraduate department. Journal clubs not only imparts new information but also trains the candidate to objectively assess and criticize various articles which come out and should be useful in ensuring evidence based dentistry.
- **Guest Lectures** can be integrated into the PG program at least once in a month. Even the retired faculty can be invited for delivering the lectures and will ensure importing of greater wisdom to the candidates.




- **Orientation Classes** for newcomers should also be incorporated. These classes can even be assigned to junior faculty/senior PGs.
- **Clinical posting.** Each PG student should work in the clinics on regular basis to acquire adequate professional skills and competency in managing various cases to be treated by a specialist.
- **Clinico Pathological Conferences** should be held once a year involving the faculties of Oral Medicine and Radiology, Oral Pathology and concerned clinical department. The student should be encouraged to present the clinical details, radiological and histopathological interpretations and participation in the discussions.
- **Rotation postings in other departments** should be worked out by each department in order to bring in more integration between the speciality and allied fields.
- **Periodical Quiz** can be both informative and entertaining and should be encouraged and planned.
- **Computer Training and Internet Applications** are now becoming a must for both faculty and students. These areas should be strengthened as a next step. There can be a sort of internet information club in the departments.
- **Conferences/CDEs** – All postgraduate students should be encouraged to attend conferences and CDEs. They should also be asked to present papers wherever appropriate and should be rewarded by assigning scores for them.
- **Publication of scientific papers** – It is desirable and advisable to have at least two publications in the State/National/International indexed dental journals.
- **Involvement in Teaching Activity** – PG students can be assigned the job of teaching the undergraduate students and these will definitely improve the teaching skills in the postgraduate students.

7.2 Monitoring Progress of Studies

- **Work Diary / Log Book**

Logbooks serve as a document of the trainee's work. The trainee shall maintain this Logbook of the special procedures/operations observed/assisted/performed by him/her during the training period right from the point of entry and its authenticity shall be assessed weekly by the concerned Post Graduate Teacher / Head of the Department. This shall be made available to the Board of Examiners for their perusal at the time of his / her appearing at the Final examination. The logbook should record clinical cases seen and presented, procedures and tests performed, seminars, journal club and other presentations. Logbook entries must be qualitative and not merely quantitative, focusing on learning points and recent advances in the area and must include short review of recent literature relevant to the entry. A work diary containing all the various treatment done by the candidate in the course of the study should also be maintained. The work diary shall be



scrutinized and certified by both the guide/co guide and Head of the Department and presented in the University practical/clinical examination.

▫ **Periodic Tests/Internal Assessment**

The concerned departments may conduct three tests, one at the end of the first year before the MDS Part I and the other in the second year. The third test may be conducted three months before the final examination.

Records and marks obtained in these tests will be maintained by the Head of the Department and the performance in these should decide on the candidate being eligible for the final examination. The results of the **periodic tests conducted by the respective departments** shall be displayed within 5 days from the last test.

7.3 Dissertation

Every candidate pursuing MDS degree course is required to carry out work on a selected research project under the guidance of a recognized postgraduate teacher. The results of such a work shall be submitted in the form of a dissertation.

The dissertation is aimed to train a postgraduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, and comparison of results and drawing conclusions.

Every candidate shall submit to the University in the prescribed format a synopsis containing particulars of proposed dissertation work after obtaining ethical clearance from the Institutional Ethical Committee **within six months from the date of commencement of the course or before the dates notified by the University**. The synopsis shall be sent only through the Principal of the institution.

Such synopsis will be reviewed and the dissertation topic will be registered by the university. No change in the dissertation topic or guide/coguide shall be made without prior approval of the University. The dissertation should not be just a repetition of a previously undertaken study but it should try to explore some new aspects. The dissertation should be written under the following headings:

- | | |
|--------------------------------------|-----------------|
| i. Introduction | vi. Discussion |
| ii. Aims and Objectives of the study | vii. Conclusion |
| iii. Review of Literature | viii. Summary |
| iv. Methodology | ix. References |
| v. Results | x. Annexures |

The written text of dissertation shall be not less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires, and other annexures. It should be neatly



typed (font size 13-Times New Roman or font size 13-Cambria) in 1.5 line spacing on one side of the paper (A4 size, 8.27" x 11.69") and bound properly. Spiral binding should be avoided. (Refer Section V and VII). The guide, co-guide if any, Head of the Department and the Head of the Institution shall certify the dissertation.

For uniformity, it was suggested that the colour of the hard bind of the dissertation for all branches of MDS course in the purview of KUHS shall be dark brown with letters of gold colour. The title, author, and year of study should also be imprinted or embossed on the spine of the book. **Three hard copies and one properly labeled soft copy in a CD (refer Section VII) of the dissertation thus prepared shall be submitted to KUHS on the 29th month of commencement of the course / 31st Oct. of the 3rd academic year, whichever falls first.** Dissertation should preferably be sent to a minimum of three reviewers / examiners / assessors. Consent for acceptance for evaluation of dissertation should be obtained from the reviewer/examiner/assessor before the dissertation are despatched. Proforma for evaluation of dissertation should be sent along with the copies of the dissertation to the reviewers appointed by the university. The proforma should contain all the assessment criteria with the clause – **Accepted/Accepted with modifications/Rejected** and reasons for rejection by the examiner. This proforma should be sent back to the University within two weeks / within the date specified after receipt of dissertation. The dissertation may be declared accepted if more than 50% of the reviewers (2 in the case of 3 reviewers) have accepted it. If modifications are to be made as specified, 3 hard copies and one soft copy of the dissertation after corrections made by the candidate should be submitted within 45 days to the University which may be sent back to the same examiner/s by the University for Acceptance after a fee has been levied from the candidate. If the dissertation has been rejected by more than 50% of the reviewers (2 in the case of 3 reviewers), the dissertation may be reviewed by an Expert Reviewing Committee comprising of not less than two subject experts, Dean (Research) of KUHS and Guide of the candidate provided the Guide requests for a review, after a fee has been levied from the candidate. If rejected by the Reviewing Committee, the candidate should take up a new topic and undergo all the procedures of submitting the synopsis, fees, IEC clearance, etc as prescribed by the University. The candidate who takes up the new topic can appear only for the subsequent examination.

Approval of dissertation work is an essential precondition for a candidate to appear in the final University examination. Hall tickets for the Part II examination should be issued to the candidate only if the dissertation has been accepted.

A candidate whose dissertation has been accepted by the examiners and approved by the University, but who is declared to have failed at the final examination will be permitted to reappear at the subsequent MDS examination without having to prepare a dissertation.



Guide – The academic qualification and teaching experience required for recognition by the University as a guide for dissertation work is as laid down by the Dental Council of India / KUHS.

Co-guide – A co-guide may be included provided the work requires substantial contribution from the same department or a sister department or from another institution recognized for teaching/training by KUHS/DCI. The co-guide should fulfill the academic qualification and teaching experience required for recognition by the University as a co-guide for dissertation work.

Change of Guide – In the event of a registered guide leaving the college for any reason or in the event of death of guide, guide may be changed with prior permission from the University.

8. EXAMINATIONS

Evaluation is a continuous process, which is based upon criteria developed by the concerned authorities with certain objectives to assess the performance of the learner. This also indirectly helps in the measurement of effectiveness and quality of the concerned MDS programme. Evaluation is achieved by two processes

- 1) Formative or internal assessment
- 2) Summative or university examinations.

Formative evaluation is done through a series of tests and examinations conducted periodically by the institution. Summative evaluation is done by the university through examination conducted at the end of the specified course.

A candidate registered for MDS course must clear the final examination within six years of the date of admission. The examinations should be so organized that this shall be used as the mechanism to confirm that the candidate has acquired appropriate knowledge, skill and competence at the end of the training that he/she can act as a specialist and/or a medical teacher as per expectation. University examination will be held regularly by KUHS in April-May/October-November every year.

A candidate who wishes to study for MDS in a second specialty should have to take the full course of 3 years in that specialty and appear for both Part I and Part II examinations. However, if the candidate pursuing the subsequent specialty has done the MDS course of KUHS and qualified in the MDS Part I examination conducted by KUHS, he / she shall be exempted from appearing for the MDS Part I examination of the subsequent specialty provided the syllabus and scheme of examination is the same.



8.1 Eligibility

To be eligible for the **MDS Part I examination**, the candidate should require a minimum 80% attendance in the first year (70% for students who are granted condonation) and should have submitted the library dissertation.

Every candidate to become eligible to appear for the **MDS Part II examination** shall fulfill the following requirements.

8.1.1 Should have passed the Part I examination

8.1.2 Attendance

Every candidate shall have fulfilled the attendance prescribed by the University during **each academic year** of the Postgraduate course. A candidate becomes eligible for writing the Part II University examination only after the completion of 35 months from the date of commencement of the course. The 36th month may be for the examination and announcement of results. The candidates should have completed the training period before the commencement of examination.

8.1.3 Progress and Conduct

Every candidate shall have participated in seminars, journal review meetings, symposia, conferences, case presentations, clinics and didactic lectures during each year as designed by the concerned department.

8.1.4 Work Diary and Logbook

Every candidate shall maintain a work diary and logbook for recording his/her participation in the training programmes conducted by the department. The work diary and logbook shall be verified and certified by the Head of the department.

The certification of satisfactory progress by the Head of the Department and Head of the Institution shall be based on 8.1.1, 8.1.2, 8.1.3 and 8.1.4 mentioned above.

- **Students should note that in case they do not complete the exercises and work allotted to them within the period prescribed, their course requirements will be considered unfulfilled.**
- **Clinical Records, Work Diaries and Logbooks should be maintained regularly and approved by the guide, duly certified by the Head of the Department.**

8.2 Schedule of Examination

The MDS. Part I examination shall be held at the end of the first academic year and the examination for MDS. Part II shall be held at the end of third academic year. The university shall conduct two examinations in a year at an interval of four to six months between two examinations. **Not more than two examinations shall be conducted in an academic year.**



8.3 Scheme of Examination

- MDS examination will consist of two examination
 - Part I examination will be at the end of first year.
 - Part II examination will be at the end of third year

8.3.1 First Year

Written Examination (Theory)

Written examination shall consist of **four question papers**, each of three hours duration – the papers will be on Applied Basic Subjects and common to all specialties. Each paper shall carry 100 marks. The type of questions in these papers will be two long essay questions carrying 20 marks each and six short essay questions each carrying 10 marks. **There will be no options/choices in the questions.** Distribution of topics in each paper is shown in Section III along with the course description of the concerned specialty. **The total marks for the theory examination shall be 400.**

Practical and Viva voce Examination

There will be no practical and viva voce examination for the papers in the first year.

8.3.2 Second Year - There is no Examination in the second year of study.

8.3.3 Third Year

Written Examination (Theory)

Written examination shall consist of **four question papers**, each of three hours duration – the papers shall pertain to the concerned specialty. Each paper shall carry 100 marks. The type of questions in the first three papers will be two long essay questions carrying 20 marks each and six short essay questions each carrying ten marks. **There will be no options in the questions in the first 3 papers. Fourth paper will be a single essay question paper which will carry an option and the candidate is to answer only one of the essays.** Questions on recent advances may be asked in any or all the papers. Distribution of topics in each paper is shown in Section III along with the course description of the concerned specialty. **The syllabus for the theory papers of the concerned specialty should cover the entire field of the subject and topics given in Section III may be used as guidelines only and not limited to them. Though the topics assigned to the different papers are generally evaluated under designated papers, a strict division of the subject may not be possible and some overlapping of topics is inevitable. Students should be prepared to answer overlapping topics.** The theory examinations shall be held sufficiently earlier than the practical/clinical examinations so that the answer books can be assessed and evaluated before the start of the practical/clinical examination. The total marks for the theory examination shall be 400.

Practical Examination



In case of practical examination, it should aim at assessing competence and skills of techniques and procedures. It should also aim at testing student's ability to make relevant and valid observations, interpretation and inference of laboratory or experimental or clinical work relating to his/her subject for undertaking independent work as a specialist. The actual format of clinical examinations in various specialities is given in Section III. The total mark for practical/clinical examinations shall be 400.

Viva voce

Viva voce examination shall aim at assessing depth of knowledge, logical reasoning, confidence and oral communication skills. The candidate may be given a topic for the pedagogy in the beginning of the clinical examination and asked to make a presentation on the topic for 8-10 minutes. The total marks shall be 200 of which 160 would be for the viva voce (40 marks/examiner) and 40 marks for the pedagogy.

8.4 Number of Candidates

The maximum number of candidates to be examined in the Clinical/Practical and Viva voce on any day for MDS degree shall not exceed six. This is to ensure that sufficient time will be available for evaluation of the candidates.

8.5 Examiners

There shall be at least four examiners in each branch of study. Out of four, two (50%) should be external examiners and two shall be internal examiners. The qualification and teaching experience for appointment as an examiner shall be as laid down by the DCI. The external examiners shall ordinarily be invited from another recognized University from outside the state. An external examiner may ordinarily be appointed for the same institute for not more than two years consequently. Thereafter he may be reappointed after an interval of one year. The same set of examiners shall ordinarily be responsible for the practical and oral part of the examination.

The Head of the Department shall ordinarily be one of the examiners and the chairperson of the Board of Examinations; second internal examiner shall rotate after every two consecutive examinations if there are more than two postgraduate teachers in the department other than the Head of the department. No person who is not an active Postgraduate teacher in that subject can be appointed as Examiner. However in case of retired personnel, a teacher who satisfies the above conditions could be appointed as examiner up to one year after retirement.

For the MDS Part II examination, if there are no two qualified internal examiners in an institute the second internal examiner can be from a neighbouring DCI and KUHS approved / recognized Dental College having PG course in the specific speciality. This examiner should be an active PG teacher in the same speciality with the qualifications and experience recommended for a teacher for postgraduate degree programme. The examination can also



be conducted by one qualified internal examiner and three qualified external examiners if there is no qualified second internal examiner.

Reciprocal arrangement of Examiners should be discouraged, in that, the internal examiner in a subject should not accept external examinership of a college from which the external examiner is appointed in his subject in the same academic year.

8.6 Valuation of the Answer Scripts of Written Examination.

Centralised valuation of the answer scripts of all the papers of MDS Part I and Part II will be done at a nodal valuation centre. The Answer Papers of the Part – I and Part II MDS Examination will be evaluated by **qualified, active PG teachers having at least 5 years PG teaching experience preferably from other universities outside the state.**

8.7 Promotion to subsequent years

Students will be promoted to the subsequent years irrespective of whether they have passed or not. However each examination should be cleared before appearing for the higher examination.

8.8 Re-appearance of failed candidates or Extension of Course

Candidates who have failed in the final M.D.S. examination should attend the clinical posting in the respective department and remit the whole amount of the tuition fees of the third year irrespective of the subsequent period of training provided they do not undergo the training for more than a year. If the training period extends beyond one year after failing, another year of tuition fee is to be remitted.

8.9 Procedure for Defaulters

Every department should have a committee to review such situations. The defaulting candidate shall be counseled by the guide and head of the department. In extreme cases of default the departmental committee may recommend the defaulting candidate be withheld from appearing the examination if he/she fails to fulfill the requirements in spite of being given adequate chances to set himself or herself right.

8.10 Criteria for Declaration as Pass

It is **mandatory for the candidate to have passed the MDS Part I examination** before submitting the dissertation and before appearing for the MDS Part II examination.

To pass in the MDS Part I examination, the candidate should secure in each theory paper independently a minimum of 50% of the total marks allotted (50 marks out of 100 for each theory paper).

To pass in the MDS Part II examination, a candidate shall secure in theory examination, viva voce and in practical/clinical independently 50% of total marks allotted (200 marks out of 400 for theory with a minimum of 40% per paper, 100 marks out of 200 for viva voce and 200 out of 400 for practical/clinical).



Distribution of Marks

Year	Theory				Viva Voce	Practical	Total
	I	II	III	IV			
Part I	100	100	100	100	-	-	400
Part II	100	100	100	100	200	400	1000

8.11 Classification of Results

The classification of the results of the programme shall be done at the end of the third year based on total marks secured in the Part II examinations only.

Below 50%	-Failed
50 to 59 percent	-Passed in Second Class
60 to 74 percent	-Passed in First Class
75 percent and above	-Passed in First Class with Distinction

Candidates who fail to pass in the first attempt in the **Part II examinations** and pass subsequently **will not be placed in 1st class with distinction**. There will be two Marks transcripts – one for Part I and the other for Part II. The Marks transcript of the Part I examination should show the distribution of marks for each of the theory papers. Only the marks for each theory paper, viva voce and practical secured for the Part II examination will be entered in the final marks transcript.

A candidate failing in any of the theory papers of Part I examination is required to appear in the failed papers only but should clear the Part I examination in a maximum of 3 supplementary chances in each subject in addition to the first attempt. However failing in any of the theory papers / practical / viva voce in Part II examination, it is mandatory that the candidate should appear for the whole examination of Part II (all four theory papers, viva voce and practicals) and should pass the Part II examination in a maximum of 3 supplementary chances in addition to the first attempt.

A candidate registered for three years MDS Course must qualify in the Examinations within six years from the date of his / her admission. The candidate will not be permitted to appear for more than three supplementary chances in addition to the first attempt in the Part I or Part II examinations and shall have to re-enroll for the course if he / she fails to pass examination in the said number of attempts. If the candidate has failed in the Part I examination in the said number of attempts, he/she would have to redo the 1st year and if failed in the Part II examination in the said no: of attempts he/she would have to redo the course from the second year.

8.12 Grace Marks

Grace Marks may be awarded for the MDS Part I examination only, limiting to a maximum of five marks. Only candidates who have passed all papers except one (i.e. failed in one paper only) will be eligible for grace marks to get a whole pass. There is no grace marks for the MDS Part II examination. This is applicable for all MDS Part I examinations after 01.06.2012.



8.13 Revaluation and Retotaling of theory papers

Double valuation of the answer papers in two different centers / centralized valuation camp will be conducted and if the variation in total marks obtained in two valuations is more than 15%, the paper would undergo a third valuation. Hence **there is no provision for revaluation in MDS Part I and Part II examinations, but retotaling is permitted in the failed papers.** The average of marks obtained for double valuation is taken as the final mark of the student and in case of a third valuation, the average of nearest two marks is taken as final marks.

9. ACADEMIC CALENDAR

Year of Course	Requirements	Period	Tentative Date*
First Year	Commencement of Course (Date of Admission)		1st June
	Registration at University	Within one month	30th June
	Approval of Topic of Library Dissertation	Within 3 months	31st Aug
	Synopsis of Proposed Dissertation to the University	Within 6 months	30th Nov of 1st Academic Year
	Departmental Periodic Test - 1	10 th month	15th – 20th March
	Submission of Library Dissertation	10 th month	31st March
	MDS Part I Examination	12th month	1st May
Second Year	Departmental Periodic Test - 2	22 nd month	15th – 20th March of 2nd Academic Year
Third Year	Submission of Dissertation to University	29th month	31st Oct of 3rd Academic year
	Departmental Periodic Test - 3	33 rd month	15th – 20th March of 3rd Academic Year
	MDS Part II Examination	36th month	1st May

*Suggested dates based on the date of commencement of course (1st June). Since the date of commencement of course can differ, the period will be strictly followed and notified in the University website.

If any of the dates prescribed in the calendar happens to be a holiday, the next working day shall be the prescribed date for the academic event.



SECTION II

GOALS & OBJECTIVES OF THE MDS COURSE

1. Goals

The goals of postgraduate training in various specialities are to train the BDS graduate who will:

- Practice respective specialty efficiently and effectively, backed by scientific knowledge and skill.
- Exercise empathy and a caring attitude and maintain high ethical standards.
- Continue to evince keen interest in continuing professional education in the specialty and allied specialties irrespective of whether in teaching or practice.
- Willing to share the knowledge and skills with any learner, junior or a colleague.
- To develop the faculty for critical analysis and evaluation of various concepts and views, to adopt the most rational approach.

2. Objectives

The objective is to train a candidate so as to ensure higher competence in both general and special area of interest and prepare him for a career in teaching, research and specialty practice. A candidate must achieve a high degree of clinical proficiency in the subject matter and develop competence in research and its methodology as related to the field concerned.

The above objectives are to be achieved by the time the candidate completes the course. The objectives may be considered as under –

1. Knowledge (Cognitive Domain)
2. Skills (Psychomotor Domain)
3. Human values, ethical practice and communication abilities.

2.1. Knowledge

- Demonstrate understanding of basic sciences relevant to the specialty.
- Describe etiology, pathophysiology, principles of diagnosis and management of common problem within the specialty in adults and children.
- Identify social, economic, environmental and emotional determinants in a given case and take them into account for planning treatment.
- Recognize conditions that may be outside the area of specialty/competence and to refer them to an appropriate specialist.



- Update knowledge by self-study and by attending courses, conferences and seminars relevant to specialty.
- Undertake audit; use information technology and carryout research both basic and clinical with the aim of publishing or presenting the work at various scientific gatherings.

2.2.Skills

- Take a proper clinical history, examine the patient, perform essential diagnostic procedures and order relevant tests and interpret them to come to a reasonable diagnosis about the condition.
- Acquire adequate skills and competence in performing various procedures as required in the specialty.

2.3.Human values, ethical practice and communication abilities

- Adopt ethical principles in all aspects of practice.
- Foster professional honesty and integrity.
- Deliver patient care, irrespective of social status, caste, creed, or religion of the patient.
- Develop communication skills, in particular skill to explain various options available in management and to obtain a true informed consent from the patient.
- Provide leadership and get the best out of his team in congenial working atmosphere.
- Apply high moral and ethical standards while carrying out human or animal research.
- Be humble and accept the limitations in his knowledge and skill and to ask for help from colleagues when needed.
- Respect patient's rights and privileges including patient's right to information and right to seek a second opinion.



SECTION III

COURSE DESCRIPTION OF VARIOUS SPECIALITIES

- ◆ Definitions of Various Specialties
- ◆ Syllabus MDS Part I
- ◆ Model Question Papers MDS Part I
- ◆ Course Contents Speciality-wise
 - Syllabus MDS Part II
 - Model Question Papers MDS Part II
 - Recommended Books and Journals

DEFINITIONS OF VARIOUS SPECIALTIES

Branch 1 – Prosthodontics and Crown & Bridge

Prosthodontics is the dental specialty pertaining to the diagnosis, treatment planning, rehabilitation and maintenance of the oral function, comfort, appearance and health of patients with clinical conditions associated with missing or deficient teeth and/or maxillofacial tissues using biocompatible substitutes.

Branch 2 – Periodontology

Periodontics is the science dealing with the health and diseases of the investing and supporting structures of the teeth and oral mucous membrane.

Branch 3 – Oral and Maxillofacial Surgery

This branch deals with the diagnosis and surgical and adjunctive treatment of diseases, injuries and defects of the human facial skeleton and associated oral and facial structures.

Branch 4 – Conservative Dentistry and Endodontics

Conservative Dentistry and Endodontics deals with the etiology, diagnosis, prevention and treatment of the diseases and injuries of the hard dental tissues, pulp of the tooth and associated periapical conditions.

Branch 5 – Orthodontics and Dentofacial Orthopedics

Orthodontics deals with the prevention, interception and correction of dentofacial anomalies and malocclusion and the harmonizing of the structures involved, so that the dental mechanisms will function in a normal way.



Branch 6 – Oral Pathology and Microbiology

This branch deals with the nature of oral diseases, their causes, processes and effects. It relates the clinical manifestation of oral diseases to the physiologic and anatomic changes associated with these diseases.

Branch 7 – Pedodontics and Preventive Dentistry

Pedodontics, also known as Pediatric Dentistry, is an age-defined specialty that provides both primary and comprehensive preventive and therapeutic oral health care for infants and children through adolescence, including those with special healthcare needs.

Branch 8 – Oral Medicine and Radiology

Oral medicine is that specialty concerned with the basic diagnostic procedures and techniques useful in recognizing the diseases of the oral tissues of local and constitutional origin and their medical management. Radiology is a science dealing with x-rays and their uses in diagnosis and treatment of diseases in relation to orofacial diseases.

Branch 9 – Public Health Dentistry

Community dentistry is the science and art of preventing and controlling dental diseases and promoting dental health through organized community efforts.

SYLLABUS (COMMON FOR ALL BRANCHES) - THEORY M.D.S. PART I (FIRST YEAR)- PAPER I, II, III AND IV.

Common Syllabus (Common for all branches / specialities) –

BASIC SCIENCES – All the four papers of the MDS Part I will pertain to Applied Basic Sciences which is common for all specialties. **The syllabus for the theory of Applied Basic Sciences should cover the entire field of the subject and the following topics may be used as guidelines but not limited to them.**

PAPER I – APPLIED GENERAL ANATOMY OF THE HEAD AND NECK, ORAL AND DENTAL ANATOMY AND HISTOLOGY.

1.1. General knowledge of Genetics applied to dentistry.

1.1.1. Introduction

1.1.2. Modes of Inheritance

1.1.3. Chromosomal and genetic anomalies

1.2. Embryology

1.2.1. Early embryology, development up to the appearance of the three primary germ layers.

1.2.2. Histogenesis and organogenesis.



1.2.3. Post natal growth and development of bony and soft tissue structure of the head and neck.

1.2.4. Principles of physical growth, differentiation between growth and development.

1.2.5. Development of Branchial arches, Pharyngeal pouches & cleft, face, tooth, tongue, hard and soft palate, alveolar bone, salivary glands, thyroid gland, TMJ, maxilla and mandible, muscles of mastication and deglutition.

1.2.6. Developmental Abnormalities

1.2.7. Congenital anomalies of face

1.3. Applied General Anatomy

1.3.1. Osteology of Head and Neck with special reference to facial bones.

1.3.2. Face – Facial Muscles, Nerve supply, Blood supply, Lymphatic drainage.

1.3.3. Myology – Muscles of the neck, Muscles of Facial Expression, Mastication, Deglutition and Speech.

1.3.4. Cranial Nerves (5,7,9,11,12)

1.3.5. Parasympathetic Ganglia – Submandibular, pterygopalatine, otic.

1.3.6. Vascular and lymphatic system of the head and neck.

1.3.7. Salivary glands.

1.3.8. Paranasal Air Sinuses.

1.3.9. Palate.

1.3.10. Temporal and Infratemporal Fossa

1.3.11. Submandibular region.

1.3.12. Anatomy of Tongue – muscles, blood and nerve supply.

1.3.13. TM Joint – Movements, relations, anomalies and age changes.

1.3.14. Pharynx, Larynx, Trachea, Thyroid gland.

1.3.15. Nasal Cavity – Lateral wall of the nose, Nasal Septum.

1.3.16. Cranial cavity - Dural venous sinuses – classification, cavernous sinus in detail.

1.4. Oral and Dental Anatomy

1.4.1. Morphology of individual teeth in primary and permanent dentition with variations.

1.4.2. Anatomy of pulp canal and their variations.

1.4.3. Occlusion, dental arch formation, development of occlusion from gum pads, deciduous, mixed and permanent dentition.

1.4.4. Functional occlusion.

1.4.5. Sequence of eruption.

1.4.6. Age changes in the dentition.

1.4.7. Oral and dental developmental anomalies.

1.4.8. Tooth Numbering Systems



1.5. General Histology

1.5.1. Different types of epithelium, glands.

1.5.2. Bone

1.5.3. Cellular elements of blood.

1.5.4. Lymphatic system, Muscle, Neural tissue, Endocrine glands (Thymus, Thyroid, Pituitary, Parathyroid)

1.5.5. Tongue and Taste glands

1.6. Oral Histology

1.6.1. Histology of developing tooth germ, enamel, dentin, cementum, periodontal ligament, pulp, alveolar bone, oral mucous membrane, salivary glands, gingival, gingival sulcus and epithelial attachment.

1.6.2. ENAMEL: Physical characteristics, chemical properties structure. Development - Life cycle of ameloblasts Amelogenesis and Mineralisation. Clinical considerations. Age changes. .

1.6.3. DENTIN: Physical characteristics, chemical properties, structure. Types of dentin. Dentin innervation and hypersensitivity. Development - Dentinogenesis and mineralisation. Clinical considerations. Age Changes.

1.6.4. PULP: Anatomy, structural features, functions, pulp organs. Development. Clinical consideration. Age changes.

1.6.5. CEMENTUM: Physical characteristics, chemical properties, structure. Cementogenesis. Clinical consideration. Age changes.

1.6.6. PERIODONTAL LIGAMENT: Cells and fibers. Functions. Development. Clinical Considerations. Age Changes.

1.6.7. ALVEOLAR BONE: Physical characteristics, chemical properties and structure. Development. Internal reconstruction. Clinical consideration.

1.6.8. Oral Mucous membrane: Definitions, General consideration. Functions and classifications. Structure and microscopic appearance of gingiva, palate, lips, alveolar mucosa, tongue, floor of mouth, Gingival sulcus and dento gingival junction. Clinical considerations and age changes.

1.6.9. Eruption and Shedding of Teeth, Theories of Eruption.

1.7. **Anthropology** – General introduction to Anthropology with special reference to evolution of jaws and teeth.



PAPER II – APPLIED GENERAL AND ORAL PHYSIOLOGY INCLUDING NUTRITION AND PHARMACOLOGY

1.1. General principles of Human Physiology.

1.2. Blood and Lymph

- 1.2.1. Composition & functions of blood,
- 1.2.2. Plasma, plasma functions, Plasma proteins - Types, concentration, functions & variations, Erythrocyte: Morphology, functions and variations.
- 1.2.3. Erythropoiesis and factors affecting erythropoiesis
- 1.2.4. ESR- factors affecting, variations and significance.
- 1.2.5. Haemoglobin - Normal concentration, method of determination and variation in concentration, functions
- 1.2.6. Anaemia - Definition, classification, life span of RBC's destruction of RBC's, formation & fate of bile pigments, Jaundice - types.
- 1.2.7. Hemolysis and Fragility of RBC
- 1.2.8. Leucocytes: Classification, number, percentage, distribution morphology, properties, functions & variation. Role of lymphocytes in immunity, life span & fate of leucocytes.
- 1.2.9. Thrombocytes - Morphology, number, variations, function.
- 1.2.10. Haemostasis – Role of vasoconstriction, platelet plug formation in haemostasis, coagulation factors, intrinsic & extrinsic pathways of coagulation, clot retraction.
- 1.2.11. Fibrinolytic system.
- 1.2.12. Tests of haemostatic function, platelet count, clotting time, bleeding time, prothrombin time - normal values, method & variations. Anticoagulants - mechanism of action.
- 1.2.13. Hemorrhage
- 1.2.14. Bleeding disorders.
- 1.2.15. Blood groups: ABO & Rh system, method of determination, importance, indications & dangers of blood transfusion, blood substitutes.
- 1.2.16. Blood volume: Normal values, variations.
- 1.2.17. Functions of reticulo-endothelial system.
- 1.2.18. Specific gravity, Packed cell volume, Methods of estimation
- 1.2.19. Blood Indices - MCV, MCH, MCHC - definition, normal values, variation.
- 1.2.20. Leucopoiesis
- 1.2.21. Thrombopoiesis
- 1.2.22. Hydrogen ion concentration of blood.
- 1.2.23. Homeostasis, Fluid and Electrolyte Balance, Acid Base Balance.
- 1.2.24. Osmotic and Oncotic pressure.
- 1.2.25. Lymph – Composition and Functions – Comparison with Blood..



1.3. CVS

- 1.3.1. Heart, Heart Sounds, Pulse,
- 1.3.2. Blood Pressure – Definition, normal values, variations, determinants. Control and Maintenance.
- 1.3.3. Dynamics of Circulation.
- 1.3.4. Cardiac Cycle and Cardiac Output.
- 1.3.5. ECG - Basic principles only. Normal electrocardiogram.
- 1.3.6. Heart rate: Normal value, regulation, variation.
- 1.3.7. Hemorrhage and Shock.
- 1.3.8. Vascular Disorders.

1.4. Excretory System

- 1.4.1. Kidney – General Outline and Functions.
- 1.4.2. Formation of urine. Abnormal Constituents of Urine.
- 1.4.3. Role of kidney in the regulation of pH of the blood

1.5. Digestive System

- 1.5.1. Introduction to digestion: General structure of G.I. tract, Innervation.
- 1.5.2. In general with special reference to physiology of mastication and deglutition – Gagging and vomiting.
- 1.5.3. Salivary glands: Saliva: composition, regulation of secretion & functions of saliva. Influence of saliva on teeth and surrounding structures, effect of drugs and chemicals on salivary secretion, abnormalities.
- 1.5.4. Stomach: Composition and functions of gastric juice, mechanism and regulation of gastric secretion, phases of gastric secretion.
- 1.5.5. HCl secretion. Physiological basis of Peptic ulcer management
- 1.5.6. Motor functions of GIT: Mastication, deglutition, gastric filling & emptying, movements of small and large intestine, defecation.

1.6. Respiratory System

- 1.6.1. Mechanics of respiration.
- 1.6.2. Principles governing control of respiration and respiratory exchange.
- 1.6.3. Control of Respiration.
- 1.6.4. High altitude, space and deep sea physiology.
- 1.6.5. Disturbances of respiration – Apnea, hyperventilation, hypoventilation, Hypoxia, Hypercapnea, hypocapnea, asphyxia, Dyspnea, cyanosis and Anoxia.
- 1.6.6. Artificial respiration - Methods

1.7. Endocrine System

- 1.7.1. General Outline of Endocrine Glands and their functions
 - 1.7.1.1. Pituitary, Thyroid and Parathyroid.



1.7.1.2. Adrenal gland and its dual function.

1.7.1.3. Neurohormones.

1.7.2. Endocrine regulation of Blood Sugar.

1.7.3. Regulation of Blood Calcium level.

1.7.4. Physiology of Bone, Applied aspects of hormones on bone biology.

1.8. Central Nervous System

1.8.1. Classification of nerves,

1.8.2. Receptors – Classification, Types, properties

1.8.3. Structure of muscle - Molecular mechanism of muscle contraction,

1.8.4. Neuromuscular junction and NM transmission

1.8.5. Physiology of pain, Pain Pathway, Referred pain, Physiology of pulpal pain, odontogenic and non-odontogenic pain. Pain disorders.

1.9. Autonomous Nervous System

1.10. Special Senses

1.10.1. Cutaneous sensations.

1.10.2. Taste – Taste buds, Pathway for taste sensation, Mechanism of stimulation of taste receptors.

1.11. Nutrition and Metabolism

1.11.1. General Principles of Nutrition.

1.11.2. Balanced Diet.

1.11.3. Diet in relation to oral health with special reference to Fluoride.

1.11.4. Digestion and Metabolism of Carbohydrate, Fat and Protein.

1.11.5. Vitamin and Minerals – Dietary Requirements.

1.11.6. BMR – Body temperature regulation and heat balance.

1.11.7. Effect of Diet on Growth and Development.

1.11.8. Dietary formulation for specific dental conditions like dental caries, periodontal disease, Geriatrics, post operative cases.

1.12. Pharmacology

1.12.1. Mechanism of drug action.

1.12.2. Mechanism of Detoxication in the Body.

1.12.3. Intolerance, Tolerance, Cumulative action, Synergism, Antagonism.

1.12.4. Dosage, Classification of Drugs.

1.12.5. Central Depressants.

1.12.6. General Anesthetics.

1.12.7. Basal narcotics, Hypnotics.

1.12.8. Stimulant Drugs.

1.12.9. Local Anesthetics.



- 1.12.10. Drugs acting on the Autonomous Nervous System
- 1.12.11. Sympathomimetic and Sympatholytic drugs.
- 1.12.12. Respiratory stimulants and depressants.
- 1.12.13. Vasodilators and vasoconstrictors.
- 1.12.14. Histaminic and anti-histaminic drugs.
- 1.12.15. Coagulants and anticoagulants.
- 1.12.16. Sialogogues, antisialogogues, Emetics, Antiemetics.
- 1.12.17. Vitamins and anti-vitamins
- 1.12.18. Parathyroid and Calcium metabolism.
- 1.12.19. Analgesics, antipyretic drugs and hypothermia.
- 1.12.20. Chemotherapy, antiseptics and Disinfectants.
- 1.12.21. Sulphonamides, Antibiotics.
- 1.12.22. Drugs acting on the CNS.
- 1.12.23. Counter irritants.
- 1.12.24. Mouth washes, Astringents, Antacids, Caustics, Bleaching agents.
- 1.12.25. Obtundents, mummifying agents.
- 1.12.26. Pharmacological action of Mercury, Arsenic, Bismuth, Barium.
- 1.12.27. Anti-diabetic Drugs
- 1.12.28. Steroids

PAPER III - APPLIED GENERAL AND ORAL PATHOLOGY AND MICROBIOLOGY.

1.1. General

- 1.1.1. Introduction - Pathology of the cell
- 1.1.2. Cellular adaptation, Cellular degeneration, Apoptosis, Oncosis, Necrosis, Gangrene, Pathologic calcification
- 1.1.3. Intracellular accumulations - Fatty changes, deposition of proteins, glycogen
- 1.1.4. Pigmentation
- 1.1.5. Detailed study of Inflammation - Definition, Vascular phenomena, Inflammatory Exudates, Localization of infection, Tissue changes in inflammation and variations of Inflammation.
- 1.1.6. Healing, Regeneration, Repair Mechanisms, Healing by primary intention, Healing by secondary intention, Fracture healing, Factors influencing healing process, Complications. Healing of a wound - organization, parenchymal repair, healing of a socket after extraction.



- 1.1.7. Infection – its localization, spread, facial infection and recovery from infections. Bacterial, fungal and viral infections. Tuberculosis, Syphilis, Mycosis, Tetanus, Candidiasis, Herpes, Measles and Mumps. Hepatitis and AIDS.
- 1.1.8. Diffuse Collagen Diseases.
- 1.1.9. Autoimmune diseases.
- 1.1.10. Immunological mechanisms in disease. Humoral & cellular immunity. Hypersensitivity and Allergy, autoimmunity.
- 1.1.11. Disorders of circulation,
 - 1.1.1.1. Thrombosis - Definition, Pathophysiology, Formation, complications & Fate of a thrombus.
 - 1.1.1.2. Embolism, Definition, Types, Effects
 - 1.1.1.3. Ischemia and Infarction, Definition, etiology, types, Infarction of various organs
 - 1.1.1.4. Normal water and electrolyte balance, Derangements of body fluids, Oedema - Pathogenesis, Different types.
 - 1.1.1.5. Vascular disorders with special reference to bleeding disorders.
 - 1.1.1.6. Disturbance of Fluid balance, Disturbances of Blood Volume.
 - 1.1.1.7. Hemorrhage and Shock.
- 1.1.12. Metabolic Disorders – Kwashiorkor, Marasmus, Hypervitaminosis, Hypovitaminosis,
- 1.1.13. Rickets, Osteomalacia.
- 1.1.14. Pigments – Melanosis.
- 1.1.15. Endocrine disturbances.
- 1.1.16. Physical and Chemical injuries. Chemical and metallic poisoning.
- 1.1.17. Atrophy, Hypertrophy, Hyperplasia, Metaplasia, Dysplasia, Premalignant lesions
- 1.1.18. General Aspects of neoplasia, Definition, terminology, classification, Differences between benign and malignant neoplasms, The neoplastic cell, Metastasis, Etiology and pathogenesis of neoplasia, Carcinogenesis, Tumour biology, Oncogene and antioncogenes, Diagnosis, Precancerous lesions, Common specific tumours, Sq papilloma and Ca, Basal cell Ca, Adenoma & Adenocarcinoma, Fibroma & Fibrosarcoma, Lipoma and liposarcoma, Grading and staging. Clinical aspects of Neoplasia.
- 1.1.19. Diseases of Cardiovascular system Cardiac failure, Congenital heart disease ASD, VSD, PDA, Fallot's Tetralogy, Infective Endocarditis, Atherosclerosis, Ischaemic heart Disease.
- 1.1.20. Introduction to haematology, haemopoiesis, bone marrow aspiration & biopsy, Anaemias, classification, Iron Deficiency anaemia, Megaloblastic anaemia, hemolytic anaemias and their lab investigations, Polycythemia.



1.1.21. Haemorrhagic Disorders, Coagulation cascade Coagulation disorders Platelet function, Platelet disorders.

1.1.22. Diseases of WBC's pathologic variations in white blood cell counts and leukemoid reactions, Leukaemias, Acute and chronic leukaemias, Diagnosis and clinical features.

1.1.23. Diseases of Lymph nodes, Hodgkin's disease, Non Hodgkins lymphoma, Metastatic carcinoma

1.1.24. Genetic factors in Disease.

1.2. Oral and Dental Pathology

1.2.1. Developmental anomalies of teeth and jaws.

1.2.2. Regressive changes in the dentine and pulp.

1.2.3. Dental caries – Etiology, histopathology, clinical characteristics and sequelae.

1.2.4. Minerals and dental caries – Fluorides in particular.

1.2.5. Pulpitis – Etiology, Pathology and sequelae of Acute and Chronic Pulpitis.

1.2.6. Acute apical periodontitis and dentoalveolar abscess.

1.2.7. Topography of root ends and surrounding structures, relationship between maxillary teeth and maxillary sinus.

1.2.8. Osteomyelitis.

1.2.9. Discolourations and stains.

1.2.10. Cysts of the oral cavity.

1.2.11. Tumours of oral cavity, classification, morphology, etiology, benign and malignant characteristics with special reference to odontogenic tumours.

1.2.12. Common oral and dental disease with special reference to Dental Office.

1.3. Microbiology

1.3.1. Classification.

1.3.2. Elementary knowledge of Bacteria, Viruses and Fungi.

1.3.3. Microbial flora of oral cavity-morphology, cytology and staining reactions-bacterial metabolism-the effect of environment, culture media.

1.3.4. Bacteriology of dental caries and periodontal disease

1.3.5. Virology of HIV, Herpes, Hepatitis.

1.3.6. Caries activity tests.

1.3.7. Infection Control

1.3.7.1. Sterilization with special reference to dental office. Sterilization and Asepsis.

1.3.7.2. Hand washing and hand hygiene.

1.3.7.3. Personal protective equipments.

1.3.7.4. Handling of sharp instruments.

1.3.7.5. Needle-stick injury, exposure to body fluids.

1.3.7.6. Post-exposure prophylaxis.



- 1.3.8. Management and disposal of waste.
- 1.3.9. Communicable diseases and notification.
- 1.3.10. Infection and resistance-defense mechanisms
- 1.3.11. Immunisations schedule, Collection of materials,
- 1.3.12. Experimental animals & hospital infections.
- 1.4. **Basic Immunology** – Cellular and humoral Immunity, Antigen and Antibody System, Hypersensitivity, Autoimmune diseases.

PAPER IV - RESEARCH METHODOLOGY, BIostatISTICS, DENTAL RADIOLOGY, EMERGENCY MEDICAL MANAGEMENT & ETHICS IN DENTISTRY

1. Research Methodology

- 1.1. What is research?
- 1.2. What is research methodology?
- 1.3. Types of research
 - 1.3.1. Basic or fundamental
 - 1.3.2. Applied
 - 1.3.3. Clinical
 - 1.3.4. Experimental
- 1.4. Selection of subject for research
 - 1.4.1. Intuition
 - 1.4.2. Intuition based on experience
 - 1.4.3. Knowledge of subject and questions that one asked of oneself
 - 1.4.4. Areas of unknown aspects that have not been explored. Questions that is unanswered.
 - 1.4.5. Survey of relevant literature, using library.
- 1.5. Setting of research problem
 - 1.5.1. List the aims and objectives
 - 1.5.2. What is there in the relevant literature that has been done, is being done and remains undone?
 - 1.5.3. How can the aims and objectives be achieved?
 - 1.5.3.1. Retrospective research
 - 1.5.3.2. Prospective research
 - 1.5.3.3. Advantages and disadvantages of each. What will therefore be the best in the circumstances?
 - 1.5.3.4. Evolve a hypothesis
 - 1.5.3.5. Develop a protocol to give answers so as to give the necessary data in the light of the hypothesis



1.5.3.6. Develop a model especially designed to test the hypothesis and may confirm the data.

1.5.3.7. Advantages & disadvantages of experimental model

1.5.3.8. How does the data from the experimental model fit the hypothesis? Are the conclusions comparable? Are there any other conclusions possible?

1.6. Objectivity in Research methodology

1.6.1. Open trials, Bias and safeguards against it.

1.6.2. Double blind and triple blind studies.

1.6.3. Cross over methods

1.7. Quantification in Research Methodology

1.8. Protocol writing, including preparation of dissertation

1.9. Study Designs

1.9.1. Epidemiological studies, Observations, Descriptive, Cohort case control studies.

1.9.2. Experimental, Clinical trials (Randomized control), Community trends (Non randomized)

1.9.3. Probability.

1.10. Ethical Considerations of Research.

2. Biostatistics

2.1. Introduction to Biostatistics – Application of statistics on Dental Health.

2.2. Descriptive statistics – Definition, Presentation of Statistics, Measures of Central tendency – measures of Dispersion, Normal distribution, Binomial Distribution.

2.3. Health survey, Dental Health surveys – Methods of planning of Health surveys.

2.4. Collection, compilation, and graphical representation of statistical data, techniques of sampling, bias in sampling.

2.5. Inferential statistics – Testing of Hypothesis, standard error, t-test, Z-test, chi square test, Analysis of Variance, “U” test.

2.6. Correlation and Regression.

3. Dental Radiology

3.1. Radiographic Principles And Techniques

3.1.1. Intra oral radiography

3.1.2. Periapical

3.1.3. Bitewing

3.1.4. Occlusal

3.1.5. Ideal radiograph

3.1.6. Defective radiograph

3.1.7. Extra oral radiography – Routine, modified and special views of TMJ, Maxillary sinus.

3.2. Radiographic Interpretation



- 3.2.1. Fundamental principles of radiographic interpretation.
- 3.2.2. Normal radiographic anatomy of teeth, jaws and normal variations.
- 3.2.3. Developmental variation and abnormalities of teeth and jaws.
- 3.2.4. Radiographic and Radiolucent lesions of jaw bones.
- 3.2.5. Radiographic diagnosis and Interpretation of pathologic lesions.
- 3.3. Digital imaging - Principles of imaging, properties, advantages and disadvantages, Analog and digital images, Intra oral detectors : CCD, CMOS, TFT, PSP, Bulk charge modulated devices, Fundamental classes of Digital image processing -Image Enhancement, Image restoration, Image analysis, Image compression, Image synthesis, Application for Digital imaging in Dentistry, TACT, Subtraction Radiology, Digital radiographic image archival and retrieval and management

4. Medical Emergencies & Management

- 4.1. Prevention – Introduction, Prevention, Preparation, Medico legal considerations
- 4.2. Unconsciousness - general considerations, Vasodepressor syncope, Postural hypotension, Acute adrenal insufficiency, Unconsciousness – differential diagnosis
- 4.3. Respiratory distress- general considerations, Airway obstruction, Hyperventilation, Asthma, Heart failure and acute pulmonary edema, Respiratory distress – differential diagnosis
- 4.4. Altered Consciousness: general considerations, Diabetes mellitus – hyperglycemia and hypoglycemia, Thyroid gland dysfunction, Cerebrovascular accidents, Altered consciousness – differential diagnosis
- 4.5. Seizures
- 4.6. Drug related emergencies – general, Drug overdose reaction, Allergy, Drug related emergencies.
- 4.7. Chest pain – general considerations, Angina pectoris, Acute myocardial infarction, Chest pain – differential diagnosis
- 4.8. Cardiac arrest - Cardiac arrest and cardiopulmonary resuscitation.
- 4.9. Basic Life Support
- 4.10. Medico legal considerations:- Malpractice, Negligence, Informed consent, Issue of medical/ wound/treatment/ discharge/disability certificates, Role of doctor as a witness in the court of law.

5. Ethics in Dentistry

- 5.1. Introduction to ethics:
 - 5.1.1. What is ethics?
 - 5.1.2. What are values and norms?
 - 5.1.3. How to form a value system in one's personal and professional life?
 - 5.1.4. Hippocratic oath.



5.1.5. Declaration of Helsinki, WHO declaration of Geneva, International code of ethics, D.C.I.

Code of ethics

5.2. Ethics of the Individual

5.2.1. The patient as a person

5.2.2. Right to be respected

5.2.3. Truth and confidentiality

5.2.4. Autonomy of decision

5.2.5. Doctor patient relationship

5.3. Profession Ethics

5.3.1. Code of conduct

5.3.2. Contract and confidentiality

5.3.3. Charging of fees, fee splitting

5.3.4. Prescription of drugs

5.3.5. Over-investigating the patient

5.3.6. Malpractice and negligence.

5.4. Research Ethics

5.4.1. Animal and experimental research/humanness

5.4.2. Human experimentation

5.4.3. Human volunteer research – informed consent

5.4.4. Drug trials

5.4.5. Ethical workshop of cases

5.5. Gathering all scientific factors

5.6. Gathering all value factors

5.7. Identifying areas of value-conflict, setting or priorities

5.8. Working our criteria towards decisions.

6. Infection Control

6.1. HIV and AIDS

6.2. Viral hepatitis

6.3. Aseptic techniques

6.4. Sterilization with special reference to dental office.

6.5. Dental control unit water systems and handpiece asepsis

6.6. Infection control of impressions

6.7. Cross infection



DISTRIBUTION OF TOPICS IN THEORY PAPERS OF MDS PART I EXAMINATION

Paper I – Applied General Anatomy of the Head and Neck, Oral and Dental Anatomy and Histology.

1. Long Essay on Applied General Anatomy of the Head and Neck (20 marks)
2. Long Essay on Applied Oral / Dental Anatomy (20 marks)
3. Short Essay on General Histology/ Anthropology (10 marks)
4. Short Essay on Oral Histology (10 marks)
5. Short essay on Embryology, Growth and Development (10 marks)
6. Short essay on Applied General Anatomy of the Head and Neck (10 marks)
7. Short essay on Oral / Dental Anatomy (10 marks)
8. Short essay on Applied Genetics (10 marks)

Paper II – Applied General and Oral Physiology including Biochemistry, Nutrition and Pharmacology

1. Long Essay on Applied General Physiology (20 marks)
2. Long Essay on Applied General Pharmacology (20 marks)
3. Short Essay on General Pharmacology (10 marks)
4. Short Essay on Oral Physiology(10 marks)
5. Short essay on General Pharmacology(10 marks)
6. Short essay on Nutrition/Metabolism (10 marks)
7. Short essay on General Pharmacology (10 marks)
8. Short essay on General Physiology (10 marks)

Paper III – Applied General and Oral Pathology and Microbiology.

1. Long Essay on Applied General Pathology (20 marks)
2. Long Essay on Applied Oral Pathology (20 marks)
3. Short Essay on General Microbiology(10 marks)
4. Short Essay on Oral Microbiology(10 marks)
5. Short Essay on Basic Immunology(10 marks)
6. Short Essay on General Microbiology (10 marks)
7. Short Essay on General Pathology (10 marks)
8. Short Essay on Oral pathology (10 marks)

Paper IV –Research Methodology, Biostatistics, Dental Radiology, Emergency Medical Management, Ethics in Dentistry

1. Long Essay on Dental Radiology (20 marks)



2. Long Essay on Research Methodology / Biostatistics (20 marks)*
3. Short Essay on Emergency medical Management(10 marks)
4. Short Essay on Ethics in dentistry(10 marks)
5. Short Essay on Biostatistics / Research Methodology / (10 marks)*
6. Short Essay on Dental Radiology (10 marks)
7. Short Essay on Emergency medical Management (10 marks)
8. Short Essay on Ethics in Dentistry (10 marks)

*If the long essay was on Research Methodology, the Short essay should be Biostatistics and vice versa.



PRESCRIBED BOOKS FOR MDS Part I – BASIC SCIENCES

SUBJECT	NAME OF AUTHOR	NAME OF BOOK
Anatomy	BD Chaurasia William, Peter L Lasts Anatomy	BD Chaurasia's Human Anatomy Grays Anatomy Mc Minn RMH Ed
Oral Anatomy	Ash, Major M Sicher, Harry, Du Brull , Llyod Bhaskar B.N. Ed	Wheeler's Dental Anatomy, Physiology and Occlusion Oral Anatomy
Oral Histology	Avery, James K tenCate Shroff F.R.	Orbans Oral Histology and Embryology Essentials of Oral Histology and Embryology Oral Histology and Development
Embryology	Sadler Inderbeer Singh Guyton Arthur and John L Hall	Basic Dental Anatomy and Histology Langmans Medical Embryology Human Embryology
Physiology	Ganong, William F Sujit K Choudhury KD Tripathi	Text Book of Medical Physiology Review of Medical Pysiology Concise Medical Physiology
Pharmacology	Hardman, Joel G Katzung, Bertham G	Essentials of Medical Pharmacology Goodman and Gillmans pharmacological basis of Therapeutics Basic and Chemical Pharmacology
Nutrition	Nizel	Nutrition in Preventive Dentistry: Science and Practice
General Pathology	Cotran, Ramzi S and Others Harsh Mohan Shaffer, William and Others	Robbins Pathologic Basis of Disease Textbook of Pathology
Oral Pathology	Neville, Brad W and Others Cawson	Textbook of Oral Pathology Oral and Maxillofacial Pathology Oral Pathology
Microbiology	Ananthanarayan and Panicker Lakshman S Dr. Symalan	Textbook of Microbiology Essential Microbiology for Dentistry
Biostatistics	Soben Peter Joseph John Sunder Rao and Richard J.	Statistics in Medicine Essentials of Preventive and Community Dentistry Textbook of Preventive and Community Dentistry Introduction to Biostatistics and Research Methods



COURSE DESCRIPTION AND SYLLABUS OF MDS PART II

VARIOUS SPECIALTIES

MDS -BRANCH 1

PROSTHODONTICS AND CROWN & BRIDGE

Prosthodontics is the dental specialty pertaining to the diagnosis, treatment planning, rehabilitation and maintenance of the oral function, comfort, appearance and health of patients with clinical conditions associated with missing or deficient teeth and/or maxillofacial tissues using biocompatible substitutes.

Removable Prosthodontics is devoted to replacement of missing teeth and contiguous tissues with prosthesis designed to be removed by the wearer. The further divisions of removable Prosthodontics include Removable Complete Prosthodontics and Removable Partial Prosthodontics. Fixed Prosthodontics is the art and science of restoring damaged teeth with cast metal or porcelain restorations and of replacing missing teeth with fixed or cemented prosthesis. Implant Prosthodontics deals with the replacement of missing structures by artificial means through surgical and prosthetic approach. Maxillofacial prosthetics is concerned with the restoration of stomatognathic and associated facial structures that have been affected by disease, injury, surgery or congenital defects.

Aim:

To train dental graduates so as to achieve higher competence in both general and special aspects of Prosthodontics and to develop teaching, research and clinical skills with special emphasis in prevention and follow up procedures including Crown and Bridge and Implantology.

Objectives:

1. Knowledge
 - 1.1. The candidate should attain a sound knowledge in applied basic medical sciences.
 - 1.2. A thorough knowledge in various divisions of Prosthodontics must be achieved by a variety of teaching learning programmes such as seminars, workshops, continuing education programme, computer assisted learning etc.
 - 1.3. The candidate should have essential knowledge in ethics, laws and jurisprudence and forensic odontology in Prosthodontics
 - 1.4. The candidate must be able to identify cases beyond the limits of his/her speciality and refer them to appropriate specialists



- 1.5. The candidate should have essential knowledge of personal hygiene, infection control, prevention of cross infection and safe disposal of biomedical waste.
2. Skills
 - 2.1. The candidate should be able to examine the patients requiring Prosthodontic therapy, investigate the patient systemically, analyze the investigation results, radiographic findings, diagnose the ailment, plan a treatment, communicate it with the patient and execute it.
 - 2.2. Understand the prevalence and prevention of diseases of cranio-mandibular system related to Prosthodontics.
 - 2.3. The candidate should be able to restore the lost functions of the stomatognathic system namely speech, mastication etc to provide a quality health care for craniofacial region.
 - 2.4. The candidate should be able to interact with other specialists including a medical specialists for the management of cases requiring multi disciplinary approach including medical specialist for the management of patients
 - 2.5. Should be able to exhibit the clinical competence necessary to carry out the most appropriate treatment available in the speciality.
 - 2.6. The candidate must develop the ultimate dexterity and artistic skill for carrying out various Prosthodontic procedures with precision.
 3. Attitudes
 - 3.1. Adopt ethical principles in all Prosthodontic practice. Professional honesty and integrity are to be fostered. Treatment to be delivered irrespective of social status, caste, creed or religion of patient.
 - 3.2. Willing to share the knowledge and clinical experience with professional colleagues.
 - 3.3. Willing to adopt new methods and techniques in prosthodontics from time to time based on scientific research, which is in patient's best interest.
 - 3.4. Respect patients' rights and privileges including patients' right to information and right to seek second opinion.
 4. Communication Abilities
 - 4.1. Develop communication skills, in particular, to explain treatment options available in the management of a particular case
 - 4.2. Provide leadership and get the best out of his group in a congenial working atmosphere.
 - 4.3. Should be able to communicate with the patient in simple language and to explain the principles of Prosthodontics to the patient. He should be able to guide and counsel the patient with regard to various treatment modalities available.
 - 4.4. Develop the ability to communicate with professional colleagues through various media like Internet, e-mail, videoconference etc. to render the best possible treatment.



COURSE CONTENTS
SYLLABUS FOR PROSTHODONTICS AND CROWN & BRIDGE - MDS PART II
MDS PART II

THE MDS PART II WRITTEN EXAMINATION CONSIST OF FOUR PAPERS

The syllabus for the theory of Prosthodontics should cover the entire field of the subject and the following topics may be used as guidelines only and not limited to them.

The topics assigned to the different papers are generally evaluated under those sections. However a strict division of the subject may not be possible and some overlapping of subjects is inevitable. Students should be prepared to answer overlapping subjects.

1. PAPER I (APPLIED DENTAL MATERIAL SCIENCES AND REMOVABLE COMPLETE PROSTHODONTICS)

1.1. APPLIED DENTAL MATERIAL SCIENCES

- 1.1.1. Introduction
- 1.1.2. Structure of matter.
- 1.1.3. Physical properties of dental materials
- 1.1.4. Mechanical properties of dental materials
- 1.1.5. Biocompatibility of dental materials.
- 1.1.6. Hydrocolloid Impression materials
- 1.1.7. Non aqueous elastomeric impression materials.
- 1.1.8. Inelastic impression material
- 1.1.9. Gypsum products
- 1.1.10. Synthetic resins
- 1.1.11. Denture base resins
- 1.1.12. Restorative resin
- 1.1.13. Bonding
- 1.1.14. Solidification and micro structure of metals
- 1.1.15. Constitution of alloys
- 1.1.16. Corrosion
- 1.1.17. Dental casting alloys & metals
- 1.1.18. Inlay casting wax
- 1.1.19. Investments
- 1.1.20. Casting procedure
- 1.1.21. Dental cements
- 1.1.22. Ceramics
- 1.1.23. Soldering
- 1.1.24. Wrought base metal & gold alloys
- 1.1.25. Dental implant materials



- 1.1.26. Maxillofacial prosthetic materials
- 1.1.27. Lasers in dentistry
- 1.1.28. Finishing & polishing materials
- 1.1.29. Mechanics of cutting with dental burs
- 1.1.30. Recent developments in dental materials
- 1.1.31. Materials used for the treatment of craniofacial disorders – Clinical, treatment and Laboratory materials, Associated materials, Technical consideration, shelf life, storage, manipulation, sterilization and waste management.

1.2. REMOVABLE COMPLETE PROSTHODONTICS

- 1.2.1. Introduction
- 1.2.2. Applied anatomy and physiology of oral and maxillofacial region including age changes
- 1.2.3. Diagnosis and Treatment planning
- 1.2.4. Residual ridge resorption
- 1.2.5. Mouth preparation
- 1.2.6. Impression procedures including the various theories of impression making.
- 1.2.7. Maxillo-mandibular relations.
- 1.2.8. Mandibular movements.
- 1.2.9. Articulators and Face Bows.
- 1.2.10. Selection and arrangement of teeth.
- 1.2.11. Occlusion
- 1.2.12. Verification of the jaw relations
- 1.2.13. Processing and finishing of Complete Dentures
- 1.2.14. Laboratory remount
- 1.2.15. Denture insertion
- 1.2.16. Clinical remount and recall check up
- 1.2.17. Trouble shooting
- 1.2.18. Repair, relining and rebasing.
- 1.2.19. Duplication of denture
- 1.2.20. Immediate denture
- 1.2.21. Single complete denture
- 1.2.22. Overdenture
- 1.2.23. Principles of Aesthetics including characterization of denture.
- 1.2.24. Implantology related to implant supported Overdentures.
- 1.2.25. Infection control and biomedical waste management in Prosthodontics.

2. PAPER II - REMOVABLE PARTIAL PROSTHODONTICS AND MAXILLOFACIAL PROSTHETICS




2.1. Removable Partial Denture

- 2.1.1.Introduction
- 2.1.2.Classification of partially edentulous situation
- 2.1.3.Examination, diagnosis, treatment planning
- 2.1.4.Components of removable partial denture
- 2.1.5.Principles of RPD, forces acting on RPD, control of stresses
- 2.1.6.Surveyor
- 2.1.7.Surveying Principles, procedure and designing
- 2.1.8.Mouth preparation
- 2.1.9.Impressions for distal extension RPD
- 2.1.10. Jaw Relations.
- 2.1.11. Laboratory procedure
- 2.1.12. Insertion and post insertion follow up
- 2.1.13. Failures in RPD.
- 2.1.14. Repair lining.
- 2.1.15. Immediate RPD.
- 2.1.16. Transitional Denture.
- 2.1.17. Interim denture.
- 2.1.18. Dental Material aspects related to RPD.

2.2. Maxillofacial Rehabilitation

- 2.2.1.Scope, terminology, definitions, cross infection control and hospital waste management, work authorization.
- 2.2.2.Behavioral and psychological issues in Head and neck cancer, Psychodynamic interactions - clinician and patient - Cancer Chemotherapy: Oral Manifestations, Complications, and management, Radiation therapy of head and neck tumors: Oral effects, Dental manifestations and dental treatment: Etiology, treatment and rehabilitation (restoration)- Acquired defect of the mandible, acquired defects of hard palate, soft palate, clinical management of edentulous and partially edentulous maxillectomy patients, Facial defects, Restoration of speech, Velopharyngeal function, cleft lip and palate, cranial implants, maxillofacial trauma, Lip and cheek support prosthesis, Laryngectomy aids, Obstructive sleep apnoea, Tongue prosthesis, Esophageal prosthesis, Vaginal radiation carrier, Burn stents, Nasal stents, Auditory inserts, trismus appliances, mouth controlled devices for assisting the handicapped, custom prosthesis for lagophthalmos of the eye. Osseo integrated supported facial and maxillofacial prosthesis. Resin bonding for maxillofacial prosthesis, Implant rehabilitation of the mandible compromise by radiotherapy, Craniofacial Osseo



integration, Prosthodontic treatment, Material and laboratory procedures for maxillofacial prosthesis.

2.3. Maxillofacial Prosthetics

2.3.1. Obturators

2.3.2. Occlusal splints

2.3.3. Gunning Splint

2.3.4. Guiding Flange appliance.

2.3.5. Other prostheses like ocular prosthesis, finger prosthesis, ear prosthesis, etc.

2.3.6. Implantology related to maxillofacial prosthetics.

2.3.7. Dental Material aspects related to Maxillofacial prosthetics.

3. PAPER III - FIXED PARTIAL PROSTHODONTICS, OCCLUSION, TMJ AND AESTHETICS

3.1. FIXED PARTIAL PROSTHODONTICS

3.1.1. Tooth Supported Fixed Partial Dentures

3.1.1.1. Introduction

3.1.1.2. Diagnosis and treatment planning

3.1.1.3. Occlusion in detail

3.1.1.4. Mandibular movements, occlusal correction

3.1.1.5. Articulators and face –bow

3.1.1.6. Classification of FPD and parts of FPD

3.1.1.7. Retainers – Classification, Indications

3.1.1.8. Selection of Retainers

3.1.1.9. Principles of tooth preparations

3.1.1.10. Preparation of vital and endodontically treated teeth to receive various retainers

3.1.1.11. Fluid control and soft tissue management.

3.1.1.12. Preparation of special tray and impression making

3.1.1.13. Preparation various dies

3.1.1.14. Maxillomandibular relations and relating them to articulators.

3.1.1.15. Laboratory procedures including preparation of wax pattern, casting and finishing.

3.1.1.16. Failures in FPD.

3.1.1.17. Dental Material aspects related to FPD.

3.1.2. Implant Supported Fixed Partial Dentures

3.1.2.1. Introduction and Terminology

3.1.2.2. Diagnosis and treatment Planning

3.1.2.3. Classification of Prostheses

3.1.2.4. Biomechanics in Oral Implantology



3.1.2.5. Cement retained and Screw retained prostheses.

3.1.2.6. Principles of Occlusion in Implantology.

3.1.2.7. Progressive Bone loading.

3.1.2.8. Immediate Load applications in Implant dentistry

3.1.2.9. Failures in implant supported fixed partial dentures

3.1.2.10. Maintenance and Hygiene.

3.2. OCCLUSION

3.2.1. Evaluation, Diagnosis and Treatment of Occlusal Problems

3.2.2. Scope, definition, terminology, optimum oral health, anatomic harmony, functional harmony, occlusal stability, causes of deterioration of dental and oral health, Anatomical, physiological, neuro - muscular, psychological, considerations of teeth, muscles of mastication, temporomandibular joint, intra oral and extra oral and facial musculatures, the functions of Cranio mandibular system.

3.2.3. Occlusal therapy, the stomatognathic system, centric relation, vertical dimension, the neutral zone, the occlusal plane, differential diagnosis of temporomandibular disorders, understanding and diagnosing intra articular problems, relating treatment to diagnosis of internal derangements of TMJ, Occlusal splints, Selecting instruments for occlusal diagnosis and treatment, mounting casts, Pankey-mann-schuyler philosophy of complete occlusal rehabilitation, long centric, anterior guidance, restoring lower anterior teeth, restoring upper anterior teeth, determining the type of posterior occlusal contours, methods for determining the plane of occlusion, restoring lower posterior teeth, restoring upper posterior teeth, functionally generated path techniques for recording border movements intra orally, occlusal equilibration, Bruxism, Procedural steps in restoring occlusions, requirements for occlusal stability, solving occlusal problems through programmed treatment planning, splinting, solving - occlusal wear problems, deep overbite problems, anterior overjet problems, anterior open bite problems. Treating - end to end occlusion, splayed anterior teeth, cross bite patient, Crowded, irregular, or interlocking anterior bite, using Cephalometric for occlusal analysis, solving severe arch malrelationship problems, transcranial radiography, postoperative care of occlusal therapy.

3.3. TMJ - Temporomandibular joint dysfunction - Scope, definitions, and terminology

3.3.1. Temporomandibular joint and its function, Orofacial pain, and pain from the temporomandibular joint region, temporomandibular joint dysfunction, temporomandibular joint sounds, temporomandibular joint disorders

3.3.2. Anatomy related, trauma, disc displacement, Osteoarthritis/Osteoarthritis, Hyper mobility and dislocation, infectious arthritis, inflammatory diseases, Eagle's syndrome (Styloid -stylohyoid syndrome), Synovial chondromatosis,



Osteochondrosis disease, Osteonecrosis, Nerve entrapment process, Growth changes, Tumors, Radiographic imaging

3.3.3. Etiology, diagnosis and cranio mandibular pain, differential diagnosis and management, orofacial pain - pain from teeth, pulp, dentin, muscle pain, TMJ pain - psychologic, physiologic - endogenous control, acupuncture analgesia, Placebo effects on analgesia, Trigeminal neuralgia, Temporal arteritis

3.3.4. Occlusal splint therapy - construction and fitting of occlusal splints, management of occlusal splints, therapeutic effects of occlusal splints, occlusal splints and general muscles performance, TMJ joint uploading and anterior repositioning appliances, use and care of occlusal splints.

3.3.5. Occlusal adjustment procedures - Reversible - occlusal stabilization splints and physical therapies, jaw exercises, jaw manipulation and other physiotherapy or irreversible therapy - occlusal repositioning appliances, orthodontic treatment, Orthognathic surgery, fixed and removable prosthodontic treatment and occlusal adjustment, removable prosthodontic treatment and occlusal adjustment, Indication for occlusal adjustment, special nature of orofacial pain, Indication for occlusal adjustment, special nature of orofacial pain, Psychopathological considerations, occlusal adjustment philosophies, mandibular position, excursive guidance,, occlusal contact scheme, goals of occlusal adjustment, significance of a slide in centric, Preclinical procedures, clinical procedures for occlusal adjustment.

3.4. AESTHETICS

3.4.1. Scope, definitions, Morpho psychology and esthetics, structural esthetic rules - facial components, dental components, gingival components physical components.

3.4.2. Esthetics and its relationship to function - Crown morphology, physiology of occlusion, mastication, occlusal loading and clinical aspect in bio esthetic aspects.

3.4.3. Physical and physiologic characteristic and muscular activities of facial muscle, perioral anatomy and muscle retaining exercises

3.4.4. Smile - classification and smile components, smile design, esthetic restoration of smile,

3.4.5. Esthetic management of the dentogingival unit, intraoral plastic for management of gingival contours, and ridge contours, Periodontal esthetics,

3.4.6. Restorations - Tooth colored restorative materials, the clinical and laboratory aspects, marginal fit anatomy, inclinations, form, size, shape, color, embrasures, contact point.



4. PAPER - IV - ESSAY -

A 3 hour essay on any of the major topics in Prosthodontics.

PROSTHODONTIC TREATMENT MODALITIES

1. Tooth and tooth surface restorations

- Fillings - GIC & composites
- Veneers - composites and ceramics
- Inlays- composite, ceramic and alloys
- Onlay - composite, ceramic and alloys
- Partial crowns - $\frac{3}{4}$ th, $\frac{7}{8}$ th, proximal $\frac{1}{2}$ crowns
- Pin-ledge restorations.
- Radicular crowns
- Full crowns

2. Tooth Replacements

PARTIAL /COMPLETE

Tooth supported	Fixed partial denture	Overdenture
Tissue Supported	Interim partial denture	Complete denture Immediate denture
Tooth and tissue supported	Cast partial denture Precision attachment	Overdenture
Implant supported	Cement retained Screw retained	Bar & clip attachment Ball attachment
Tooth and implant supported	Screw retained Cement retained	
Root supported	Dowel and core Pin retained	Overdenture

3. Tooth and tissue defects (Maxillo- facial and Cranio-facial prostheses)

- Cleft lip and palate
- Partial and complete anodontia related to various syndromes
- Splints and stents as adjuncts to surgical procedures
- Prostheses for facial defects
- Auricular, nasal, ocular, orbital prostheses
- Craniofacial implants
- Prostheses following hemi mandibulectomy and maxillectomy
- Speech and velopharyngeal prostheses
- Laryngectomy aids, prosthetic nasal stents, burn stents, auditory inserts
- Trismus appliance- screw gag



4. T.M.J and Occlusal disturbances

- Occlusal equilibration
- Splints - Diagnostic
- Repositioners / Deprogrammers
- Anterior bite plane
- Posterior bite plane
- Bite raising appliances
- Occlusal rehabilitation

5. Esthetic/Smile designing

- Laminates / Veneers
- Tooth contouring (peg laterals, malformed teeth)
- Tooth replacements
- Inter disciplinary management

6. Geriatric Prosthodontics

- Prosthodontics for the elderly
- Behavioral and psychological counseling
- Removable Prosthodontics
- Fixed Prosthodontics
- Implant supported Prosthodontics
- Maxillofacial Prosthodontics
- Psychological and physiological considerations

7. Preventive measures

- Modulation of diet and nutrition; counseling
- Referring edentulous individuals for further evaluation

PRECLINICAL EXERCISES

• Complete Denture

1. Special tray with spacer in autopolymerizing resin
 - i. Maxillary
 - ii. Mandibular
2. Occlusal rims on maxillary and mandibular permanent bases
3. Teeth arrangement
 - i. Class I
 - ii. Class II
 - iii. Class III with posterior cross bite
 - iv. Balanced arrangement of teeth (Class I)
4. Acrylized balanced complete denture (Class I)



- **Removable Partial Denture**

1. Surveying, designing and wax pattern on mandibular and maxillary casts
 - i. Kennedy Class I
 - ii. Kennedy Class II
 - iii. Kennedy Class III
 - iv. Kennedy Class IV
2. Complete laboratory steps in the fabrication of anyone class of partial denture

- **Fixed Partial Denture**

Preparation of natural teeth mounted on a phantom head

1. Full crown
 - i. Anterior
 - ii. Posterior
2. Partial veneer crown
 - i. $\frac{3}{4}$ th crown on Canine
 - ii. $\frac{3}{4}$ th crown on Premolar
 - iii. Proximal half crown on mandibular second molar
 - iv. $\frac{7}{8}$ th crown maxillary first molar

3. Preparation for porcelain laminate veneer

Maxillary central incisor

- **Implant dentures**

1. Preparation of impression tray
 - i. Open impression
 - ii. Closed impression
2. Surgical guide for implant placement
3. Fabrication of radiographic template

STRUCTURED TRAINING PROGRAMME

MDS FIRST YEAR

1. Preclinical works and lab exercises to be completed within 6 month
2. Seminars – 6 Nos (Dental materials)
3. Library Dissertation to be completed in first year
4. Dissertation topic & submission of protocol of proposed dissertation work after obtaining ethical clearance –within 9 months
5. Journal club -6 nos
6. Attending conferences and Continuing Educational programmes Minimum 2 CDEs, 2 Conferences (one National)
7. Complete Dentures cases-20, Temporary RPD cases-20, maxillofacial prostheses- 5
8. Publication of scientific articles –minimum one



9. Clinical training
 - 9.1. Maintenance of a log book of recorded cases
10. Lecture classes for undergraduates – A minimum of 5 Lecturer classes should be taken for Undergraduate in presence of teaching faculty
11. Basic computer application- MS Office, Photo editing
12. Completion of seminar Vol. 1

MDS SECOND YEAR

1. Journal club – 6 Nos.
2. Seminar on CD, RPD, FPD – 3 each
3. Clinical works
 - 3.1. Conventional CD -30
 - 3.2. Balanced CD -7
 - 3.3. Temporary RPD-30
 - 3.4. Crown /FPD -25
 - 3.5. MFP -15
 - 3.6. Cast RPD- 5
 - 3.7. Case discussion – 10 nos
4. Presenting Scientific papers/posters during state and national conferences -2 (one national)
5. Attending CDE- 3
6. Publication of scientific articles-2
7. Lecturers for undergraduate students –A minimum of 5 Lecturer classes should be taken for Undergraduates in presence of teaching faculty.
8. Maintenance of Log book of recorded cases

MDS THIRD YEAR

1. Clinical Requirements in the 3d year
 - 1.1. Conventional CD -10
 - 1.2. Temporary RPD- 10
 - 1.3. Balanced CD- 5
 - 1.4. FPD cases -20
 - 1.5. MFP cases -10
 - 1.6. Cast RPD -5
 - 1.7. Implants-10 cases, out of which 2 implant supported overdentures
 - 1.8. Full mouth occlusal rehabilitation -2
2. Journal club -5
3. Publication of Scientific articles – 2 nos
4. CDE – 3 nos
5. Presentation of scientific papers in National and State level conferences – 1+2



6. Case discussions – 10 nos
7. Submission of Photo album on clinical cases- A minimum of 20 different types of cases
8. Submission of seminars vol. 1, 2 & 3
9. Lecture classes for Undergraduates - A minimum of 5 Lecturer classes should be taken for Undergraduates in presence of teaching faculty.
10. At the end of 30th month of commencement of course, dissertation should be submitted

MDS PART I & PART II

Developing essential skills through clinical training

* Key

O -Observes a procedure performed by a faculty

A-Assists a senior faculty

PA- performs procedure under the direct supervision of a senior specialist

PI-Performs independently


PROCEDURE	CATEGORY			
	0	A	PA	PI
Tooth surface restorations				
Composites - fillings, laminates, inlay, onlay	2	2	2	8
Ceramics - laminates, inlays, onlays	1	1	1	8

CROWNS

FVC in metal	1	2	2	10
FVC in all ceramic	1	2	2	10
FVC in full Metal ceramic	1	2	2	2
All ceramic- CAD-CAM	1	1	1	2
3/4th crowns molar	1	-	-	5
7/8th crown on maxillary molar	1	-	-	5
Proximal half crown	1	-	-	5
Pinledge and pinhole crowns	1	-	-	5
Telescopic crowns	1	-	-	5
Intraradicular crowns (central, lateral, canine, premolar, and molar)	1	-	-	5
Crown on implant supported prosthesis	-	1	1	5

FIXED PARTIAL DENTURES

PROCEDURE	CATEGORY			
	0	A	PA	PI
Cast metal-precious and non precious(3 unit posterior)	1	-	-	5



Metal ceramic (anterior and posterior)	1	1	1	10
Multiple abutment- maxillary and mandibular full arch	1	1	1	5
Incorporation of custom made and readymade precision joint or attachment	1	1	1	5
Adhesive bridge for anterior/ posterior	1	-	1	10
Metal with acrylic resin facing anterior FPD	-	-	1	5
Immediate fixed partial dentures (interim)	1	-	-	5
Fixed prosthesis as a retention and rehabilitation	1	1	-	5
for acquired and congenital defects - maxillofacial	-	-	-	-
Prosthetics	-	-	-	-
Implant supported prosthesis	1	-	1	1
Implant - tooth supported prosthesis	1	-	1	1

REMOVABLE PARTIAL DENTURE

Provisional partial dentures	1	1	1	50
Cast removable partial denture	1	1	1	6
Removable denture with precision attachments and telescopic crowns for anterior and posterior	1	1	2	4
Partial denture for the medically compromised and handicapped	1	1	1	5

COMPLETE DENTURES -

Neurocentric occlusion & characterized prosthesis	-	-	1	5
Complete dentures (by using semi adjustable articulator)	-	-	1	15
Single dentures	-	-	1	5
Overlay dentures	-	-	1	5
Treatment complete dentures for abused tissues	-	-	1	5
Complete denture prosthesis (for abnormal ridge relation, ridge form and ridge size)	-	-	1	5
Complete dentures for patients with TMJ syndromes	-	-	1	5
Complete dentures for medically compromised and handicapped patients	-	-	1	5

GERIATRIC PATIENTS

Tooth and tooth surface restorations, crowns, fixed prosthesis, removable prosthesis	-	-	1	10
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IMPLANT SUPPORTED COMPLETE PROSTHESIS -

Implant supported complete prosthesis (maxillary and Mandibular)	-	-	1	1
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**MAXILLOFACIAL PROSTHESES**

Guiding flange and obturators	-	-	1	4
Speech and palatal lift prosthesis	-	-	1	2
Eye prosthesis	-	-	1	2
Ear prosthesis	-	-	1	2
Nose prosthesis	-	-	1	2
Face prosthesis	-	-	1	1
Maxillary obturators	-	-	1	2
Hemimandibulectomy	-	-	1	2
Cranial prostheses	-	-	1	1
Finger/ hand, foot	-	-	1	2
Management of burns, scars	-	-	-	1

TMJ SYNDROME MANAGEMENT

Splints - periodontal, teeth, jaws	-	-	1	4
TMJ supportive and treatment prosthesis	-	-	1	1
Stabilization appliances for maxilla and mandible with freedom to move from IP to CRCP	-	-	-	1
In IP without the freedom to move to CRCP	-	-	-	1
Repositioning appliances, anterior disclusion	-	-	-	1
Chrome cobalt and acrylic resin stabilization appliances	2	-	-	-

FULL MOUTH REHABILITATION

Full mouth rehabilitation - restoration of esthetics and function of stomatognathic system	-	1	-	4
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INTER-DISCIPLINARY TREATMENT MODALITIES

Inter-disciplinary management - restoration of Oro craniofacial defects for esthetics, phonation, mastication and psychological comforts	-	1	-	2
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MANAGEMENT OF FAILED RESTORATION

Tooth and tooth surface restorations	-	-	-	5
Removable prosthesis	-	-	-	10
Crowns and fixed prosthesis	-	5	-	-
Maxillofacial prosthesis	-	-	-	2
Implant supported prosthesis	-	-	-	1
Occlusal rehabilitation and TMJ syndrome	-	-	-	2
Restoration failure of psychogenic origin	-	-	-	5
Restoration failure to age changes	-	-	-	2



SCHEME OF EXAMINATION

MDS PART II

Theory

Consists of four papers each carrying 100 marks and 3 hour duration which would be centralized valuated.

Practical / Clinical Examination

The examination shall be conducted in 3 days. If there are more than 6 candidates, it shall be extended for one more day. Each candidate shall be examined for a minimum of three days, six hours per day including viva voce. There must be four examiners out of which 50 percent of the examiners will be from other states.

The practical examination will include Complete Denture, Removable Partial Denture and Fixed Partial Denture.

DAY 1 - Forenoon

(Complete denture) – Preliminary impression, Final impression

Afternoon

(FPD) diagnosis and treatment planning, tooth preparation, impression, temporization

DAY 2 - Forenoon

FPD – Evaluation of temporary FPD in patient, evaluation of die and wax pattern of FPD

CD - Tentative jaw relation,

Afternoon

Face bow, tracing, inter occlusal records

DAY 3 - Forenoon

Try in of CD, surveying of cast and designing RPD

After noon- Pedagogy/Thesis Presentation & Viva voce

EVALUATION OF PRACTICALS & VIVA- VOCE

Practical / Clinical Examination:

400 Marks

1. Presentation of treated patients and records during their three year training period.

- 50 Marks

2. Clinical procedures-complete denture

-180 Marks

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|--|----------|
| 2.1. Discussion on treatment plan and patient review | 30 marks |
| 2.2. Tentative jaw relation records | 10marks |
| 2.3. Face Bow - transfer | 10marks |
| 2.4. Transferring it on articulators | 10 marks |
| 2.5. Extra oral tracing and securing centric and protrusive/lateral. | 50 marks |
| 2.6. Transfer in on articulator. | 10 marks |
| 2.7. Selection of teeth | 10 marks |
| 2.8. Arrangement of teeth | 30 marks |



2.9. Waxed up denture trial 20 marks

All steps will include chair side, lab and viva voce

3. Fixed Partial Denture 100 Marks

3.1. Case discussion and selection of patients for F.P.D. 10 marks

3.2. Abutment preparation isolation and fluid control 50 marks

3.3. Gingival retraction and impressions 20marks

3.4. Cementation of provisional restoration 20 marks

4. Removable Partial Denture 70 Marks

4.1. Surveying and designing of partially edentulous cast- 30 marks

4.2. Discussion on components and material selection 40 marks

Viva Voce 200 Marks

i. Viva-Voce examination: 160 marks

All examiners will conduct viva-voce conjointly on candidate's comprehension, analytical approach, expression, interpretation of data and communication skills. It includes all components of course contents. It includes presentation and discussion on dissertation also.

ii. Pedagogy Exercise: 40 marks

A topic will be given at the beginning of the clinical examination and will have to be presented for 8-10 minutes.



LIST OF PRESCRIBED BOOKS

DENTAL MATERIALS

1. Dental Materials- Properties and manipulation- O'Brien
2. Restorative Dental Materials- Robert G. Craig
3. Notes on Dental Materials- EC Combe
4. Applied Dental Materials- Mc Cabe
5. Philip's science of Dental Materials- Anusavice
6. Esthetics, Composite bonding technique and materials-Jorden

COMPLETE DENTURE

1. Prosthodontic treatment for edentulous patients: Complete dentures and implant supported prostheses- Zarb George A. Ed and Charles L.Bolender
2. Essentials of complete denture Prosthodontics- Sheldon Winkler
3. Text book of Complete dentures- Arther O Rahn and Charles M. Heartwell
4. Swensons Complete dentures-Swenson, Merrill G.
5. Denture prosthetics: Complete dentures- Nagle and sears
6. Complete dentures Prosthodontics- John J Sharry
7. Treatment of edentulous patient- Victor O.Lucia
8. Clinical Dental prosthetics- Fenn and Lidelow
9. Dental lab procedures- Complete dentures – Morrow, Robert M and others
10. Complete denture- A clinical pathway- Mc Entee
11. Problems and solutions in complete denture Prosthodontics- Lamb, David J
12. A color atlas of Complete denture- John W Hobkirk
13. Color atlas and text of Complete denture-Grant
14. Clinical dental Prosthodontics- Penn NRW
15. Mastering the art of Complete denture- G Raser and R. Godd
16. Geriatric dentistry- Aging and oral health
17. Synopsis of Complete dentures- Charles W. Bartlett
18. Clinical problem solving in Prosthodontics- David W. Bartlett
19. Treatment of edentulous patients – J. Fraser, Mc Cord



REMOVABLE PARTIAL DENTURE

1. Removable partial denture- Grasso and Miller
2. Mc. Crackens removable partial Prosthodontics- Mc Givney, Glen P, Castleberry, Dwight J
3. Clinical Removable Partial Prosthodontics- Stewart
4. Removable Denture Prosthodontics- Alan A Grant
5. Partial dentures- Terkla, Louis G, Laney, William R
6. Partial denture prosthetics – Neill D J and Walt J D
7. Partial dentures -Osborne
8. Atlas of Removable partial denture design- Stratton, Russel J, Wiebelt, Frank J
9. Dental lab procedures- Removable partial dentures- Rudd, Kenneth D and others
10. Removable denture construction- Butes, John P. and others
11. A color atlas of removable partial dentures – JD Davenport
12. Removable denture Prosthodontics- Lechner
13. Removable Partial denture- Revenue/Bochu
14. Removable Partial Prosthodontics: A case oriented manual of treatment planning-Lechner S. and Mac Gregor

FIXED PARTIAL DENTURE

1. Contemporary Fixed Prosthodontics- Rosensteil, Stephen F.
2. Fundamentals of Fixed Prosthodontics- Herbert T, Shillingburg
3. Theory and practice of crown and bridge Prosthodontics- Tylman, Stanley D
4. Occlusion- Ash and Ramjford
5. Evaluation, diagnosis and treatment of occlusal problems- Dawson
6. Management of TMJ disorders and occlusion-Okesson
7. Planning and making crown and bridge- Bernad C N Smith
8. Esthetics of Anterior Fixed Prosthodontics- Chiche/Pinnualt
9. Change your smile- Goldstein
10. Text book of Occlusion- Mohl/ Zarb/ Rough
11. Ceramometal Fixed partial denture- Iracron
12. Precision fixed Prosthodontics- Clinial and laboratory aspects- Shconanbayer
13. Dental Ceramics- Mc Lean
14. Science and Art of Dental Ceramics- Vo. I , Vol. II- Mc Lean
15. Dental Lab procedures- Fixed partial dentures – Rhoads, John E and others
16. Introduction to Metal Ceramic Technology- Naylor, Patric W
17. Esthetic restoration: Improved dentist laboratory communication- Muia, Paul J and Petersburg
18. Esthetic approach to metal ceramic restoration for the mandibular anterior region- Muterthies, Klaus
19. Precision fixed Prosthodontics: Clinical and laboratory aspects- Martignoni M.



20. Aesthetic design for ceramic restoration- Korson, David
21. Modern practice in crown and bridge Prosthodontics- Johnston and Dykema
22. Modern Gnathological concept – updated- Victor O. Lucia
23. Complete mouth rehabilitation through crown and bridge Prosthodontics- Kazis H. and Kazis J
24. Occlusion and clinical practice- An evidence based approach-Klineberg and Jagger

MAXILLOFACIAL PROSTHETICS

1. Prosthetic rehabilitation- Keith F. Thomas
2. Clinical Maxillofacial prosthesis- Taylor
3. Maxillofacial Prosthodontics- Chalian
4. Maxillofacial rehabilitation- John J. Beumer

IMPLANT PROSTHODONTICS

1. Contemporary Implant Dentistry - Carl E. Misch
2. Principles and practice of oral implantology- Weiss
3. Practical implant dentistry- Arun K Garg
4. Implant Prosthodontics clinical and laboratory procedures-Stevens
5. Atlas of oral implantology- Norman Cranin
6. Endosteal dental implants- McKinney
7. Implant Prosthodontics- Surgical and prosthetic procedures- Fagan
8. Implant Prosthodontics- clinical and laboratory procedures- Fagan
9. Osseointegration and occlusal rehabilitation- Hobo, Sumiya and others
10. Oral rehabilitation with implant supported prostheses- Jimenez lopez, Vicente
11. Branemark osseointegrated implant- Albrektsson and George A Zarb
12. Clinical atlas of dental implant surgery- Michael S. block
13. Dental implants- The art and science – Charles A Babbush
14. Guided bone regeneration in implant dentistry- Buser, Daniel and others
15. Tissue- integrated prostheses: Osseointegration in clinical dentistry- Per-Ingvar Branemark and others

PRESCRIBED JOURNALS

1. Journal of Prosthetic Dentistry.
2. British Dental Journal
3. International Journal of Prosthodontics
4. Journal of Prosthodontics
5. Journal of American Dental Association
6. Dental Clinics of North America
7. Quintessence international
8. Australian Dental Journal



9. Journal of Indian Dental Association

10. Journal of Oral Implantology

MDS - BRANCH 2

PERIODONTOLOGY

The program outlined, addresses both the knowledge needed in PERIODONTOLOGY and allied Medical specialities in its scope. A minimum of three Years of formal training through a graded system of education as specifies, will equip the trainee with skill and knowledge at its completion to be able to practice basic Periodontics and have the ability to intelligently pursue further apprenticeship towards advanced Periodontics.

OBJECTIVES:

The training programme in Periodontics is to structure and achieve the following four objectives

KNOWLEDGE

1. Basic sciences relevant to the practice of Periodontics.
2. The etiology, patho-physiology, diagnosis and treatment planning of various common Periodontal problems.
3. Interaction of social, genetic and environmental factors and their relevance to treatment planning and management of Periodontal problems.
4. Recognize conditions that may be other than the area of periodontal specialty/ competence to refer them to the appropriate specialist
5. Factors affecting the long-term maintenance of periodontal health.
6. Update the knowledge by self studying and by attending courses, conferences, seminars relevant to the specialty.
7. Carry out research both basic and clinical, publish and present the work at various scientific gatherings.
8. Personal hygiene and infection control, prevention of cross infection and safe disposal of hospital waste, keeping in view the high prevalence of Hepatitis and HIV and other highly contagious diseases.

SKILLS

1. To take proper clinical history, methodical examination of the patient, perform essential diagnostic procedures, and interpret them and arrive at a reasonable diagnosis about the Periodontics.
2. Acquire adequate skills and competence in performing various periodontal procedures.

ATTITUDES:

1. Develop an attitude to adopt ethical principles in all aspects of Periodontics practice.
2. Professional honesty and integrity are to be fostered.
3. Treatment care is to be delivered irrespective of the social status, cast, creed or colleagues.



4. Willingness to share the knowledge and clinical experience with professional colleagues.
5. Willingness to adopt, after a critical assessment, new methods and techniques of periodontal management developed from time based on scientific research, which are in the best interest of the patient.
6. Respect patient's rights and privileges, including patient's right to information and right to seek a second opinion.

COMMUNICATION SKILLS:

1. Develop adequate communication skills particularly with the patients giving them the various options available to manage a particular periodontal problem and to obtain a true informed consent from them for the most appropriate treatment available at that point of time.
2. Develop the ability to communicate with professional colleagues, in Periodontology or other specialties through various media like correspondence, etc. To render the best possible treatment. One year teaching basic subjects including completion of clinical exercises 2 ½ years of coverage of all the relevant topics in Periodontology, clinical training involving treatment of patients, and submission of dissertation. These may be divided into blocks of 6 to 8 Months duration each, depending on the training policies of each institution.

COURSE CONTENTS SYLLABUS

The syllabus for the theory of Periodontology should cover the entire field of the subject and the following topics may be used as guidelines only and not limited to them.

FIRST YEAR MDS

EVIDENCE-BASED DECISION MAKING

- Introduction to Evidence-Based Decision Making
- Assessing Evidence
- Implementing Evidence-based Decisions in Clinical Practice

THE NORMAL PERIODONTIUM

- The Gingiva
- The Tooth-Supporting Structures
- Aging and the Periodontium

CLASSIFICATION AND EPIDEMIOLOGY OF PERIODONTAL DISEASES

- Classification of Diseases and Conditions Affecting the Periodontium
- Epidemiology of Gingival and Periodontal Diseases



PHARMACOLOGY

- Drug administration – modes, physiology, toxicology of antibiotics.
 - Tetracycline. Metronidazole, Penicillins, Cephalosporins, Clindamycin, Ciprofloxacin, Macrolides, Antifungal Drugs
 - Local Drug Delivery Systems
 - Periodontal Dressing
 - Antibiotic Prophylaxis in medically compromised patients
 - Anticoagulants and Antiplatelet drugs with special reference to the periodontium
 - Antiepileptic drugs with special reference to the periodontium
 - Antihypertensive drugs with special reference to Calcium channel blockers
 - Immunosuppressive drugs. with special reference to the periodontium
- Antiseptics, disinfectants and mouthwashes.
- Analgesics and anti-inflammatory drugs
- Astringents
- General and local anesthesia – indications and contraindications premedication and anesthetics in different clinic.
- Condition with special reference to periodontics.
 - Nutritional Influences –
 - General
 - Vitamin A Deficiency.
 - Vitamin B Complex deficiency and the Periodontium.
 - Role of Vitamin C in the Periodontium.
 - Vitamin D Calcium, Phosphorus and the Periodontium..
 - Vitainin E, K,
 - Protein deficiency.
 - Minerals
 - Endocrine Disorders –
 - Diabetes Mellitus,
 - Hyperparathyroidism, Hyperthyroidism
 - Sex Hormones
 - Hematologic Disorders
 - Leukaemia
 - Anaemia.
 - Agranulocytosis
 - Polycythemia.



- Hemophilia,
- Thrombocytopenia
- Metal Intoxication –
 - Bismuth
 - Lead
 - Mercury
- Other chemicals
- Emergency drugs in dental practice.
- Calcium channel blockers.
- Immunosuppressive drugs.
- Biotransformation of drugs.
- Antibiotics sensitivity tests.

MATERIAL SCIENCE

- Foreign body reactions in tissues.
- Composite Resins and Glass Ionomer Cements.
- Biological aspects of GTR therapy.
- Biological aspects of Synthetic bone graft materials.
- Splinting of Teeth
- Dental Implants – Various Implant Systems.

SECOND YEAR MDS

ETIOLOGY OF PERIODONTAL DISEASES

- Microbiology of Periodontal Diseases
- The role of dental calculus and other predisposing factors
- Genetic factors associated with periodontal disease
- Immunity and Inflammation: Basic Concepts
- Microbial interactions with the host in periodontal diseases
- Smoking and periodontal disease
- Molecular Biology of the host-microbe interaction in periodontal diseases: Selected Topics:
Molecular signalling aspects of pathogen-mediated bone Destruction in periodontal disease
- Host Modulation

RELATIONSHIP BETWEEN PERIODONTAL DISEASE AND SYSTEMIC HEALTH

- Influence of systemic disorders and stress on the periodontium
- Periodontal medicine: impact of periodontal infection on systemic health
- Oral malodour



PERIODONTAL PATHOLOGY

1. GINGIVAL DISEASE

- Defence mechanisms of the gingiva
- Gingival inflammation
- Clinical features of gingivitis
- Gingival enlargement
- Acute gingival infections
- Gingival diseases in childhood
- Desquamative gingivitis

2. PERIODONTAL DISEASE

- The Periodontal Pocket
- Bone Loss and Patterns of Bone Destruction
- Periodontal Response to External Forces
- Masticatory System Disorders
- Chronic Periodontitis
- Necrotizing Ulcerative Periodontitis
- Aggressive Periodontitis
- Pathology and Management of Periodontal Problems in Patients with HIV Infections

III YEAR MDS

TREATMENT OF PERIODONTAL DISEASE

1. DIAGNOSIS, PROGNOSIS AND TREATMENT PLAN

- Clinical Diagnosis
- Radiographic Aids in the diagnosis of Periodontal Disease
- Advanced Diagnostic Techniques
- Risk Assessment
- Levels of Clinical Significance
- Determination of Prognosis
- The Treatment Plan
- Rationale for Periodontal Treatment
- Periodontal Therapy in the Female Patient
- Periodontal Treatment of Medically Compromised Patients
- Periodontal Treatment for Older Adults
- Treatment of Aggressive and Atypical Forms of Periodontitis

2. TREATMENT OF PERIODONTAL EMERGENCIES

- Treatment of acute gingival disease
- Treatment of periodontal abscess



3. NONSURGICAL THERAPY

- Phase I Therapy
- Plaque control for the periodontal patient
- Scaling and root planing
- Chemotherapeutic agents
- Host modulation agents
- Sonic and ultrasonic instrumentation
- Supragingival and Subgingival Irrigation
- Occlusal Evaluation and Therapy
- Adjunctive role of Orthodontic therapy
- Periodontic- Endodontic continuum

4. SURGICAL THERAPY

- Phase II Periodontal therapy
- General principles of Periodontal Surgery
- Surgical Anatomy of the periodontium and related structures
- Gingival Surgical Techniques
- Treatment of Gingival enlargement
- The periodontal Flap
- Flap technique for pocket therapy
- Resective osseous Surgery
- Reconstructive Periodontal surgery
- Furcation - Involvement and treatment
- Periodontal plastic and aesthetic surgery
- Recent advances in Surgical technology

5. PERIODONTAL RESTORATIVE INTERRELATIONSHIPS

- Preparation of periodontium for restorative dentistry
- Restorative interrelationships

ORAL IMPLANTOLOGY

1. Biological aspects of oral implants
2. Clinical aspects and evaluation of implant patient
3. Diagnostic imaging for the implant patient
4. Standard implant surgical procedures
5. Localised Bone augmentation and Implant site development
6. Advanced implant surgical procedures
7. Recent advances in implant surgical technology
8. Biomechanics, Treatment planning and prosthetic considerations



9. Implant related complications and failures

PERIODONTAL MAINTENANCE

1. Supportive periodontal treatment
2. Results of periodontal treatment

ETHICAL, LEGAL, AND PRACTICAL ISSUES IN THE MANAGEMENT OF PERIODONTAL PATIENTS

1. Dental ethics
2. Legal principles : Jurisprudence
3. Dental insurance and Managed Care in Periodontal Practice

STRUCTURED TRAINING SCHEDULE

FIRST YEAR

1 Clinical cases:

- i. Practice of incision and suturing techniques on typhodont models
- ii. X ray techniques and interpretations
- iii. Local anesthetic techniques
- iv. Basic diagnostic microbiology and immunology, collection & handling samples, culturing techniques.
- v. Practical training on basic life support devices.
- vi. Basic Biostatistics. Survey & data analysis.
- vii. Applied periodontal Indices 10 Cases
- viii. Scaling & Root planing 50 cases
- ix. Ultrasonic scaling 50 cases.
- x. Curettage 15 Cases.
- xi. Local Drug Delivery 10 cases
- xii. Gingivectomy& Gingivoplasty 5 cases.


2 **Seminars:** One Seminar per week to be conducted in the department. A minimum of five seminars should be presented by each student each year. A minimum of 30 seminars should be attended by each student each year.

3 **Journal club:** One Journal club per week to re conducted in the department. A minimum of five journal clubs should be presented by each student each year . A minimum of 30 journal clubs should be attended by each student each year.

4 Protocol for library dissertation to be submitted on or before the end of six months from the date of admission. Library dissertation should be submitted at the end of first year.

5 Synopsis for dissertation to be submitted at the end of first year.

6 Under graduate classes: Around 4-5 classes should be handled by each post-graduate student.

- 
- 7 Field survey: To be conducted and submit the report
 - 8 Inter – department meetings: should be held once in 3 months.
 - 9 Case discussions
 - 10 Field visits: To attend dental camps and to educate the masses
 - 11 Basic subjects classes
 - 12 Internal assessment or Term paper
 - 13 Scientific paper and poster presentations at various conferences and post graduate workshops.

SECOND YEAR:

- 1 Clinical work
 - i. Case history & treatment planning 5 cases.
 - ii. Periodontal surgical procedures 50 surgeries
 - a. Pocket therapy
 - b. Mucogingival surgery
 - c. Perio-endo problems
 - d. Perio splint
 - e. Occlusal adjustment
 - iii. Implant - 1 case
- 2 Seminars: One Seminar per week to be conducted in the department. A minimum of five seminars should be presented by each student each year. A minimum of 30 seminars should be attended by each student each year.
- 3 Journal club: One Journal club per week to be conducted in the department. A minimum of five journal clubs should be presented by each student each year . A minimum of 30 journal clubs should be attended by each student each year.
- 4 Undergraduate classes: Each post- graduate student should handle Around 4-5 classes.
- 5 Inter –departmental meetings: Should be held once in 3 months
- 6 Case discussions
- 7 Field visits: To attend dental camps and to educate the masses.
- 8 Dissertation work: On getting the approval from the university work for the dissertation to be started.
- 9 Scientific paper and poster presentations at various conferences and post graduate workshops.



THIRD YEAR

1 Clinical work

- i. Surgeries - 20
- ii. Including 10 Surgeries using Regenerative surgical techniques -graft material & membranes
- 2 Seminars One Seminar per week to be conducted in the department. Each student should present a minimum of five seminars each year.
- 3 Journal Club: One Journal club per week to be conducted in the department.
- 4 Under graduate classes: each post –graduate student, should handle Around 4-5 classes.
- 5 Inter departmental meetings: Should be held once in a month.
- 6 The completed dissertation should be submitted six months before the final examination
- 7 Case discussions
- 8 Field visits: To attend dental camps and to educate the masses.
- 9 Finishing and presenting the cases taken up.
- 10 Preparation of finished cases and presenting the cases (to be presented for the examination).
- 11 Maintenance of record and log book of all cases done during post graduate training period
- 12 Mock examination

NOTE: All documents of the treated cases and seminar topics duly attested by the concerned guide should be submitted prior to the Clinical/Practical University Examination.

MODE OF MONITORING PROGRESS OF TRAINING (as mentioned in Section I)

It is essential to monitor the learning progress to each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring to be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using checklists that assess various aspects. Checklists are given in Section IV.

SCHEME OF EXAMINATION

Part II examination

- Dissertation presentation.
- THEORY: the written examination shall consist of four papers each of three hours duration and 100 marks . Total 400 marks.



Paper I - Applied Anatomy and Physiology of the Periodontium, Pharmacology and Applied Material Science

Paper II - Etiopathogenesis of Periodontal Diseases

Paper III - Clinical Periodontology and Oral Implantology

Paper IV - Recent Advances in Periodontics

- Practicals: Clinicals, Oral and viva voce examination shall be conducted in 2 days.
- Practical - 400 marks
- Viva Voce - 200 marks

DAY	SESSION	CLINICAL / PRACTICAL WORK	Distribution of Marks
Day 1	Morning	Short Cases 2 - Discussion	2 x 50 = 100 marks
		Long Case - Detailed case analysis, treatment planning	100 Marks
	After noon	Appropriate access therapy of the patient	150 Marks
Day II	Morning	Post operative evaluation and discussion of surgical patient	50 marks
	After noon	Dissertation / Pedagogy(40 marks) General viva-voce (160 marks)	200 marks



LIST OF ESSENTIAL AND RECOMMENDED REFERENCE BOOKS AND PERIODICALS

PRESCRIBED JOURNAL

1. Journal of Periodontal Research
2. Journal of Periodontology
3. Journal of Oral Implantology
4. Journal of Clinical Periodontology
5. Periodontology 2000



6. I.S.P Journal
7. International journal of oral implantology and clinical research
8. International journal of clinical implant dentistry
9. British Dental Journal
10. Journal of American Dental Association
11. Dental Clinics of North America
12. Dental Quintessance
13. Australian Dental Journal
14. Journal of Indian Dental Association

RECOMMENDED BOOKS

- | | |
|---|---|
| 1. Clinical Periodontology, 10 th Edition | Fermin A. Carranza
Jr. Michael G. Newman |
| 2. Contemporary Periodontics | Genco |
| 3. Decision making in Periodontology, 3rd edn | Walter Burnell Hall |
| 4. Periodontology color guide | Heasman, Preshaw, Smith |
| 5. Essentials of Periodontics, 4th edition | Hoag |
| 6. Outline of Periodontics | J. D. Manson, B. M. Eley |
| 7. Colour atlas of Periodontal Surgery | Jeffrey D Johnson |
| 8. Periodontal Medicine, Surgery and Implants | Louis F Rose, Brian L Mealey, Robert
G Jenco, D Walter Cohen |
| 9. Contemporary Periodontal Instrumentation | Diane Schoen |
| 10. Clinical Guide to Periodontics | Murray Schwartz |
| 11. Periodontics- in the tradition of Gottlieb & | D A Grant, Irving B Stern |
| 12. Orban | Max A Listgarten |
| 13. Clinical Periodontology and Implant Dentistry | Jan Lindhe |
| 14. Geriatric Dentistry- Ageing and oral health | |
| 15. Ash & Ramfjord occlusion | Mash & Marcus L Ward |
| 16. Evaluation, Diagnosis and Treatment of
occlusal problems | Dawson |
| 17. Implant Prosthodontics Clinical & Laboratory
Procedures | Fagan |
| 18. Implant Prosthodontics Surgical & Prosthetic
Procedures | Fredrickson |
| 19. Endosteal Dental Implants | Mc Kinney |
| 20. Contemporary Implant Dentistry | CE Misch |
| 21. Changes your Smile | Goldstein |
| 22. Successful Restorative Dentistry | Prof. A. D. Wamsley |



23. The Periodontal Ligament in Health and Disease	Berkovitz, B. J. Moxham, H. N. Newman
24. History of Dentistry	Hoffman/ Asthet
25. Anatomical atlas of TMJ	Ide/Nakazann
26. Textbook of occlusion	Moh/ Zarb/ Castern Rogh
27. Essentials of clinical periodontology and periodontics – Shanthipriya Reddy	
28. Periodontics-medicine surgery and implants	Brean.l.Mealy,Louis.F.Rose
29. Clinical Periodontology-Current concepts	Dr.B.R.R.Varma & R.P.Nayak
30. Text book of Periodontology	Dr. Gururaja Rao

MDS - BRANCH 3

ORAL AND MAXILLOFACIAL SURGERY

OBJECTIVES AND GOALS OF THE COURSE

The following objectives are laid out to achieve the goals of the course. The following sub-headings may be considered as objectives.

1. Knowledge

- Etiology, pathogenesis, histopathological diagnosis, medical and surgical management of common pathological conditions affecting the oral and maxillofacial region
- To familiarize with the biochemical, microbiologic, immunologic and genetic aspects of maxillofacial lesions.
- Etiology, diagnosis and management of minor and major trauma of the maxillofacial region
- Adequate knowledge in BLS and ATLS
- Adequate knowledge in the growth and development of facial skeleton and soft tissues.
- Identification, diagnosis and management of dentofacial deformities.
- Various treatment modalities of oral disease from historical to the currently available ones.
- Adequate knowledge in the management of hospitalized patients, requesting investigations, references etc
- Knowledge to prepare a patient for major surgery and pre and post operative management there of.
- The interrelationship between oral disease and various systemic conditions.



- Various mucosal lesions due to iatrogenic causes and deleterious habits and prevention, medical and surgical management of it.
- Identify rarities in oro-facial diseases, syndromes and their genetic and molecular biologic determinant in a given case.
- Adequate knowledge in legal implications and requirements in trauma and other cases and to assist in the judicial process when required.
- Recognize conditions that may be outside the area of his specialty / competence and refer them to an appropriate specialist.
- Update themselves by attending course, conference and seminars relevant to maxillofacial surgery.
- Plan out / carry out research activities at both basic and clinical aspects with the aim of publishing his works in scientific journals.
- Reach to the public to motivate and educate regarding oral precancerous diseases. Its prevention and consequences if not treated.
- Shall develop knowledge, skill in the science and practice of oral and maxillofacial surgery.
- Shall develop teaching skills in the field of maxillofacial surgery.

2. Skills and attitudes

- The PG student is expected to acquire the necessary skill and expertise to independently diagnose and manage cases of clinical significance encompassing the broad area of oral and maxillofacial region.
- Take a proper clinical history, medical history, through intraoral and extraoral examinations, investigations and its evaluation, diagnostic procedures and interpretation of all of the above to come to a diagnosis.
- Take a proper clinical history, through intraoral and extraoral examinations, medical history evaluation, diagnostic procedures and interpretation to come to a diagnosis.
- Effective motivation and education regarding oromucosal disease management.
- Acquire adequate knowledge and expertise of various diseases of oral and maxillofacial region and their medical and surgical management.
- Acquire adequate knowledge about the recent histopathological, molecular, genetic, cytological, medical and surgical techniques which aid the Maxillofacial surgeon to treat disease, defects and deficits of maxillofacial region.
- Acquire an empathetic attitude in dealing with suffering patients and relatives, proper and dignified attitude during examination of the patient.



3. Human values, ethical practice and communication abilities

- Adopt ethical principles in all aspects of treatment modalities, professional honesty and integrity are to be fostered.
- To justify all the investigations requested and treatments planned.
- Develop communication skills to make awareness regarding oral diseases, to inform the patient and by-stander of the bad news, to help them to understand the various treatment modalities and the consequences of the treatment and to help them to decide.
- Develop empathy towards the suffering patients and relatives and to understand their fear and anxiety and to alleviate these as much as possible.
- Accept and to manage the patient to the best of the ability in spite of the history of the patient. (ie. The patient reported to you at a later stage, was consulted and managed by another professional earlier etc.)
- Apply high moral and ethical standards while carrying out human or animal research.
- Be humble, accept limitations in his knowledge and skill, and ask for help from colleagues when needed.
- Respect patients rights and privileges, including patients' right to information, right to seek a second opinion and the right to refuse treatment.

COURSE CONTENTS

SPREAD OF CURRICULUM

I-MDS

- Exodontia posting – 3 months
- Dental Casualty postings
- Seminar presentation – one in a month
- Journal club – one in a month
- Lecture classes on preclinical subjects
- Library dissertation and presentation
- Attending conferences and symposiums
- Publication of scientific articles
- Selection of dissertation topic, feasibility with pilot study and registration
- Quarterly internal assessment examinations
- I MDS examination at the end of 12 months



II - MDS

- Dental Casualty postings
- Seminar – one in a month
- Journal club – one in a month
- Dissertation work and presentation
- Attending conferences and symposiums
- Publication of scientific articles
- Specialty (APEX) posting: 6 months
 - General Surgery - 30 days
 - Anesthesia - 15 days
 - ENT - 15 days
 - Plastic Surgery - 15 days
 - Surgical oncology - 60 days
 - Neurosurgery - 15 days
 - Cleft & craniofacial surgery - 15 days
 - General medicine - 15 days
- Anatomy dissection/ demonstration of head & neck , thorax and limbs in the second half of the second year- 1 hour every working day
- Quarterly internal assessment examinations

III-MDS

- Dental Casualty postings
- PG clinical work
- Operation theatre, Ward duty
- Seminars – one in a month
- Journal Club – one in a month
- Attending conferences and symposiums
- Publication of scientific articles
- Quarterly internal assessment examinations
- MDS Part II University examination at end of 36 months

SYLLABUS –MDS - ORAL AND MAXILLOFACIAL SURGERY PART II- 2ND YEAR

- There is no theory examination at the end of the second year.
- At the beginning of the II year, library dissertation is started along with posting in allied surgical specialties to complete the clinical practice of II and III year MDS.
- After successful completion of 12 months of training in Basic science, Applied Science, Animal study, Laboratory and library work, students are taken up for clinical posting in



General Surgery, Anaesthesiology, ENT, Plastic surgery and Oncology, Neuro surgery, and General medicine. The intensive coaching to the standards of residents in these specialties are expected.

- In spite of the training in basic sciences students of oral surgery are expected to learn anatomy of the whole body and hence they may be posted to the anatomy department for dissection/ demonstrations, at least one hour on all working days.

1. General Surgery

- 1.1. General surgical principles
- 1.2. Wound healing and wound care
- 1.3. Incision
- 1.4. Hospital care
- 1.5. Control of hemorrhage
- 1.6. Sterilization
- 1.7. Fluid and Electrolyte balance
- 1.8. Common bandages and splints
- 1.9. Shifting of critically ill patients
- 1.10. Prophylactic therapy
- 1.11. Assisting Major cases of abdomen, Thorax, Thyroid, Limb
- 1.12. Post-operative surgical management.

2. General Anaesthesia

- 2.1. Assessment of case
- 2.2. Premedication
- 2.3. Inhalation anaesthesia
- 2.4. Monitoring
- 2.5. Extubation
- 2.6. Complications
- 2.7. Assisting of OT or General Anaesthesia.

3. ENT

- 3.1. Reference to Maxillary sinus
- 3.2. Ear
- 3.3. Throat
- 3.4. Tonsil
- 3.5. Nasal cavity
- 3.6. Tracheostomy
- 3.7. Ophthalmology
- 3.8. Orbital injuries
- 3.9. Nerve injury



- 3.10. Orbital muscle injury
- 3.11. Assessment of orbital fractures including complications hemorrhages
- 3.12. Assisting surgical cases

4. Plastic Surgery

- 4.1. Revision of suture
- 4.2. Planning
- 4.3. Tissue planes
- 4.4. Flaps, grafts
- 4.5. Nerve surgery
- 4.6. Post operative assessment
- 4.7. Care in relation to maxillofacial region
- 4.8. Management of cleft lip/ palate patients

5. Oncology

- 5.1. Surgical medical planning
- 5.2. Assessing and planning
- 5.3. Assisting surgical cases
- 5.4. Intensive care unit care for immediate postoperative cases
- 5.5. Post op. care
- 5.6. Management of complications viz. chyle leak, orocutaneous fistulae etc
- 5.7. Nutritional care and counseling
- 5.8. Management of radiation mucositis, osteonecrosis

6. Neuro Surgery


- 6.1. Care of critically ill maxillofacial trauma patients with neurological deficit.
- 6.2. Assisting major surgical emergencies.
- 6.3. Assisting craniotomy cases, fracture reduction in craniofacial region, repair of dural tear.

7. General Medicine

- 7.1. Management of Diabetes Mellitus
- 7.2. Management of Hypertension
- 7.3. Management of Cardiac compromised
- 7.4. Management of Neurological cases
- 7.5. Care in ICCU
- 7.6. Management of Medical emergencies in Casualty dept. including cardio pulmonary resuscitation

8. Cleft and craniofacial Surgery

Students shall carry out all Oral Surgery Programme throughout the three academic years, particularly in tutorials, seminars lectures and clinical discussions. Full-time resident job in the department of OMFS, Cases of Trauma, tumours, Osteotomy, Oncology, infections and clefts are



attended under guidance. Treatment planning is given after thorough investigation and surgery carried out under the supervision of postgraduate Guide.

SYLLABUS - MDS - ORAL AND MAXILLOFACIAL SURGERY PART II- 3RD YEAR

The syllabus for the theory of Oral and Maxillofacial Surgery should cover the entire field of the subject and the following topics may be used as guidelines.

PAPER – I APPLIED BASIC SCIENCE, DIAGNOSTIC AIDS AND ANAESTHESIA

1. Oral and Maxillofacial Surgery – Definition and scope.
2. General principles and surgical technique with special reference to plastic surgery.
 - 2.1. Sterilization and Disinfection.
 - 2.2. Scrub technique
 - 2.3. Incision
 - 2.4. Wound healing
 - 2.5. Suture materials and techniques
 - 2.6. Dressings
3. Diagnosis in Oral and Maxillofacial Surgery.
 - 3.1. History taking
 - 3.2. Clinical examinations
 - 3.3. Radiographic examination
 - 3.4. Clinical laboratory diagnosis
 - 3.5. Biochemical profiles
 - 3.6. Special investigations
 - 3.7. Diagnostic aids – Biopsy, radiography
 - 3.8. Sialography & CT scan
 - 3.9. Recent advances in diagnostic aids with reference to oral and maxillofacial surgery
4. Local anesthesia
 - 4.1. Properties of local anesthetic drug
 - 4.2. Indications, contraindications
 - 4.3. Components of local anesthetic solution
 - 4.4. Mode of action of the anesthesia
 - 4.5. Complications and their management.
5. General anesthesia
 - 5.1. Properties of common drugs
 - 5.2. Preanaesthetic preparation of the patient and premedication.
 - 5.3. Short anaesthesia in Dental chair.
 - 5.4. Endotracheal anaesthesia
 - 5.5. Intravenous anaesthesia.



- 5.6. Complications and their management.
- 5.7. Hypotensive anesthesia
6. Medical emergencies in oral and maxillofacial surgery.
7. Importance of general conditions of the patient in relation to oral and maxillofacial surgery.
 - 7.1. Cardiac disorders
 - 7.2. Renal diseases
 - 7.3. Patients on steroid therapy, anticoagulant therapy
8. Fluid and electrolyte balance
9. Hematology – Blood, Bleeding disorders, coagulation
10. Hemorrhage and shock
11. Medically compromised patients – Management.
12. Surgical anatomy and pathology with special reference to Oral and Maxillofacial region.
13. Applied pharmacology in relation to Oral and Maxillofacial Surgery.
 - 13.1. Recent antibiotics, analgesic and Anti inflammatory drugs
14. Applied physiology in relation to Oral and Maxillofacial surgery.
15. Care of the hospitalized oral and maxillofacial surgery patient.
16. Biomaterials used in Oral and Maxillofacial Surgery.
17. Exodontia and impactions.

PAPER II – DISEASES & DEFECTS OF ORO-FACIAL REGION, SURGICAL PATHOLOGY


1. Acute and chronic infections of the Oral and Maxillofacial region.
 - 1.1. Odontogenic and non-odontogenic infections
 - 1.2. Soft tissue infections
 - 1.3. Facial space infections
 - 1.4. Hard tissue infections
 - 1.5. Osteomyelitis – classification, diagnosis and management specific infections of the oral and maxillofacial region management of infections
 - 1.6. Recent concepts in management.
2. Cysts of the Head and Neck region – Odontogenic and non-odontogenic, Its Etiology
 - 2.1. Pathology
 - 2.2. Clinical examination
 - 2.3. Diagnosis
 - 2.4. Investigations
 - 2.5. Management
 - 2.6. Recent advances
3. Tumours of the mouth and jaws
 - 3.1. Benign odontogenic and non odontogenic tumours.
 - 3.1.1. Etiology



- 3.1.2.Pathology
- 3.1.3.Diagnosis and Management
- 3.1.4.Ameloblastoma
- 3.1.5.Etiology and Pathology
- 3.1.6.Diagnosis and investigations
- 3.1.7.Management
 - 3.1.7.1. En block resections
 - 3.1.7.2. Peripheral ostotomy
 - 3.1.7.3. Hemi mandibulectomy
 - 3.1.7.4. Maxillectomy
- 4. Pre-malignant lesions of the oral cavity
 - 4.1. Leukoplakia
 - 4.2. Erythroplakia
 - 4.3. Submucous fibrosis etc,
- 5. Malignant tumours of the oral cavity
 - 5.1. Carcinomas and sarcomas
 - 5.2. Etiology
 - 5.3. Pathology
 - 5.4. Diagnosis and investigations
 - 5.5. Staging of tumours
 - 5.6. Different modalities of treatment with special reference to surgical treatment.
 - 5.6.1.Neck dissection
 - 5.6.2.Block dissection
 - 5.7. Recent advances in management.
- 6. Disease of the maxillary sinus
 - 6.1. Conditions involving the maxillary sinus
 - 6.2. Relationship to dental diseases
 - 6.3. Oro-antral fistula and foreign bodies in the maxillary sinus
 - 6.4. Cysts of the maxillary sinus
 - 6.5. Management of diseases of the maxillary sinus
- 7. Diseases of the Salivary Glands
 - 7.1. Surgical anatomy
 - 7.2. Disease of the duct and gland proper
 - 7.3. Sialadenitis
 - 7.4. Sialolithiasis – sialolithotomy
 - 7.5. Treatment planning & management
 - 7.6. Benign and malignant tumours of salivary gland pathology



- 7.7. Investigation with special references to sialography
- 7.8. Management.
8. Disease of the Temporomandibular joint
 - 8.1. Surgical anatomy
 - 8.2. Clinical examination, diagnostic aids
 - 8.3. Arthritis, hypoplasia and hyperplasia of the condyle
 - 8.4. Subluxation and dislocation
 - 8.5. Ankylosis
 - 8.6. Trismus – differential diagnosis
 - 8.7. Myofunctional pain dysfunctional syndrome
 - 8.8. Management of the disease of the Temporomandibular joint
 - 8.9. Surgery of the temporomandibular joint.
9. Neurological disorders of the maxillofacial regions
 - 9.1. Orofacial pain – concepts, pain pathways.
 - 9.2. Neuralgias
 - 9.3. Nerve palsies
 - 9.4. Nerve injuries
 - 9.5. Management
10. AIDS and Hepatitis in relation to oral and maxillofacial surgery
11. Systemic disease in relation to oral and maxillofacial surgery.
 - 11.1. Endocrine disorders
 - 11.2. Blood Dyscrasias
12. Auto immune diseases
13. **Surgical Pathology**
 - 13.1. Wound healing – as related to soft tissues, bone fracture, Dental sockets, grafts etc.
 - 13.2. Infections – Gross infections, specific infection of the jaws and mouth. Fungal infections of interest to oral surgeons.
 - 13.3. Actinomycosis, Granulomatous lesions of the oral cavity.
 - 13.4. Specific, non specific granulomas, pyogenic, lethal midline granulomas etc., Osteomyelitis developing from dentoalveolar abscess, Odontolysis, teeth fracture.
 - 13.5. Immune responses of the body, and its role in disease process, collagen diseases are related to the oral cavity. Recent concepts of immune reactions in transplants and oncology.
 - 13.6. Developmental abnormalities, atrophy, hypertrophy, dysplasia hypoplasia and hyperplasias, hamartomas – Osseous, Odontogenic etc. Congenital and hereditary anomalies of jaws, atrophy of jaws, diseases of T.M. Joint.

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- 13.7. Cyst and cyst like conditions – their pathogenesis, pathology and sequelae. Odontogenic cyst, follicular cyst, radicular cyst dermoid cysts, median cysts, nasopalatine cysts, globule maxillary cysts, simple retention cysts, retention cysts of
- 13.8. Pre – malignant conditions of the oral cavity, leukoplakia, erythroplakia of Quayrat, Bowens disease, Lichen planus etc. Grading of tumours – significance and prognosis in relation to therapy.
- 13.9. Neoplasms - Benign & malignant, modern concepts of oncogenesis, Diagnostic criteria and methods for benign neoplasm. General character, classification of pathology of benign tumours of jaws, salivary glands and other tissues of oral cavity.
- 13.10. Tumours of oral cavity including bony tumours, classifications, morphology and etiology of benign and malignant tumours.
- 13.11. Disease of the salivary glands and ducts.
- 13.12. Pathology of the Maxillary Sinus
- 13.13. Neurological disorders of the maxillofacial region

PAPER III – TRAUMATOLOGY AND MAXILLOFACIAL SURGICAL PROCEDURES

1. Maxillofacial trauma
 - 1.1. General examination
 - 1.2. Primary care and management of the patient
 - 1.3. Treatment planning
 - 1.4. Diagnostic aids – recent advances
2. Fractures of the Mandible
 - 2.1. Classification
 - 2.2. Diagnosis and treatment planning
 - 2.3. Different method of treatment
 - 2.4. Recent advances in the management.
3. Fractures of the middle third of the facial skeleton
 - 3.1. Classification, signs & symptoms
 - 3.2. Diagnosis and treatment planning
 - 3.3. Different method of treatment
 - 3.4. Recent advances in the management.
4. Fractures of the upper third of the facial skeleton
 - 4.1. Classification, signs & symptoms
 - 4.2. Diagnosis and treatment planning
 - 4.3. Different method of treatment
 - 4.4. Recent advances in the management.
5. Surgical procedures in relation to endodontic therapy – Apicoectomy
6. Implantology



- 6.1. Endosseous, mucosal, subperiosteal, transosseous implants
- 6.2. Osseointegration, tissue integration and tissue regeneration
- 6.3. Intraoral, extraoral and extra cranial implants
- 6.4. Recent advances in implantology
7. Pre-prosthetic surgery
 - 7.1. Principles and minor procedures
 - 7.2. Grafting technique
 - 7.3. Augmentation of alveolar ridge
 - 7.4. Vestibuloplasty
8. Orthognathic surgery
 - 8.1. Recognition and etiology of facial deformity
 - 8.2. Assessment of the patient
 - 8.3. Clinical examination
 - 8.4. Diagnostic aids- Cephalometrics
 - 8.5. Treatment planning
 - 8.6. Surgical procedures
 - 8.6.1. Mandible
 - 8.6.2. Midfacial skeleton
 - 17.1. Recent advances
9. Plastic and Reconstructive Surgery – Congenital & Acquired Defects
 - 9.1. Surgical correction of Cleft lip & palate
 - 9.2. Correction of post – traumatic deformities
 - 9.3. Major flaps used in reconstruction – skin & mucosal
 - 9.4. Repair of bone defects
10. Facial Aesthetic Surgical procedures
 - 10.1. Rhinoplasty
 - 10.2. Liposuction
 - 10.3. Face lifting procedures
 - 10.4. Laser cosmetic procedures
11. Distraction osteogenesis:
 - 11.1. Concepts and technique, Histiogenesis

PAPER IV – RECENT ADVANCES IN ORAL AND MAXILLOFACIAL SURGERY

A 3 hour theory pertaining to oral & Maxillofacial surgery, mentioned above with emphasis on recent advances



ESSENTIAL SKILLS TO BE LEARNED BY THE STUDENT DURING THE COURSE OF THE STUDY

Students shall be on full-time resident job in the department of OMFS and will manage/ help in manage cases of dento- alveolar surgery, trauma, tumors, cysts, facial deformities, oncology, infections and clefts. They are under guidance should also carry out all oral & maxillofacial surgery programme throughout the three academic years, particularly in tutorials, seminars lectures and clinical discussions. Treatment planning and its execution is to be learned under the supervision of a postgraduate Guide.

Requirements for the students are as follows

Key for the chart below


O -Observer

A-Assisting a senior

PA- Performs procedure under the direct supervision of a senior specialist

PI- Performs independently

Procedure	Category	Year	Number
Injection I.M. and I.V.	PI	I,II	50,20
Minor suturing and removal of sutures	PI	I	N,A
Incision & drainage of an abscess	PI	I	10
Surgical extraction	PI	I	15
Impacted teeth	PA, PI	I, II	20,10
Pre prosthetic surgery-	PI		
a) corrective procedures	PI	I	5
b) ridge extension	PA	I,II	3
c) ridge reconstruction	A	II,III	3
OAF closure	PI, PA	I, II	3,3
Maxillary fractures	PA, A	II, III	3, 5
Orbito- zygomatic fractures	PA, A	II, III	3, 5
Cyst enucleation	Pl.PA	I, II	5,5
Mandibular fractures	Pl, PA	I,II	10, 10
Periapical surgery	Pl, PA	I	5
Infection management	Pl, PA	I, II, III	N. A
Biopsy procedures	PI	I, II, III	N. A
Removal of salivary calculi	PA	II, III	3, 5
Benign tumors	Pl, PA	II, III	3, 3



Mid face fractures	PA, A	II, III	3, 5
Implants	PI, PA	II, III	5, 5
Tracheostomy	PA, A	II, III	2, 2
Orthognathic surgery	PA, A	II, III	3
Harvesting bone & cartilage grafts			
a) Iliac crest	PA, O		2, 3
b) Rib	A, O	II, III	2, 3
c) Calvarial	A, O		2, 3
d) Fibula	A, O		2, 3
T.M. Joint surgery	PA, A	II, I,	1
Jaw resections	PA, A	III, II	3, 3
Onco surgery	A, 0	III, III	3, 3
Micro vascular anastomosis	A, 0	III	3, 5
Cleft lip & palate	PA, A	II, III	5, 10
Distraction osteogenesis	A, 0	II, III	2, 3
Rhinoplasty	A, 0	III	3, 5
Access osteotomies and base of skull surgeries	A, 0	III	1, 1

The log book and record books are maintained about all work. Detailed history, investigations, treatment planning, preparation and assisting of all types of maxillofacial surgeries – major and cases – is to be recorded and to be presented in the Part II examination.

SCHEME OF EXAMINATION

3rd YEAR -MDS PART II Examination

1. Written examination

- i. Number of papers – 4
- ii. Duration – 3 hrs each
- iii. Maximum marks per paper – 100
- iv. Distribution of marks per paper – the type of questions in these papers will be two long essay questions carrying 20 marks each and six short essay questions each carrying ten marks. There will be no options in the questions of all papers.
- v. Title of the papers

Paper I – Applied Basic sciences, Diagnostic aids and Anaesthesia

Paper II – Diseases and defects of Oro-facial region and Surgical Pathology

Paper III- Traumatology and maxillofacial surgical procedures.

Paper IV – Essay - All the above topics in Oral and Maxillofacial surgery with emphasis on recent advances.



1. Practical / Clinical examination (Total - 400 marks)

- i. Duration -Two days
- ii. Time -9 am to 4 pm

Day I -

- 1. Minor Oral Surgery – impacted mandibular 3rd molar removal or any other surgical procedure under LA. 200 marks
- 2. Two Short cases discussion (2 x 40 marks) 80 marks
- 3. One long case – discussion 120 marks

Day II-

- 1. Pedagogy presentation and discussion
- 2. Radiographs, instruments – identification and discussion

Viva Voce – (200 marks)

Each candidate will be evaluated by a panel of four examiners – 50% of the examiners should be external examiners. (from other states).

Each examiner will have to evaluate the candidates independently, graded and practical and viva voce marks compiled.



LIST OF RECOMMENDED TEXT BOOKS

- | | |
|---|-----------------------------|
| • Maxillofacial injuries | L- Rowe & Williams |
| • Oral & Maxillofacial Trauma | Raymond J Fonseca |
| • Surgery of the Mouth & Jaws | JR. Moore |
| • Oral & Maxillofacial Surgery Vol I & II | Daniel M. Laskin |
| • Oral & Maxillofacial infections | Richard G. Topazion |
| • Dentofacial Deformities (Vol, II & III) | Brunce N., Epker, L C. Fish |
| • Text book of Oral & Maxillofacial Surgery | Neelima A. Malik |
| • Oral & Maxillofacial Surgery | Raymond J Fonseca |
| • Oral cancers | Mc Cregor |
| • Local Anesthesia | Malamed |



- Medical Emergencies Malamed
- Plastic Surgery Joseph J. Mc Carthy
- Surgical Orthodontics Hell, Profitt, Moore
- TMJ Disorders David A. Keith
- A Practical Guide to Hospital Dentistry George Varghese
- A Practical Guide to the Management of Impacted Teeth George Varghese
- Peterson's Principles of Oral & Maxillofacial Surgery Vol I & II Edited by G.E.Ghali
- Oral and Maxillofacial Surgery Vol I and II Peter Ward Booth
- Craniofacial Distraction Osteogenesis Samchukov
- Approaches to the Facial Skeleton Edward Ellis
- Oral Cancer Jatin Shah
- Medical Problems in Dentistry Scully and Cowson
- Anaesthesia R.D.Miller
- Wylie and Churchill Davidson's A Practice of Anaesthesia Healy, Knight, Lina
- Pain Bonca
- Local flaps in Facial Reconstruction Shah L.Baker
- Plastic Surgery (8 vol) Joseph McCarthy
- ENT (7 vol) Scott and Brown
- Surgical Correction of Facial Deformities Varghese Mani
- Head and Neck Surgery Stell and Maran
- Salivary Gland Disorders Carlson and Ord
- Contemporary Implant Dentistry Carl E.Misch
- Oral and Maxillofacial Surgery Secrets Abubaker
- Sedation- A Guide to Patient Management Malamed
- Infection Control & Management of Hazardous Material Miller & C Palnik
- Clinical Review of Oral & Maxillofacial Surgery Bagheni
- Principles of Dental Suturing: A Complete Guide to Surgical Closure - Silverstein
- Craniomaxillofacial Reconstruction & Corrective Bone Surgery- Greenberg and Prin
- Bell's Orofacial Pain Oksan, Bell
- Osseointegration in Dentistry: An Overview Worthington, Lang
- Surgical Correction of Dentofacial Deformities- New Concepts William Bell
- Grab and Smith's Plastic Surgery William C. Grab
- Endoscopic Facial Plastic Surgery Gregory S.Keller
- Facial Paralysis: Rehabilitation Techniques Mark May
- Laser Applications in Oral & Maxillofacial Surgery Catone & Aling
- Cysts of Orofacial Region Shear & Spright



LIST OF RECOMMENDED JOURNALS

- Journal of Oral & Maxillofacial Surgery
- Journal of Craniofacial Surgery
- British Journal of Oral & Maxillofacial Surgery
- American Journal of Oral & Maxillofacial Surgery
- Journal of Dental Research
- Journal of American Dental Association.
- Journal of Indian Dental Association.
- Journal of AOMSI
- Oral and Maxillofacial Surgery Clinics of North America
- Journal of Dentistry
- International Dental Journal
- Dental Clinics of North America
- Triple 'O' (Jr. of Oral Path., Oral medicine , Oral Surgery and Endodontics)
- Quintessence International.

MDS - BRANCH 4 CONSERVATIVE DENTISTRY AND ENDODONTICS

OBJECTIVES:

1. **Knowledge based objectives:** are met by a variety of teaching methods, including seminars, lectures, essays, a research project, computer assisted learning, practical classes and a log diary. In addition students are encouraged to consolidate their clinical knowledge by teaching undergraduates.
2. **Skill based objectives:** Involving the treatment of patients and developed in the preclinical phantom head laboratories before starting work in the clinical departments. Patients are allocated to your care and you are expected to carry out the treatment under supervision and guidance. Attempt should be made to do maximum number of cases in an organized and scientific way so as to be well versed in all aspects of the specialty. Sufficient skill has to be developed in proper history taking and posting in the outpatient unit should be used to develop your clinical acumen. Preparation and presentation of seminars, research projects (dissertation) and log book will enhance your skills of documentation and presentation. Every opportunity to enhance your communication skills should be put to best use.
3. **Attitude based objectives:** an attitude of constructive self-criticism should be cultivated during seminars and clinical training. Although clinical work within the department is supervised, you are encouraged to formulate appropriate treatment strategies (which must



be agreed with your guide), take responsibility for their implementation and seek guidance when appropriate.

You have to develop a humane and considerate attitude to all your patients. High moral and ethical integrity are imperative so is obligation to the society.

COURSE CONTENTS

MDS Part II – Third Year

SYLLABUS FOR PART II MDS – CONSERVATIVE DENTISTRY AND ENDODONTICS

The syllabus for the theory of Conservative Dentistry and Endodontics should cover the entire field of the subject and the following topics may be used as guidelines.

CONSERVATIVE DENTISTRY

- 1.1. Introduction to Operative Dentistry**
 - 1.2. Definition, history
- 2. Dental Anatomy, Histology, Physiology, Occlusion**
- 3. Cariology, Etiology, Prevention and Control**
 - 3.1. Definition, hypotheses, classification.
 - 3.2. Plaque. Definition, pathophysiology, clinical characteristics, histopathology
 - 3.3. Caries diagnosis, prevention, treatment
- 4. Enamel and Dentin Adhesion**
 - 4.1. Challenges to dentin bonding
 - 4.2. Hybrid layer
 - 4.3. Dentin bonding agents
- 5. Tooth preparation**
- 6. Cavity preparation**
 - 6.1. Terminology
 - 6.2. Stages and steps in cavity preparation
 - 6.3. Factors affecting tooth preparation
- 7. Instruments and Equipment for Tooth Preparation**
 - 7.1. Hand cutting instruments
 - 7.2. Powered cutting equipment
 - 7.3. Rotary cutting instruments – burs and abrasives
 - 7.4. Hazards with cutting instruments
- 8. Infection Control**
 - 8.1. HIV and AIDS
 - 8.2. Viral hepatitis
 - 8.3. Aseptic techniques
 - 8.4. Sterilization



8.5. Dental control unit water systems and handpiece asepsis

8.6. Infection control of impressions

9. Patient Examination, Diagnosis and Treatment Planning

9.1. Patient assessment

10. Initial steps prior to treatment

10.1. Patient and operator position

10.2. Pain control – newer techniques.

10.3. Isolation of operating field

11. Material Considerations in Composite Restorations

11.1. Properties

11.2. General considerations

11.3. Clinical technique

12. Class I to Class VI of Composite Restorations

13. Tooth Colored Inlays and Onlays

14. Other Conservative Esthetic Procedures

14.1. Aesthetics and golden proportion

14.2. Bleaching

14.3. Veneers and resin bonded splints

14.4. Conservative bridges

15. General Considerations for Amalgam restorations

16. Class I to Class VI Amalgam

16.1. Indications and contraindications

16.2. Advantages and disadvantages

16.3. Clinical technique

16.4. Restoration procedures

17. Complex Amalgam Restorations

18. Cast Metal Restorations

18.1. Indications and Contraindications

18.2. Advantages and Disadvantages

18.3. Clinical Technique

18.4. Impression taking and fabrication

18.5. Cementation of the restoration

19. Direct Gold Restoration.

20. Lasers and its applications.

ENDODONTICS

1. Pulp development, structure & function

1.1. Pulp & dentin development, structure



- 1.2. Dentin sensitivity and painful pulpitis
2. **Pulpal Reaction to Dental Caries & Dental Procedures**
 - 2.1. Dental caries and sequelae
 - 2.2. Reaction of pulp to local anaesthetics, cavity and crown preparation
 - 2.3. Reaction to restorative materials
 - 2.4. Periapical pathology
3. **Microbiology and Immunology**
 - 3.1. Role of bacteria in pulpal and periradicular diseases
 - 3.2. Pathways of pulpal and periapical infections
 - 3.3. Flora of root canal and periradicular space
 - 3.4. Irrigants and intracanal medicaments
4. **Instruments, Materials and Devices**
 - 4.1. Classification of instruments & materials
 - 4.2. Instruments for root canal preparation
 - 4.3. Physical and mechanical properties of hand instruments
 - 4.4. Instruments for sealing the root canal
 - 4.5. Auxiliary instrument & devices
 - 4.6. Endosonics (Ultrasonic)
 - 4.7. Greater taper instruments
 - 4.8. Endodontics materials - core and sealer materials
 - 4.9. Lasers
 - 4.1. Endodontic micro surgery.
 - 4.2. Magnification in endodontics.
 - 4.3. Mineral Trioxide Aggregate.
5. **Endodontic Emergencies**
 - 5.1. Endodontic diagnosis and management.
6. **Non-odontogenic Facial Pain**
7. **Cases Selection and Treatment Planning**
 - 7.1. Evaluation of patient
 - 7.2. Evaluation of the tooth
 - 7.3. Treatment planning
8. **Preparation for Treatment**
 - 8.1. Preparation of patient
 - 8.2. Preparation of operator
 - 8.3. Endodontic radiography
 - 8.4. Isolation of tooth
9. **Armamentarium and Sterilization**



10. Tooth Morphology and Access Preparation

11. Cleaning and Shaping the Root Canal System

- 11.1. Working length determination
- 11.2. Instrumentation methods
- 11.3. Instrumentation techniques
- 11.4. Engine driven, power driven, sonic and ultrasonic instruments
- 11.5. Smear layer in endodontics and its importance
- 11.6. Iatrogenic complications during cleaning and shaping canal
- 11.7. Irrigants

12. Obturation of the Root Canal System

- 12.1. Objectives of canal obturation
- 12.2. Techniques of obturation using different types of filling materials and sealers
- 12.3. Newer techniques of obturation
- 12.4. Healing of periapical tissue following obturation

13. Endodontic Traumatology

- 13.1. Traumatic injuries
- 13.2. Classification and treatment
- 13.3. Crown fractures - fracture of enamel, fracture involving dentin, fracture involving the pulp, pulp capping, pulpotomy, apexogenesis, follow up
- 13.4. Root fractures, healing of fractured roots
- 13.5. Treatment of fractured root not communicating with oral cavity, pulp obliteration, apexification.
- 13.6. Treatment of fractured root communicating with the oral cavity.
- 13.7. Minor fractures of alveolar – process
- 13.8. Subluxation, avulsion and replantation
- 13.9. Splinting of teeth
- 13.10. Prevention of traumatic injuries to teeth.
- 13.11. Revascularisation.

14. Root Resorption

- 14.1. Definition, causes
- 14.2. External root resorption and management
- 14.3. Internal root resorption and management
- 14.4. Systemic causes of root resorption

15. Endodontic - Periodontic Interrelationship

- 15.1. Effect of pulpal disease on periodontium
- 15.2. Effect of endodontic treatment on periodontium
- 15.3. Effect of periodontal disease and its treatment on pulp



16. Surgical Endodontics

- 16.1. Definition, scope and prognosis
- 16.2. Contraindications and indication for surgery
- 16.3. Pre-surgical work up
- 16.4. Soft tissue management in endodontic surgery
- 16.5. Hard tissue management
- 16.6. Root resection and retro filling procedures
- 16.7. Post operative complication and management
- 16.8. Recent advances in periradicular surgery

17. Bleaching of Vital and Pulpless teeth

- 17.1. Case selection for bleaching and contraindications
- 17.2. Causes of discoloration – extrinsic and intrinsic
- 17.3. Micro abrasion technique
- 17.4. In office bleaching of vital teeth
- 17.5. Bleaching pulpless teeth
- 17.6. Night guard vital bleaching

18. Pediatric & Geriatric Endodontics

19. Endodontic Failure and Treatment

- 19.1. Extent of Endodontic failures
- 19.2. Criteria for evaluating treatment results
- 19.3. Causes of endodontic failures
- 19.4. Retreatment of endodontic failures
- 19.5. The Apexum Procedure.

20. Endodontic implants

- 20.1. Material systems, techniques, types.

21. Post Endodontic Restorations

DENTAL MATERIALS

1. Categories of Dental Materials

- 1.1. Direct and indirect materials
- 1.2. History of restorative materials

2. Structure of Matter

- 2.1. Primary and secondary bonding
- 2.2. Crystalline and noncrystalline structure
- 2.3. Adhesion and bonding

3. Physical Properties

- 3.1. Abrasion resistance, viscosity, creep, flow, color
- 3.2. Tarnish and corrosion



4. Mechanical Properties

- 4.1. Stress and strain
- 4.2. Elastic deformation
- 4.3. Strength – different types
- 4.4. Toughness, brittleness, ductility and malleability, hardness

5. Solidification and Microstructure of Pure Metals and Alloys

- 5.1. Metallic bond
- 5.2. Solidification of metals. Grain size
- 5.3. Solid solutions
- 5.4. Equilibrium phase diagram
- 5.5. Coring, homogenization, dendrite formation
- 5.6. Eutectic alloys, peritectic alloys, solid state reactions

6. Polymer Science

- 6.1. Classification, chemistry, physical properties, types, copolymerization

7. Biocompatibility

- 7.1. Adverse effects of dental materials
- 7.2. Measuring biocompatibility
- 7.3. Responses to specific materials

8. Impression Materials

- 8.1. Elastomeric impression materials–composition, chemistry, properties, manipulation
- 8.2. Hydrocolloids
- 8.3. Alginate, impression compound, impression pastes

9. Gypsum products

- 9.1. Types, composition, setting reaction, properties

10. Inlay Casting Wax

11. Casting Investments and Procedures

- 11.1. Types, composition, setting expansion
- 11.2. Die materials, sprue, casting ring liner, investing, casting, defective casting

12. Burs, Abrasives, Dentifrices

- 12.1. Principles of cutting, types

13. Bonding and Restorative Resins

- 13.1. Acid etch technique, bonding agents, pit and fissure sealants
- 13.2. Composites. Classification, composition, properties, curing, finishing
- 13.3. Posterior composites, composite veneers

14. Dental Cements

- 14.1. Classification, composition, properties, uses
- 14.2. Liners and varnishes



15. Dental Amalgam

- 15.1. Composition, manufacture, properties, advantages and disadvantages
- 15.2. Steps in placement, mercury hygiene

16. Direct Filling Gold

17. Casting and Soldering Alloys

- 17.1. Classification. Noble and base metal alloys.
- 17.2. Soldering

18. Dental Ceramics

- 18.1. Classification, methods of strengthening, metal ceramics
- 18.2. Newer materials

PRE-CLINICAL EXERCISES

1. Exercise on Plaster Models

1.1. For Amalgam Restorations

- 1.1.1. Class II cavity, MO with distal, pit and palatal extension on 16.
- 1.1.2. Class II MOD cavity with distal cusp capping on 36
- 1.1.3. Class II distal cavity on 35
- 1.1.4. Class II distal cavity including mesial pit on 35.

1.2. For Cast Restorations

- 1.2.1. Class II Box Preparation on 36.
- 1.2.2. Class II Full tapered slice on 36
- 1.2.3. Class II Modified Slice on 36
- 1.2.4. Class II Modified flare on 36
- 1.2.5. Onlay preparation with missing buccal cusps on 36

1.3. For Acid - Etch Restorations

- 1.3.1. Class III typical cavity on 11
- 1.3.2. Class III with lingual wall missing on 11
- 1.3.3. Class IV with labial and lingual walls missing on 11
- 1.3.4. Traumatic fracture of one angle on 11
- 1.3.5. Traumatic fracture of both angles on 11

2. Sectioning Of Extracted Teeth

2.1. Horizontal Section Showing Pulp Chamber

- 2.1.1. Max Central incisor
- 2.1.2. Max Canine
- 2.1.3. Max first premolar
- 2.1.4. Max second premolar
- 2.1.5. Max first Molar
- 2.1.6. Mand Central incisor



- 2.1.7.Mand Canine
- 2.1.8.Mand First premolar
- 2.1.9.Mand Second premolar
- 2.1.10. Mand first molar
- 2.2. Vertical Section Showing Pulp Chamber And Root Canals
 - 2.2.1.Max central incisor
 - 2.2.2.Max. Canine
 - 2.2.3.Max. First premolar
 - 2.2.4.Max. Second premolar
 - 2.2.5.Max. first Molar
 - 2.2.6.Mand Central incisor
 - 2.2.7.Mand canine
 - 2.2.8.Mand first Premolar
 - 2.2.9.Mand Second Premolar
 - 2.2.10. Mand first Molar
- 2.3. Access Cavity Preparations(under magnifying loupe)
 - 2.3.1.Max central incisor
 - 2.3.2.Max. Canine
 - 2.3.3.Max. First Premolar
 - 2.3.4.Max. Second Premolar
 - 2.3.5.Max. First Molar
 - 2.3.6.Mand Central incisor
 - 2.3.7.Mand canine
 - 2.3.8.Mand first premolar
 - 2.3.9.Mand Second premolar
 - 2.3.10. Mand First Molar
- 2.4. Endodontics Exercises On Extracted Teeth (under magnifying loupe)
 - 2.4.1.** Stepback preparation and lateral condensation technique on 16 and 36.
 - 2.4.2.Preparation using protaper and 4% taper instruments, & lateral condensation.
 - 2.4.3.Crown down preparation and vertical condensation on 11 with obtura.
 - 2.4.4.Section obturated teeth and observe under operating microscope.
- 3. Exercises On Typodont
 - 3.1. Post and core preparation on 11
 - 3.2. Preparation of Jacket crown on 11
 - 3.3. Preparation of metal crown with acrylic facing on 13
 - 3.4. Three fourths crown preparation on 13
 - 3.5. Preparation of bridge for missing 15



3.6. Preparation of CI. V inlay on 45

3.7. Preparation of MOD inlay on 46

4. Exercises on Extracted Teeth

4.1. Gold inlay preparation

4.1.1. Tooth preparation & wax pattern fabrication

- 4.1.1.1. Max molar – Mesio occlusal
- 4.1.1.2. Max molar – disto occlusal
- 4.1.1.3. Max molar – Mesio occlusal – distal
- 4.1.1.4. Mand. Molar – Mesio occlusal
- 4.1.1.5. Mand. Molar – Disto Occlusal
- 4.1.1.6. Mand. Molar – Mesio Occluso – distal
- 4.1.1.7. Mand. Premolar – Mesio Occlusal
- 4.1.1.8. Mand. Premolar – Mesio occluso – distal
- 4.1.1.9. Max. Premolar – Disto – Occlusal

4.1.2. Tooth Preparation, casting and finishing

- 4.1.2.1. Max molar – Mesio occlusal
- 4.1.2.2. Max molar – disto occlusal
- 4.1.2.3. Max molar – Mesio occlusal- distal
- 4.1.2.4. Mand. Molar – Mesio occlusal
- 4.1.2.5. Mand. Molar – Disto Occlusal
- 4.1.2.6. Mand. Molar – Mesio Occluso – distal

4.2. Indirect tooth colored preparation – composite, ceramic

4.2.1. Crown Preparation

- 4.2.1.1. Max. Central incisor (2)
- 4.2.1.2. Max. lateral incision – (2)
- 4.2.1.3. Max. Canines – (2)
- 4.2.1.4. Mand. Centrals -(2)
- 4.2.1.5. Max. premolar -(2)
- 4.2.1.6. Mand. Premolar -(2)
- 4.2.1.7. Max. molars -(2)
- 4.2.1.8. Mand. Molars -(2)

4.3. Endocrown preparation on mandibular molar

4.4. Post and Core Preparation

- 4.4.1. Max. Anterior teeth – (2)

4.5. Onlay Preparation

- 4.5.1. Max teeth -(1)
- 4.5.2. Mand teeth -(1)



4.6. Bridge for missing upper second premolar -(1)

CLINICAL REQUIREMENTS:1. *First Year:*

- 1.1. Anterior aesthetic restorations-GIC, Composite - 30 cases
- 1.2. Anterior Endodontics- - 30 cases
- 1.3. Amalgam fillings - Pin retained and bonded amalgams - 20 cases
- 1.4. Management of deep caries lesion-Pulpotomy, pulp Capping - 20 cases
- 1.5. Apexification and Apexogenesis - 5 cases

2. *Second Year:*

- 2.1. Cast restorations-inlays and Onlays - 20 cases
- 2.2. Direct posterior tooth colored restorations - 20 cases
- 2.3. Bleaching-Vital and non vital - 10 cases each
- 2.4. Post and core restorations-Prefabricated
[light transmitting and metal] -10 cases each
- 2.5. Core build up and full crown - 15 cases
- 2.6. Anterior and posterior endodontics - 50 cases
- 2.7. Rotation Posting of 15 days each in
 - 2.7.1. Periodontics
 - 2.7.2. Prosthodontics
 - 2.7.3. Oral surgery

3. *Third Year:*

- 3.1. Aesthetic and functional rehabilitation of complex conditions
[such as amelogenesis imperfecta] - 5 cases
- 3.2. Complex cases with multi disciplinary approach-
Endo-perio cases - 10 cases
- 3.3. Surgical Endodontics- Apicoectomy -10 cases
- 3.4. Post and core fabrication – custom made and cast-anterior -15 cases
-posterior -5 cases
- 3.5. Veneer -5 cases
- 3.6. Retreatment and fractured instrument removal -5 cases
- 3.7. Rehabilitation in cases of endodontic traumatology -15 cases
- 3.8. Posterior endodontics – difficult cases management -25 cases

Library Dissertation: Should be a comprehensive review of the selected topic which should be finalized and approved by the end of the first six months and the same to be submitted at the end



of the first year before appearing for the Part I examination. It should be approved by the guide and certified by the Head of the Department.

Conferences and Publication of Scientific Papers: During the MDS course the student should attend national conferences and attempts should be made to present at least three scientific papers and publish at least two scientific articles in a journal relevant to the speciality.

Minimum Requirements:

1. Seminars - 20
2. Journal Clubs - 15
3. Teaching training programme for under graduate students – lecture and clinical – 20
4. Scientific paper publication in an indexed journal – 2 articles
5. Scientific paper presentation in conference – State/National/Speciality – 3
6. Should attend at least one workshop in dental materials research

Scheme of Examination

Third Year M.D.S. Part II Examination

1. Written Examination

- i. Number of papers - 4
- ii. Duration - 3 hours each
- iii. Maximum marks per paper - 100
- iv. Distribution of marks per paper - First three papers will be having two long essay questions carrying 20 marks each and six short essay questions each carrying ten marks. There will be no choice in the questions for any of the first three papers. Fourth paper will be a single essay question paper where there will be an option and the candidate should answer only one essay.

v. Title of the papers

a. Paper I – Conservative Dentistry

b. Paper II – Endodontics

c. Paper III – Dental Materials and Public Health Dentistry

d. Paper IV – Essay on Recent advances on Conservative Dentistry and Endodontics

2. Practical/Clinical and Viva Voce Examination

- I. Duration - Two Days
- II. Time - 9 am to 4 pm
- Clinical examination – Three Exercises - 400 marks

The Practical / Clinical examination will include Conservative Dentistry, Endodontics and Dental Materials.

Day 1

**Forenoon**

- Exercise I – Tooth preparation for cast post and core and inlay wax impression
- Exercise II- Rubber dam placement, access cavity preparation, pulp extirpation, working length determination, biomechanical preparation and master cone radiograph – on molar tooth.
- Evaluation of preclinical exercises, clinical records and other academic activities.

After noon

- Exercise III – Posterior Class II Composite Restoration.

Day II**Forenoon**

- Gingival retraction and Impression taking after cementation of post and core.

After noon

- Viva voce (including presentation of dissertation / pedagogy).

Marks

200

MARK DISTRIBUTION OF PRACTICAL EXAMINATION & VIVA- VOCE**Practical / Clinical Examination-****400 Marks**

5. Evaluation of preclinical exercises, clinical records, other academic activities and overall performance during the course

50 marks**6. Clinical procedures****6.1. Cast Post and Core****100 marks**

- a. Case presentation and treatment plan 20
- b. Post space preparation 20
- c. Coronal preparation 20
- d. Wax pattern 20
- e. Gingival retraction and impression 20

6.2. Molar RCT**150 marks**

- a. Case presentation and treatment plan 20
- b. Isolation and fluid control 20
- c. Access cavity preparation 50
- d. Working length determination 20
- e. Pulp space preparation 20
- f. Master Cone Selection 20

6.3. Posterior Class II Composite restoration**100marks**

- a. Case presentation and treatment planning 20
- b. Isolation and fluid control 20
- c. Tooth preparation 30
- d. Matricing and wedging 10



e. Restoration

20

Viva Voce -

200 Marks

i. Viva-Voce examination:

160

All examiners will conduct viva-voce conjointly on candidate's comprehension, analytical approach, expression, interpretation of data and communication skills.

ii. Dissertation presentation / Pedagogy

40



RECOMMENDED TEXTBOOKS AND REFERENCE BOOKS

ENDODONTICS

- | | | |
|---|--|--------------------------|
| 1. Pathways of the Pulp | Stephen Cohen | 10th Edition |
| 2. Ingle's Endodontics | John Ingle | 6 th Edition |
| 3. Endodontic Therapy | Franklin S. Weine | 7 th Edition |
| 4. Grossman's Endodontic Practice | Suresh Chandra, Gopikrishna | 12 th Edition |
| 5. Color Atlas Of Microsurgery In Endodontics | Syngcuk Kim | Nov. 2000 |
| 6. Endodontic Microsurgery | Enrique Merino | 1 st Edition |
| 7. Endodontic Surgery | C R Stockdale | Nov. 1992 |
| 8. Endodontics | Christopher J. R. Stock, Kishor Gulabivala And Richard T. Walker | 3 rd Edition |
| 9. Endodontics | Mahmoud Torabinejad | 4 th Edition |



10. Essential Endodontology D Orstavik
11. Text Book Of Endodontics Mithra Hegde
12. Textbook Of Endodontics Garg

OPERATIVE DENTISTRY

1. Sturdevant's Art & Science of Operative Dentistry Theodore M. Roberson 5th edition
2. Fundamentals of Operative Dentistry: A Contemporary Approach Summitt 2nd edition
3. Operative Dentistry Modern Theory and Practice M A Marzouk 2nd edition
4. Pickard's Manual of Operative Dentistry E A M Kidd 1996
5. Advanced Operative Dentistry Luiz Narciso Baratieri Dec. 1993
6. Advances in Operative Dentistry: Volume 1: Contemporary Clinical Practice Jean-Francois Roulet Aug. 2001
7. Advances in Operative Dentistry: Volume 2: Challenges of the Future Jean-Francois Roulet Oct. 2001
8. Decision Making in Operative Dentistry Paul A. Brunton Dec. 2002
9. Failure in the Restored Dentition: Management and Treatment Michael D. Wise Jan. 1995
10. Minimally Invasive Restorations with Bonding M Degrange Jan. 1997
11. Operative Dentistry : A Practical Guide to Recent Innovations (Clinical Sciences in Dentistry) Hugh Devlin 1st edition
12. Restorative Dentistry A. D. Walmsley June 2002
13. Restorative Dentistry An Integrated Approach P H Jacobsen Aug. 1998
14. Clinical Operative Dentistry- Ramya Raghu.

DENTAL MATERIALS

1. Phillips' Science of Dental Kenneth J 11th Edition



Materials		
2. Craig's Restorative Dental Materials	John M.	12 th Edition
3. Restorative Dental Materials	Robert G. Craig	11 th Edition
4. Applied Dental Materials	J F McCabe	7 th Edition
5. Clinical Aspects of Dental Materials: Theory Practice and Cases	Marcia Gladwin	2 nd Edition
6. Clinical Aspects of Dental Materials: Theory Practice and Cases	Marcia A Gladwin	3 rd Edition
7. Dental Biomaterials	Bagby	
8. Dental Materials and Their Selection	William J. O'Brien	3 rd Edition
9. Dental Materials: Properties and Manipulation	John M. Powers	9 th edition
10. Introduction to Dental Materials	Richard Van Noort	2 nd Edition
11. Introduction to Dental Materials	Richard Van Noort	3 rd Edition
12. Materials in Dentistry Principles and Applications	Jack L Ferracane	2 nd Edition
13. Materials Science for Dentistry	Dr. Brian W. Darvell	9 th Edition

LIST OF JOURNALS

1. Journal of Endodontics
2. International Endodontic Journal
3. Journal of Operative Dentistry
4. Dental Clinics of North America
5. Dental Materials
6. Endodontics & Dental Traumatology
7. Australian Dental Journal
8. JADA
9. Journal of Dental Research
10. Journal of Restorative & esthetic Dentistry
11. British Dental Journal
12. Journal of Indian Dental Association



13. Journal of Conservative Dentistry
14. International Dental Journal
15. Journal of Dentistry
16. Journal of Dental Materials

MDS - BRANCH 5

ORTHODONTICS & DENTOFACIAL ORTHOPEDICS

OBJECTIVES OF THE COURSE

The training programme in Orthodontics is to structure and achieve the following four objectives

- a. Knowledge
- b. Skills
- c. Attitude
- d. Communicative skills and ability

1. Knowledge of

1. The dynamic interaction of biologic processes and mechanical forces acting on the stomatognathic system during orthodontic treatment.
2. The etiology, pathophysiology, diagnosis and treatment planning of various common Orthodontic problems.
3. Various treatment modalities in Orthodontics – preventive, interceptive and corrective.
4. Basic sciences relevant to the practice of Orthodontics.
5. Interaction of social, cultural, economic, genetic and environmental factors and their relevance to management of Oro-facial deformities.
6. Factors affecting the long range stability of orthodontic correction and their management.
7. Personal hygiene and infection control, prevention of cross infection and safe disposal waste, keeping in view the high prevalence of Hepatitis and HIV and other highly contagious diseases.

2. Skills

1. To obtain proper clinical history, methodical examination of the patient, perform essential diagnostic procedures, and interpret them and arrive at a reasonable diagnosis about the dentofacial deformities.
2. To be competent to fabricate and manage the most appropriate appliance intra or extra oral, removable or fixed, mechanical or functional, and active or passive – for the treatment of any orthodontic problem to be treated singly or as a part of multidisciplinary treatment of orofacial deformities.



3. Attitudes

1. Develop an attitude to adopt ethical principles in all aspects of Orthodontic practice.
2. Professional honesty and integrity are to be fostered.
3. Treatment care is to be delivered irrespective of the social status, cast, creed or religion of the patients.
4. Willingness to share the knowledge and clinical experience with professional colleagues.
5. Willingness to adopt, after a critical assessment, new methods and techniques of orthodontic management developed from time to time based on scientific research, which are in the best interest of the patient.
6. Respect patient's rights and privileges, including patients right to information and right to seek a second opinion.
7. Develop attitude to seek opinion from allied medical and dental specialists as and when required.

4. Communication Skills

1. Develop adequate communication skills particularly with the patients giving them the various options available to manage a particular dentofacial problem and to obtain a true informed consent from them for the most appropriate treatment available at that point of time.
2. Develop the ability to communicate with professional colleagues, in Orthodontics or other specialties through various media like correspondence, internet e-video conference, etc. To render the best possible treatment.

COURSE CONTENT

The program outlined, address both the knowledge needed in Orthodontics and allied Medical specialties in its scope. A minimum of three years of formal training through a graded system of education as specified, will equip the trainee with skill and knowledge at its completion to be able to practice basic Orthodontics and have the ability to intelligently pursue further apprenticeship towards advanced orthodontics.

SPREAD OF THE CURRICULUM

- A. 6 months teaching of basic subjects including completion of pre-clinical exercises.
- B. 2 ½ years of coverage of all the relevant topics in orthodontics, clinical training involving treatment of patients and submission of dissertation. These may be divided into blocks of 6 to 8 months duration each, depending on the training policies of each institution.

1. Pre-Clinical Exercises

A general outline of the type of exercise is given here. Every institution can decide the details of exercises under each category.

1. General Wire bending exercises to develop the manual dexterity.



2. Clasps, Bows and springs used in the removable appliances.
3. Soldering and welding exercises.
4. Fabrication of removable habit breaking, mechanical and functional appliances, also all types of space maintainers and space regainers.
5. Bonwill Hawley ideal arch preparation
6. Construction of orthodontic models trimmed and polished preferably as per specifications of Tweed or A.B.O.
7. Cephalometric tracings and various Analyses, also superimposition methods.
8. Fixed appliance typodont exercises.
 - 8.1. Training shall be imparted in one basic technique i.e. Standard Edgewise/Begg technique or its derivatives/Straightwire etc. with adequate exposure to other techniques.
 - 8.2. Typodont exercise.
 - 8.2.1. Band making
 - 8.2.2. Bracket positioning and placement
 - 8.2.3. Different stages in treatment appropriate to technique taught.
9. Clinical Photography
10. Computerized imaging
11. Preparation of surgical splints, and splints for TMJ problems
12. Handling of equipments like vacuum forming appliances and hydrosolder etc.

First Year

I. Basic Pre-Clinical Exercise Work for the MDS Students:

First 6 Months

1. NON-APPLIANCE EXERCISES

All the following exercises should be done with **0.7** or **0.8mm** wire

SI. No.	Exercise	No.
1	Straightening of 6" & 8" long wire	1 each
2	Square of 2" side	1
3	Rectangle of 2" x 1" sides	1
4	Triangle of 2" side	1
5	Circle of 2" diameter	1
6	Bending of 5 U's	1
7	Bending of 5 V's	1

2. CLASPS

SI. No	Exercise	No.
1	$\frac{3}{4}$ Clasps	2
2	Full clasps	2



3	Triangular Clasps	2
4	Adam's clasp - upper molar	2
5	Adam's Clasp - lower molar	2
6	Adam's Clasp - Pre-molar	2
7	Adam's Clasp - Incisor	2
8	Modification of Adam's - With Helix	2
9	Modification of Adam's - With distal extension	2
10	Modification of Adam's - With soldered tube	2
11	Duyzing Clasps on Molars	2
12	Southend Clasp	1

3. LABIAL BOWS

SL NO	Exercise	NO
1	Short labial bow (upper & lower)	1
2	Long labial bow (upper & lower)	1
3	Robert's retractor	1
4	High labial bow-with apron springs	1
5	Mill's labial bow	1
6	Reverse loop labial bow	1
7	Retention labial bow soldered to Adam's clasp	1
8	Retention labial bow extending distal to second molar	1
9	Fitted labial bow	1
10	Split high labial bow	1

4. SPRINGS

SI No	Exercise	No
1	Finger spring-mesial movement	2
2	Finger spring-distal movement	2
3	Double cantilever spring	2
4	Flapper spring	2
5	Coffin spring	2

6	T spring	2
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5. CANINE RETRACTORS

SI No	Exercise	No
1	U loop canine retractor	2 PAIRS
2	Helical canine retractor	2 PAIRS
3	Palatal canine retractor	2 PAIRS
4	Self-supporting canine retractor	2 PAIRS
5	Self-supporting canine retractor	2 PAIRS

6. APPLIANCES

SI No	Exercise
1	Hawley's retention appliance with anterior bite plane
2	Upper Hawley's appliance with posterior bite plane
3	Upper expansion appliance with coffin spring
4	Upper expansion appliance with expansion screw
5	Lower expansion appliance with expansion screw
6	Habit breaking appliance with tongue crib
7	Oral screen and double oral screen
8	Lip bumper
9	Splint for Bruxism
10	Catalans appliance
11	Activator
12	Bionator
13	Frankel-FR 2 appliance
14	Twin block
15	Lingual arch
16	TPA
17	Quad helix
18	Bi helix
19	Utility arches
20	Pendulum appliance

7. SOLDERING EXERCISES

SI.No.	Exercise	No.
1	Star	1



2	Comb	1
3	Christmas tree.	1
4	Soldering buccal tube on molar bands	1

8. WELDING EXERCISES

SI.No.	Exercise
1	Pinching and welding of molar, premolar, canine and Incisor bands
2	Welding of buccal tubes and brackets on molar bands and incisor bands

9. **Impression of upper and lower arches in alginate**

10. **Study model preparation**

11. **Model analysis**

SI. No.	Exercise
1	Impression of upper and lower dental arches
2	PREPARATION OF STUDY MODEL -1 And all the permanent dentition analyses to be done.
3	PREPARATION OF STUDY MODEL – 2 And all the permanent dentition analyses to be done.
4	PREPARATION OF STUDY MODEL – 3 And all the mixed dentition analyses to be done.

12. CEPHALOMETRICS

SI. No.	Exercise
1	Lateral cephalogram to be traced in five different colors and super imposed to see the accuracy of tracing
2	Steiner's analysis
3	Down's analysis
4	Tweed analysis
5	Rickett's analysis
6	Burrstone analysis
7	Rakosi's analysis
8	Mc Namara analysis
9	Bjork analysis
10	Coben's analysis
11	Harvold's analysis
12	Soft tissue analysis - Holdaway and Burstone

**13. Basics of Clinical Photography including Digital Photography****14. Light wire bending exercises for the Begg technique**

SI.No.	Exercise
1	Wire bending technique on 0.016' wire circle "Z" Omega
2	Bonwill-Hawley diagram
3	Making a standard arch wire
4	Inter maxillary hooks- Boot leg and Inter Maxillary type
5	Upper and Lower arch wire
6	Bending a double back arch wire
7	Bayonet bends (vertical and horizontal offsets)
8	Stage-III arch wire
9	Torquing auxiliary (upper)
10	Reverse Torquing (lower)
11	Up righting spring

15. TYPHODONT EXERCISES

1. Teeth setting in Class-II division I malocclusion with maxillary anterior proclination and mandibular anterior crowding
2. Band pinching, welding brackets and buccal tubes to the bands
3. Stage-I
4. Stage-II
5. Pre Stage-III
6. Stage-III

2. Orthodontic Topics

The under mentioned topics will be part of study in 3 year course. The educational methods recommended are: seminars, and workshops, review of literature and auto tutorials/ self-learning packages. **The syllabus for the theory of Orthodontics should cover the entire field of the subject and the following topics may be used as guidelines.**

1. Orthodontic history, historical perspectives, evolution of orthodontic appliances, pencil sketch history of orthodontic peers, history of orthodontics in INDIA.
2. Facial growth and development: Overview of growth process and physiology of stomatognathic system from prenatal period to maturity and old age. Comprehensive study of craniofacial biology and pathophysiology, and survey of all contemporary literature.
3. Concepts of occlusion and esthetics, structure and function of all anatomic components of occlusion, mechanics of articulation, recording of masticatory function, diagnosis of occlusal



dysfunction, relationship of TMJ anatomy and pathology and related neuromuscular physiology.

4. Social development, adolescent psychology, behavioural psychology and communication, motivation and psychological problems related to orthodontics.
5. Dentofacial anomalies: Anatomical, psychological and pathological characteristics of major groups of developmental defects of the orofacial structures.
6. Applied genetics, principles of oro-facial genetics molecular basis of genetics, genetic risks, counseling, bioethics and relationship to Orthodontic management of patients.
 - 6.1. Physical anthropology of Head and Neck
 - 6.2. Applied Pharmacology
7. Etiology of malocclusion: A comprehensive review of the local and systemic factors in the causation of malocclusion and recent concepts.
8. Biology of tooth movement: A comprehensive review of the principles of tooth movement. Review of contemporary literature. Special emphasis on applied histophysiology of bone and PDL, molecular and ultra cellular consideration in tooth movement.
9. Basic principles of mechanotherapy: Dental materials – applied aspects as related to appliance construction. Design of removable and fixed orthodontic appliances and their manipulation. Survey of contemporary literature on treatment methods and results. Specifications of and test methods for materials used in orthodontics. Applied physics, Bioengineering and metallurgy.
10. Orthodontic clinical examination, diagnosis and treatment planning: Emphasis on the process of data gathering, and treatment planning. Problem oriented cases analysis and management. Management of adult cases, handicapped and mentally retarded patients and their special problems. Critical analysis of treated cases.
11. Applied Dental Materials
 - 11.1. Gypsum Products: Dental Plaster, Dental Stone and their properties, setting reaction, etc.
 - 11.2. Impression materials: Impression materials in general and alginate impression material in particular.
 - 11.3. Acrylics: Chemistry, composition and Physical Properties.
 - 11.4. Composite: Composition, types, properties and setting reaction.
 - 11.5. Banding and Bonding cements: Zinc Phosphate, Zinc silicophosphate, Zinc polycarboxylate, resin cements and glass ionomer cements.
 - 11.6. Wrought metal alloys: Deformation, strain hardening, annealing, recovery, recrystallization, grain growth, properties of metal alloys.
 - 11.7. Orthodontic arch wires: Stainless steel, gold, wrought Co-Cr-Ni alloys, α and β titanium alloys. . Nickel titanium and esthetic wires.
 - 11.8. Bracket materials – esthetic and non esthetic



- 11.9. Elastics: Latex and non latex elastics.
- 11.1. Applied Physics: Bioengineering and metallurgy.
- 11.2. Specifications and test methods used for materials in orthodontics.
- 11.3. Survey of all contemporary literature and recent advances in the above mentioned materials.
12. Myofunctional orthodontics: Basic principles, contemporary appliances, their design and manipulation. Case selection and evaluation of the treatment results. Review of current literature.
13. Orthodontic/ Orthognathic surgery: Orthodontist's role in conjoint diagnosis and treatment planning. Pre and post surgical orthodontics: Participation in actual clinical cases, progress evaluation and post retention study. Review of current literature.
14. Ortho/Perio/Prosthetic interrelationship: Principles of interdisciplinary patient treatment. Common problems and their management.
15. Dentofacial orthopedics: Principles, biomechanics, appliance design and manipulation. Review of contemporary literature.
16. Limited tooth movement: Removable appliances, their design, fabrication and management.
17. Applied preventive aspects in orthodontics: Caries and periodontal disease prevention. Oral hygiene measures, clinical procedures.
18. Interceptive Orthodontics: Principles, growth guidance, diagnosis treatment planning and therapy emphasis on dentofacial problems and tooth material discrepancies and minor surgery for orthodontics.
19. Cephalometrics: Instrumentation, image processing, tracing and analysis of errors and applications. Radiation hygiene. Advanced cephalometric techniques and treatment prediction. Comprehensive review of literature, video imaging principles and application.
20. Introduction to applied research methodology in Orthodontics, Experiment design, animal experiment protocols, and principles in the development, execution and interpretation of methodologies in orthodontics. Critical scientific appraisal of literature.
21. Applied bio-statistics for clinical orthodontics and research. Emphasis on experimental models, design and interpretation, Development of skills for preparing clear and concise scientific abstract and publication.
22. Retention and relapse: Mechanotherapy – Special reference to stability of results with various procedures. Post retention analysis. Review of contemporary literature.
23. Cleft lip and palate rehabilitation – Diagnosis and treatment planning. Mechanotherapy – Special growth problems of cleft cases. Speech physiology, pathology and elements of therapy as applied to Orthodontics and tem rehabilitative procedures.
24. Practice management in Orthodontics: Economics and dynamics of solo and group practices. Personnel management, materials management, public relations, professional relationship,



dental ethics and jurisprudence. Office sterilization procedures and community based orthodontics.

25. Recent advances like use of mini implants, lasers, application of F.E.M. Distraction osteogenesis etc. as related to orthodontics, Lingual orthodontics, invisible orthodontics, etc.

3. The teaching program should be structured one with following aspects clearly spelt out.

3.1. Objectives and the expected learning outcome from each block of 6-8 months duration

3.2. Methods of teaching, individual topics namely didactic lectures, seminars, journal club, tutorials, discussion, etc.

3.3. Assessing method and the frequency of assessment.

3.4. Remedial measures

4. Clinical training in the following aspects.

4.1. Removable active appliances- 5 cases

4.2. Class-I malocclusion with Crowding

4.3. Class-I malocclusion with bi-maxillary protrusion

4.4. Class-II division-1

4.5. Class-II division-2

4.6. Class-III (Orthopedic, Surgical, Orthodontic cases)

4.7. Inter disciplinary cases

4.8. Removable functional appliance cases like activator, Bionator, functional regulator, twin block and new developments

4.9. Fixed functional appliances - Herbst appliance, jasper jumper etc - 5 cases

4.10. Dento-facial orthopedic appliances like head gears, rapid maxillary expansion NiTi expander etc., - 5 cases

4.11. Appliance for arch development such as molar distalization - 5 cases

4.12. Fixed mechano therapy cases (Begg, PEA, Tip edge, Edgewise)

4.13. Retention procedures of above treated cases.

Other work to be done during FIRST YEAR

1. **Seminars:** One Seminar per week to be conducted in the department. A minimum of five seminars should be presented by each student each year

2. **Journal club:** One Journal club per week to be conducted in the department. A minimum of five should be presented by each student each year.

3. **Library assignment** to be submitted on or before the end of 10 months.

4. Protocol for dissertation to be submitted on or before the end of nine months from the date of admission.

5. **Under graduate classes:** Around 4 - 5 classes should be handled by each post-graduate student

6. **Field survey:** To be conducted and submit the report



7. **Inter-departmental meetings:** should be held once in a month.
8. **Case discussions**
9. **Field visits:** To attend dental camps and to educate the masses
10. Basic subjects classes
11. Internal assessment or Term paper.

Second Year:

The clinical cases taken up should be followed under the guidance of a postgraduate teacher. More case discussions and cases to be taken up. Other routine work as follows.

1. **Seminars:** One Seminar per week to be conducted in the department. Each student should present a minimum of five seminars each year.
2. **Journal club:** One Journal club per week to be conducted in the department. Each student should present a minimum of five seminars each year.
3. **Undergraduate classes:** each post-graduate student should handle Around 4-5 classes.
4. **Inter-departmental meetings:** Should be held once in a month
5. **Case discussions**
6. **Field visits:** To attend dental camps and to educate the masses.
7. **Attendance in Conferences, CDEs, Workshops, etc.**
8. **Publication of Scientific Articles.**
9. **Internal assessment.**
10. **Dissertation work:** On getting the approval from the university work for the dissertation to be started.

Third Year:

The clinical cases taken up should be followed under the guidance. More cases discussions and cases to be taken up. Other routine work as follows:

1. **Seminars:** One Seminar per week to be conducted in the department. Each student should present a minimum of five seminars each year.
2. **Journal Club:** One Journal club per week to be conducted in the departments minimum of five should be presented by each student each year
3. **Under graduate classes:** each post - graduate student, should handle around 4-5 classes.
4. **Inter-departmental meetings:** Should be held once in a month.
5. **The completed dissertation should be submitted six months before the final examination (by the end of 29th month of commencement of course)**
6. **Case discussions**
7. **Field visits:** To attend dental camps and to educate the masses.
8. **Attendance in Conferences, CDEs, Workshops, etc.**
9. **Publication of Scientific Articles**
10. **Finishing and presenting the cases taken up.**



11. **Preparation of finished cases and presenting the cases** (to be presented for the examination)

12. **Mock examination**

Allocation of patients

Each postgraduate student should start a minimum of 50 cases of his/her own: additionally he/she should handle a minimum of 25 transferred cases.

Active participation in or at least exposure to multi-disciplinary treatment is essential.

5. **Dissertation**

5.1. The protocol for dissertation should be submitted within 6 months of start of course.

5.2. The completed dissertation should be submitted 6 months before the final examination.

5.3. The dissertation should not be just a repetition of a previously undertaken study but it should try to explore some new aspects.

5.4. The panel of examiners should approve the dissertation before the candidate appears for the University examination.

6. **Monitoring Learning Progress**

It is essential to monitor the learning progress of each candidate through continuous app and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring should be done by the staff of the department and participation of students in various teaching / learning activities. It may be structured assessment be done using checklists that assess various aspects. Checklists are given in Section IV.

7. **MDS Part II Examination**

Scheme of Examination: Theory : 400 Marks

Practical: 400 Marks

Viva Voce: 200 Marks

Written examination shall consist of four question papers each of three hours duration. Total marks for each paper will be 100.

Title of the Papers

Paper I – Growth and Development, Occlusion, Genetics, Child and Adult Psychology, Applied Material Science

Paper II – Diagnosis and Treatment Planning in Orthodontics

Paper III – Clinical Orthodontics

Paper IV - ESSAY

Paper I, II and III shall consist of two long questions carrying 20 marks each and 6 short essay questions carrying 10 marks each. Paper IV will be-one Essay. Questions on recent advances may be asked in any or all the papers.



Practical / Clinical Examination : **400 Marks**

Exercise No: 1 Functional Case : 100 Marks

Selection of case for functional appliance with case discussion and recording of construction bite.

Fabrication and delivery of the appliance the next day with chairside viva.

Exercise No: 2 Multiband exercise 100 Marks

1. III stage with auxiliary springs

OR

2. Bonding of SWA brackets and construction of suitable arch wire.

Exercise No. 3 Display of records of

the treated cases (minimum of 5 cases)

5 cases x 30 marks = 150 Marks

(including seminars, thesis, Library dissertation, certificates of conferences, courses, paper publications etc)

Exercise No:4-Long case discussions: 50 Marks

No	Exercise	Marks allotted	Approximate time
1	Functional appliance	100	2 hours
2	III stage mechanics/ Bonding an arch wire fabrication	100	1 hour 30 min
3	Display of case records (a minimum of 5 cases to be presented with all the cases)	150	1 hour
4	Long cases	50	2 hours

Viva Voce - Total 200 (160 marks for the grand viva and 40 marks for thesis defense / pedagogy)

All examiners will conduct viva-voce conjointly on candidate's comprehension, analytical approach expression, interpretation of data and communication skills. It includes all components of course contents. It includes presentation and discussion on dissertation also.





RECOMMENDED BOOKS:

1. WILLIAM R. PROFFIT, Contemporary Orthodontics
2. GRABER & VANARSDALL, Orthodontics - Current Principles & Techniques
3. MOYERS, Text Book of Orthodontics
4. GRABER, Orthodontics Principles and practice.
5. GRABER, PETROVIC, & RAKOSI Dentofacial Orthopedics with Functional Appliances
6. ATHENASIOU E ATHENASIOU, Orthodontic cephalometry
7. JACOBSON, Radiographic Cephalometry
8. RAKOSI, An Atlas And Manual of Cephalometric Radiography
9. ENLOW, Handbook of Facial Growth
10. EPKER & FISH, Dentofacial Deformities Vol. 1
11. PROFFIT & WHITE, Surgical Orthodontic Treatment
12. NANDA, Biomechanics in Clinical Orthodontics
13. NANDA & BURSTONE, Retention and Stability in Orthodontics
14. OKESON, Management of T.M. Disorders And Occlusion
15. LOU NORTON & DAVIDOWITZ, Biology of tooth movement
16. GERHARD PFIEFER, Craniofacial Abnormalities and clefts of the lip, Alveolus and Palate.
17. OKESON, TMJ Disorders.
18. Mc LAUGHLIN, BENNET AND TREVESI – Systemised Orthodontic treatment mechanics
19. V. P. JAYADE – Refined Begg for Modern Times
20. NANDA – Temporary anchorage devices in Orthodontics

References

1. L. JOHNSTON, New Vistas in Orthodontics
2. LEE GRABER, Orthodontics - State of the Art-
3. The Essence of Science
4. NIKOLAI, Bio Engineering Analysis of Orthodontic Mechanics
5. M. RAKOSI & GRABER, A Color Atlas of Dental Medicine
6. BURSTONE, Modern Edgewise Mechanics and Segmented Arch Technique
7. W J CLARK, The Twin Block Functional Therapy
8. McNAMARA & BRUDON, Mixed Dentition
9. R D ROBLEE, Interdisciplinary Dentofacial Therapy



10. NANDA, The Developmental Basics of Occlusion and Malocclusion
11. TIMMS, Rapid Maxillary Expansion
12. WILLIAMS & COOKS, Fixed Orthodontic Appliances
13. RICKETTS, Bioprogressive Therapy
14. VAN DER LINDEN, Quintessence Series
15. MICHIGAN CENTER, Craniofacial Growth Series for human growth and Development
16. SALZMAN, Practice of Orthodontics VoL II and I
17. ROHIT SACHDEVA, Orthodontics for the next millennium
18. SCHWIDLING, The Jasper Jumper
19. ROBERT RICKETTS, Provocations and perceptions in Craniofacial Orthopedics

LIST OF RECOMMENDED JOURNALS

1. American Journal of Orthodontics and Dentofacial Orthopedics
2. Journal of Orthodontics (formerly British Journal of Orthodontics)
3. Angle Orthodontist
4. Journal of Clinical Orthodontics
5. Journal of Indian Orthodontic Society
6. Seminars in Orthodontics
7. Journal of Orthodontics and Dentofacial Orthopedics
8. European Journal of Orthodontics
9. Australian Journal of Orthodontics
10. International Journal of Adult Orthodontics and Orthognathic surgery
11. The Functional Orthodontist.

MDS – BRANCH 6

ORAL PATHOLOGY AND ORAL MICROBIOLOGY

1. OBJECTIVES AND GOALS OF THE COURSE

The following objectives are laid out to achieve the goals of the course. The following sub-headings may be considered as objectives.

1.1. Knowledge

- Should have a thorough knowledge of Dental Anatomy for tooth identification and Histology of normal oral tissues.
- Etiology, pathogenesis, histopathological diagnosis and management of common pathological conditions affecting the Oral and maxillofacial region
- Familiarize with the biochemical, microbiologic, immunology and genetic aspects of maxillofacial lesions.



- Describe various treatment modalities of oral disease from historical to the currently available ones.
- Describe interrelationship between oral disease and various systemic conditions.
- Describe mucosal lesions due to iatrogenic causes and deleterious habits and prevention of it.
- Identify rarities in oro-facial diseases, syndromes and their genetic and molecular biologic determinant in a given case.
- Recognize conditions that may be outside the area of his specialty / competence and refer them to an appropriate specialist.
- Update themselves by attending course, conference and seminars relevant to Oral and maxillofacial pathology.
- Plan out / carry out research activities at both basic and clinical aspects with the aim of publishing his works in scientific journals.
- Reach to the public to motivate and educate regarding oral precancerous diseases its prevention and consequences if not treated.
- Shall develop knowledge, skill in the science and practice of Oral and maxillofacial pathology, Oral Histology and Dental Anatomy.
- Shall develop teaching skills in the field of maxillofacial pathology.

1.2. Skills and Attitudes

- The PG student is expected to acquire the necessary skill and expertise to independently diagnose and manage cases of clinical significance encompassing the broad area of oral and maxillofacial region.
Hence he must have a sound knowledge of etiopathogenesis, clinical features, histopathology, treatment and prognosis of oral and Para oral pathologies.
- Take a proper clinical history: through intraoral and extra oral examinations, medical history evaluation, essential advice, diagnostic procedures and interpretation to come to a diagnosis.
- Effective motivation and education regarding oromucosal disease management.
- An adequate knowledge and expertise of various histological and cytological techniques performed in histopathological laboratory.
- An adequate knowledge about the recent histopathological, molecularbiological, genetic and cytological techniques which aid the pathologist to arrive at a definite diagnosis.

1.3. Human values, ethical practice and communication abilities

- Adopt ethical principles in all aspects of treatment modalities; professional honesty and integrity are to be fostered.



- Develop communication skills to make awareness regarding oral diseases.
- Apply high moral and ethical standards while carrying out human or animal research.
- Be humble, accept limitations in his knowledge and skill, and ask for help from colleagues when needed.
- Respect patients rights and privileges, including patients' right to information and right to seek a second opinion

COURSE CONTENTS

SYLLABUS FOR MDS PART II – ORAL PATHOLOGY AND MICROBIOLOGY

The syllabus for the theory of Oral Pathology and Microbiology should cover the entire field of the subject and the following topics may be used as guidelines.

First year

1. Biostatistics and Research Methodology

- 1.1. Basic principles of biostatistics and study as applied to dentistry and research
- 1.2. Collection/organization of data/measurement scales presentation of data analysis.
- 1.3. Measures of central tendency.
- 1.4. Measures of variability.
- 1.5. Sampling and planning of health survey.
- 1.6. Probability, normal distribution and indicative statistics.
- 1.7. Estimating population values.
- 1.8. Tests of significance (parametric/non-parametric qualitative methods.)
- 1.9. Analysis of variance
- 1.10. Association, correlation and regression.

Approach:

- Didactic lectures on biostatistics and discussion on research methodology by eminent researchers.
- Two - day P.G. orientation course including general approach PG course, library and main dissertation, journal club topic selection and presentation, seminars, clinico-pathological meets, teaching methodology and use of audiovisual aids.

2. Oral Histology

- 2.1. Structure of the Oral tissues.
- 2.2. General embryology
- 2.3. Embryology of the Head, Face and Oral cavity.
- 2.4. Cytoskeleton, junctions and fibroblasts
- 2.5. Hard tissue formation and destruction.
- 2.6. Development of the tooth and its supporting tissues.
- 2.7. Bone



- 2.8. Dentinogenesis
- 2.9. Dentin pulp complex
- 1.1. Amelogenesis
- 1.2. Enamel structure.
- 1.3. Development of the Periodontium
- 1.4. Periodontium
- 1.5. Physiologic Tooth movement eruption and Shedding
- 1.6. Salivary Glands
- 1.7. Oral Mucosa
- 1.8. Temporomandibular joint
- 1.9. Repair and Regeneration of Dental Tissue
- 1.10. Prenatal and postnatal facial growth and development
- 1.11. Histochemistry of the oral tissues.
- 1.12. Lab procedures in hard tissue processing for histopathology

3. Oral Physiology / Biology

- 3.1. Pain
- 3.2. Temperature, touch, tastes, and olfaction
- 3.3. Mastication, swallowing, and related activities
- 3.4. Microcirculation
- 3.5. Biology of the dentin – pulp complex
- 3.6. Mineralized tissues; bone
- 3.7. Dental mineralized tissues
- 3.8. Salivary glands and saliva
- 3.9. Drugs: salivary excretion and oral side effects
- 3.10. Nutrition: effect on physiologic and pathologic processes
- 3.11. Nutrition and oral tissues
- 3.12. Oral Microbiology
- 3.13. Dental caries
- 3.14. Periodontal disease
- 3.15. Anaerobic infections of the head and neck.
- 3.16. Prevention and control of caries and periodontal disease

4. Applied Gross Anatomy of Head and Neck including Histology:

- 4.1. Temporomandibular joint
- 4.2. Trigeminal nerve and facial nerve
- 4.3. Muscles of mastication
- 4.4. Tongue
- 4.5. Salivary glands



4.6. Nerve supply; blood supply, lymphatic drainage and venous drainage of Oro dental tissues.

4.7. Embryology

4.7.1. Development of face, palate, mandible, maxilla, tongue and applied aspects of the same

4.7.2. Development of teeth and dental tissues and developmental defects of oral and maxillofacial region and abnormalities of teeth

4.8. Maxillary sinus

4.9. Jaw muscles and facial muscles

5. Genetics:

5.1. Introduction modes of inheritance, chromosomal anomalies of oral tissues and single genetic disorders.

Approach:

- To be covered as didactic lectures.
- Posting in department of anatomy for dissection of head, face and neck.

6. Physiology (General and oral)

6.1. Saliva

6.2. Pain

6.3. Mastication

6.4. Taste

6.5. Deglutition

6.6. Wound healing

6.7. Vitamins (Influence on growth, development and structure of oral soft and hard tissues and paraoral tissues.)

6.8. Calcium metabolism.

6.9. Theories of mineralization.

6.1. Tooth eruption and shedding.

6.2. Hormones. (Influence on growth, development and structure of oral soft and hard tissues and para oral tissues.)


6.3. Blood and its constituents.

Approach:

- To be covered as didactic lectures.

7. Cell Biology:

7.1. Cell-structure and function (ultrastructural and molecular aspects), intercellular junctions, cell cycle and division, cell cycle regulators, cell - cell and cell - extra cellular matrix interactions.



7.2. Detailed molecular aspects of DNA, RNA, and intracellular organelles, transcription and translation and molecular biology techniques.

Approach:

- To be covered as seminars and didactic lecture.

8. General Histology:

Light and electron microscopy considerations of Epithelial tissues and glands, bone, hematopoietic system, lymphatic system, muscle, neural tissue, endocrinal system (thyroid, pituitary, parathyroid)

Approach:

- Topics to be covered as didactic lectures.
- Postings in the department of anatomy and histology for slide discussion
- Record book to be maintained.

9. Biochemistry:

9.1. Chemistry of carbohydrates, lipids and proteins.

9.2. Methods of identification and purification.

9.3. Metabolism of carbohydrates, lipids and proteins.

9.4. Biological oxidation.

9.5. Various techniques - cell fractionation and ultra filtration, centrifugation, Electrophoresis, Spectrophotometry, and radioactive techniques.

Approach:

- Topics to be covered as didactic lectures.
- Postings to the department of biochemistry to familiarize with various techniques
- Record book to be maintained.

10. General Pathology:

Inflammation and chemical mediators, thrombosis, embolism, necrosis, repair, degeneration, shock, hemorrhage pathogenic mechanisms at molecular level and blood dyscrasias, Carcinogenesis and Neoplasia.

Approach:

- To be covered as seminars and didactic lectures.

11. General Microbiology:

Definitions of various types of infections.



Routes of infection and spread

Sterilization, disinfection and antiseptics.

Bacterial genetics.

Physiology and growth of microorganisms.

Approach:

- To be covered as seminars and didactic lectures. Record book to be maintained.

12. Basic Immunology

Basic principles of immunity, antigen and antibody reactions.

Cell mediated immunity and Humoral immunity.

Immunology of hypersensitivity.

Immunological basis of the autoimmune phenomena.

Immunodeficiency with relevance to opportunistic infections.

Basic principles of transplantation and tumor immunity.

Approach:

- To be covered as didactic lectures.

13. Systemic microbiology/applied microbiology

14. Morphology, classification, pathogenicity, mode of transmission, methods of pre collection and transport of specimen, for laboratory diagnosis, staining methods, comi culture media, interpretation of laboratory reports and antibiotic sensitivity tests.

14.1. Staphylococci

14.2. Streptococci

14.3. Corynebacterium diphtheria

14.4. Mycobacteria

14.5. Clostridia, bacteroides and fusobacteria © Actinomycetales

14.6. Spirochetes

15. Virology:

15.1. General properties: structure, broad classification of viruses, pathogenesis, pathology of viral infections.

15.2. Herpes virus: list of viruses included, lesions produced, pathogenesis, latency principles and laboratory diagnosis.

15.3. Hepatitis virus: list of viruses, pathogenesis, and mode of infection, list of diagnostic tests, and their interpretations, methods of prevention and control.

15.4. Human Immunodeficiency virus: structure with relevance to laboratory diagnosis, type of infection, laboratory tests and their interpretation, universal precautions, specific precautions and recent trends in diagnosis and prophylaxis.

**16. Mycology:**

16.1. General properties of fungi, classification bases on disease, superficial, subcutaneous, deep opportunistic infections.

16.2. General principles of fungal infections, diagnosis rapid diagnosis method of collection of sample and examination for fungi.

Approach:

- To be covered as seminars and didactic lectures
- Postings to the dept. of microbiology to familiarize with relevant diagnostic methods
- Record book to be maintained

17. Oral Biology (oral and dental histology)

17.1. Structure and function of oral, dental and paraoral tissues including their ultra structure, molecular and biochemical aspects.

17.2. Study of morphology of permanent and deciduous teeth

(Lectures and practical demonstrations to be given by PG students)

Approach:

- To be covered as seminars and didactic lectures.
- Slide discussion on histological appearance of normal oral tissues.
- Record book to be maintained.

18. Basic molecular biology and techniques:

18.1. Experimental aspects - DNA extraction, PCR, western blotting.

Approach:

- To be covered as didactic lectures
- Postings in centers where facilities are available for demonstration of routine molecular biology techniques.
- Record book to be maintained.

19. Basic histo techniques and microscopy:

19.1. Routine hematological tests and clinical significance of the same.

19.2. Biopsy procedures for oral lesions.

19.3. Processing of tissues for Paraffin lesions.

19.4. Microtome and principles of microtomy.

19.5. Routine stains, principles and theories of staining techniques

19.6. Microscope, principles and theories of microscopy.

19.7. Light microscopy and various other types including electron microscopy.



19.8. Methods of tissue preparation for ground sections, decalcified sections.

Approach:

- Topics to be covered as seminars.
- Preparation of ground and decalcified sections, tissue processing, sectioning and staining.
- Record book to be maintained

Academic activities:

1. Submission of synopsis of dissertation at the end of six months.
2. Journal clubs and seminars to be presented by every post graduate student twice a month.
3. To attend interdepartmental meetings.
4. To attend dental camps based on the survey to be done.
5. Library assignment to be submitted at the end of 10 months before appearing for the MDS Part I examination.

SECOND YEAR

1. Oral Pathology

- 1.1. Developmental defects of oral and maxillofacial region and abnormalities of teeth
- 1.2. Dental caries (Introduction, Epidemiology, microbiology, cariogenic bacterial including properties, acid production in plaque, development of lesion, response of dentine - pulp unit, histopathology, root caries, sequelae and immunology).
- 1.3. Pulpal and Periapical diseases
- 1.4. Infections of oral and Para oral regions (bacterial, viral and fungal infection)
- 1.5. Non - neoplastic disorders of salivary glands
- 1.6. Bone pathology
- 1.7. Hematological disorders
- 1.8. Physical and chemical injuries, allergic and Immunological diseases.
- 1.9. Cysts of odontogenic origin
- 1.10. Dermatologic diseases.
- 1.11. Periodontal diseases
- 1.12. Oral manifestations of systemic diseases
- 1.13. Facial pain and neuromuscular disorders including TMJ disorders
- 1.14. Regressive alterations of teeth

2. Clinical Pathology:

- 2.1. Laboratory investigations - Hematology, Microbiology and Urine analysis

Approach:

- Postings to Clinical Pathology for relevant training
- Record book to be maintained.



3. Specialized histotechniques and special stains:

Special staining techniques for different tissues.

Immunohistochemistry

Preparation of frozen sections and cytological smears

Approach:

- Training to be imparted in the department or in other institutions having the facility
- Record book to be maintained

4. Recording of Case history and Clinico-pathological discussions:

Approach

- Posting to the department of Oral medicine, Diagnosis and Radiology and Oral and Maxillo-facial surgery
- Record of case histories to be maintained

5. Dermatology

Study of selected mucocutaneous lesions-etiopathogenesis, pathology, clinical presentation and diagnosis.

Approach

- Posting to the Dept of Dermatology of a Medical college
- Topics to be covered as Seminars
- Record of cases seen to be maintained.

6. Oral Oncology

Detailed study including Pathogenesis, molecular and biochemical changes of tumor like lesions and Premalignant lesions affecting the hard and soft tissues of oral and paraoral tissues, Tumour markers

Approach:

- To be covered as seminars
- Posting to a Cancer center to familiarise with the pathological appearances, diagnosis, radio-diagnosis and treatment modalities.

7. Oral Microbiology and immunology

7.1. Normal Oral microbial flora

7.2. Defense mechanism of the oral cavity

7.3. Microbiology and immunology of Dental caries and Periodontal diseases © Dental caries (Introduction, epidemiology, microbiology, cariogenic bacteria including properties, acid production in plaque, development of lesion, response of dentin-pulp unit, histopathology, root caries, sequelae and immunology)

7.4. Tumor immunology



7.5. Infections of Pulp and Periapical and periodontal tissues

7.6. Oral sepsis and Bacterimia

7.7. Microbial genetics

7.8. Infections of oral and Para oral regions (bacterial, viral and fungal infections)

Approach

- To be covered as seminars

8. Forensic Odontology:

Legal procedures like inquest, medico-legal evidences post mortem examination of violence around mouth and neck, identification of deceased individual-dental importance.

Bite marks rugae patterns and lip prints.

Approach

- To be covered as seminars
- Posting to a Cancer center to familiarize with the pathological appearances, diagnosis, and
- radio-diagnosis and treatment modalities

9. Histopathology - slide discussion

Record book to be maintained

10. Laboratory techniques and Diagnosis

10.1. Routine hematological tests and clinical significance of the same

10.2. Microtome and principles of microtomy

10.3. Routine stains, principles and theories of staining techniques

10.4. Microscope, principles and theories of microscopy

10.5. Light microscopy and various other types including electron microscopy

10.6. Methods of tissue preparation for ground sections, decalcified sections.

10.7. Special stains and staining techniques for different tissues

10.8. Immunohistochemistry

10.9. Preparation of frozen sections and cytological smears

11. Other Topics in Oral Pathology.

11.1. Detailed description of diseases affecting oral mucosa, teeth, supporting tissues & jaws

11.2. Cysts of the oral & Para-oral regions

11.3. Systemic diseases affecting oral cavity.

Approach:

- Seminars & Slide discussions.
- Record notebook to be maintained.
- Training in histo-pathology slide reporting.

12. Experimental aspects of Oral diseases



Approach: Posting is desirable in Centers where animal experimentation is carried out to familiarize with laboratory technique's, upkeep & care of experimental animals.

13. Recent advances in Oral Pathology.

Approach: Update of knowledge in Oral Pathology through study of recent journals & Internet browsing. Journal Clubs & Group discussions

14. Academic activities

- 14.1. Commencement of dissertation work
- 14.2. Journal clubs and seminars to be presented by every PG student
- 14.3. Clinico - pathological discussions once in a month by every PG student
- 14.4. To attend interdepartmental meetings.
- 14.5. Lecture and practical classes and slide discussions to be taken for II BDS students in oral and dental anatomy, dental histology and oral physiology.
- 14.6. Year ending examination (theory and practical) to be conducted by the college.

IIIIRD YEAR

1. Non-neoplastic disorders of salivary glands.
2. Bone pathology
3. Physical and chemical injuries, allergic and Immunological diseases.
4. Cysts of odontogenic origin
5. Oral manifestations of systemic diseases

Approach

To be covered as seminars Slide discussions of the same Record book to be maintained

6. Academic activities

- 6.1. Visit to Center of Animal Experimentation to familiarize with Laboratory techniques, upkeep and care of animals
- 6.2. Completion of Dissertation work and submission of the same, six months before the Final Examination
- 6.3. Study of Journals, Internet Browsing, and group discussions, to update knowledge in the recent advances in Oral Pathology
- 6.4. Lecture and Practical demonstrations for third B.D.S students in Oral pathology and Microbiology
- 6.5. Reporting of histopathology slides
- 6.6. Journal clubs and Seminars to be presented by every post graduate student twice a month
- 6.7. Clinico-pathological discussions by every student once in a month
- 6.8. To attend Interdepartmental meetings.



PAPER I – ORAL HISTOLOGY, ORAL PATHOLOGY, ORAL MICROBIOLOGY, IMMUNOLOGY AND FORENSIC ODONTOLOGY

1. ORAL PATHOLOGY

- 1.1. Developmental defects of the oral and maxillofacial region.
- 1.2. Abnormalities of the teeth
- 1.3. Pulpal and periapical diseases
- 1.4. Bacterial infections
- 1.5. Fungal and protozoal diseases
- 1.6. Viral diseases
- 1.7. Physical & chemical injuries
- 1.8. Allergies and immunological diseases
- 1.9. Epithelial pathology
- 1.10. Salivary gland pathology
- 1.11. Soft tissue tumours
- 1.12. Haematologic disorders
- 1.13. Bone pathology
- 1.14. Odontogenic cyst and tumours
- 1.15. Dermatologic diseases
- 1.16. Oral manifestations of systemic disease
- 1.17. Facial pain and neuromuscular disease
- 1.18. Forensic odontology
- 1.19. Differential diagnosis of oral and maxillofacial lesions
- 1.20. Oral biopsies
- 1.21. Oral cytology
- 1.22. Dental caries
- 1.23. Oral bacterial flora
- 1.24. Basic immunology and virology
- 1.25. Lymph node and reticulo endothelial pathology
- 1.26. Dermatopathology
- 1.27. Radiation pathology
- 1.28. Regressive alternations of the teeth
- 1.29. Spread of oral infection
- 1.30. Healing of oral wounds
- 1.31. Oral aspects of metabolic disease
- 1.32. Disease of nerve and muscle
- 1.33. Diagnostic lab procedure

2. ORAL MICROBIOLOGY AND IMMUNOLOGY



- 2.1. Normal oral microbial flora
- 2.2. Defense mechanism of the oral cavity.
- 2.3. Microbiology and immunology of Dental Caries and Periodontal diseases
- 2.4. Dental Caries – Introduction, Epidemiology, Microbiology, cariogenic bacteria including properties, acid production in plaque, development of lesion, response of dentin-pulp unit, histopathology, Root caries, Sequelae and Immunology.
- 2.5. Tumor Immunology
- 2.6. Infections of the pulp and periodontal tissues
- 2.7. Oral Sepsis and Bacterimia.
- 2.8. Microbial Genetics
3. FORENSIC ODONTOLOGY
 - 3.1. Legal procedures like inquest, medicolegal evidences, post mortem examination of violence around the head and neck region, identification of deceased individual using teeth and other oral tissues.
 - 3.2. Bite marks, Rugae patterns and lip prints.
 - 3.3. Saliva and its use in forensic identification.

PAPER II – ONCOLOGY

1. Taxonomy of oral tumours
2. Tumours of Odontogenic origin.
3. Primary tumours of the jaw and soft tissues of non dental Origin
4. Metastatic tumours in the Oral Tissue
5. Salivary Gland tumours
6. The molecular biology of cancer
7. Viral Oncology
8. Carcinogenesis
9. Aetiology, epidemiology and prevention of cancer
10. Diagnosis and investigative procedures
11. Scientific basis of cancer treatment
12. Progress in cancer treatment
13. Malignancies of skin
14. Tumours of the head and neck
15. Lymphoid and myeloid neoplasia, histiocytosis, and AIDS related malignancy
16. Bone tumours and soft tissue sarcomas
17. Paediatric tumours
18. Endocrine tumours
19. Medical and surgical complications of cancer
20. Cancer in the elderly



21. Molecular biology of cancer

PAPER III – LABORATORY TECHNIQUES IN ORAL PATHOLOGY AND MICROBIOLOGY

1. Principles and practice of microscopy and photo microscopy
2. Types of biopsies – principles and methods
3. Principles and techniques in routine laboratory procedures in the identification of various oral disease
4. Investigations and Lab Procedures in Forensic odontology
5. Fixation and fixatives
6. Tissue processing, microtomy and paraffin sections
7. Frozen and related sections
8. The theory of staining
9. The haematoxylin and eosin
10. Connective tissues and stains
11. Proteins and nucleic acids
12. Amyloid
13. Carbohydrates
14. Lipids
15. Pigments and minerals
16. Micro-organisms
17. Bone
18. Cytoplasmic granules, organelles and special tissues
19. Enzyme histochemistry and Immunohistochemistry
20. In-situ hybridization
21. Diagnostic cytopathology
22. Resin embedding media
23. Electron microscopy
24. Quantification in histopathology
25. Safety in histopathology lab
26. Audit in histopathology

PAPER IV – GENERAL ESSAY

Three hour Essay pertaining to any of the above topics.

STRUCTURED TRAINING SCHEDULE

MDS PART I & II

1. Preclinical work/Lab exercises – soft tissue and hard tissue techniques
2. Library Dissertation review of a selected topic should be submitted at the end of the 1st year.
3. Seminars
4. Assignments: detail case history taking and treatment plan of academically interesting cases.



5. Attending conferences and symposiums
6. Publication of scientific articles
7. Clinical training
 - 7.1. Examination of clinical cases and recording the data
 - 7.2. Keeping a log book of recorded cases with emphasis on diagnosis and investigation.
 - 7.3. Lecture schedule for undergraduates
 - 7.4. Seminars and symposiums, both intramural and extramural
 - 7.5. Histopathology slide discussion
 - 7.6. Introduction to research methodology
 - 7.7. Routine histopathological laboratory technique
 - 7.8. Basic computer application
8. Selection of dissertation topics, registration of the topic, completion and submission of the dissertation. This should be submitted at the end of 2nd year.

SCHEME OF EXAMINATION

MDS Part II Examination

The examination consists of

1. Written
2. Practical
3. Viva voce

The written examination consists of four papers of 3 hour duration and 100 marks each.

The theory papers are

Paper I- Oral Pathology and Microbiology, Immunology and Forensic Odontology

Paper II- Oncology

Paper III- Laboratory techniques in Oral pathology and Microbiology

Paper IV -Essay

Practical Examination - 2 Days - Total 400 marks

- | | | |
|----------------------|---|---|
| 1. Case presentation | - | One long Case (40 marks)
One short case (20 marks)
Any Ulcero proliferative growth
Any white lesions
Any erythrematous lesions
Skin lesion with oral manifestation |
| 2. Haematology | - | Any 2 investigations & discussion (40 marks)
Hemoglobin Estimation
Total Count (RBC and WBC),
Differential Count
ESR |



3. Cytology - (40 marks)
Smear – Gingival / tongue, Giemsa/PAP
Staining and its discussion
4. Histopathology Techniques - (60 marks)
Staining – H & E and / special staining
Reporting of the stained slide
Viva voce on Laboratory techniques
5. Slide Discussion (200 marks) Histopathology Report Writing and
Discussion of 8 slides

Viva Voce : 200 Marks

- i. Viva voce 160 marks

All examiners will conduct viva-voce conjointly on candidate's comprehension, analytical approach, expression, interpretation of data and communication skills on the subject.

- ii. Pedagogy Exercise: 40 marks

A topic will be given at the beginning of the clinical examination and will have to be presented for 8-10 minutes.



JOURNALS (RECOMMENDED)

1. Journal of Oral & Maxillofacial Pathology (JOMP)
2. Oral & Maxillofacial Pathology Journal (OMPJ)



3. Triple 'O' (journal of Oral pathology, Oral medicine, Oral surgery and Endodontics)
4. Journal of Oral Pathology and Medicine
5. Lancet Oncology
6. Oral Disease
7. Oral Oncology
8. Journal Of The National Comprehensive Cancer Network (JNCCN)
9. Head & Neck Oncology
10. Indian Journal of Cancer
11. Indian Journal of Pathology and Microbiology
12. Human Pathology
13. Indian Journal Of Dermatology, Venereology And Leprology
14. International Journal of Dermatology
15. American Journal of Dermatology
16. Histopathology
17. Histochemistry
18. Staining Technology
19. Journal of Oral Biosciences
20. Indian Journal of Orofacial Genetics
21. International Journal of Oral Medical Science
22. Journal of Dental Research
23. Cell

RECOMMENDED BOOKS

1. Maxillofacial Pathology

- | | |
|--|------------------------|
| 1.1. Oral and maxillofacial pathology – 2 nd edition: | Nevile, Bouquot, Damn |
| 1.2. Oral medicine – 10th edition | Burket |
| 1.3. Basic pathology – 6th edition | Kumar Cotran Robbins |
| 1.4. Basic pathology – 4th edition | Harshamohan |
| 1.5. Oral pathology -- 4th edition | Regezi /Scuibba |
| 1.6. Differential diagnosis of oral lesion -- 4th edition | Wood/GAuz |
| 1.7. Cysts of oral region -- 3rd edition | Mervyn Shear |
| 1.8. Oral pathology -- 4th edition | Shafer |
| 1.9. Oral diseases – | Cawson, Binnie, Wright |
| 1.10. Colour atlas of oral pathology – | Cawson, Odell |
| 1.11. Syndromes of the head and neck – | Gorlin |
| 1.12. Colour atlas of oral pathology – | Lee |
| 1.13. Colour atlas of oral pathology – | Eveson & Scully |
| 1.14. Histopathology of Tumours - | Enzinger & Weiss |



1.15. Colour atlas of oral pathology -	Ishikawa/Waldrome
1.16. Basic histopathology -	Wheater
1.17. Ham's histology	
1.18. Surgical pathology of salivary glands -	Ellis
1.19. Oxford textbook of pathology	
1.20. Orofacial diseases -	Scully - Porter
1.21. Histopathology of skin -	Lever
1.22. Surgical pathology of mouth and jaws -	Cawson /eveson
2. Oral Microbiology	
2.1. Essential oral microbiology -2nd edition	Samaranayake
2.2. Oral Microbiology -- 3rd edition	Marsh martin
2.3. Medical Microbiology -	Murray/Rosenthal
2.4. Microbiology -	Anathanarayanan
3. Immunology	
3.1. Basic Immunology -	Ivan Roitt
3.2. Essential Immunology -	Ivan Roitt
4. Oncology	
4.1. Pathology of tumours of the oral tissue -5 th edition	Lucas
4.2. Cancer - Principles and practice -	de Vita
4.3. Cancer biology -	Ruddon
4.4. Oral cancer -	Neville / Johnson
4.5. Oxford textbook of oncology	
4.6. Evans histological appearance of tumours	
5. Staining	
5.1. Theory and practice of histological technique	Bancroft
5.2. Cellular pathology technique -	C.F. A. culling
5.3. Histopathologic technique -	Lillie
5.4. Histological methods	Kieman
5.5. Histological methods -	Disbre/Rack
6. Oral Histology & Embryology	
6.1. Oral Histology -- 5 th edition	Tencate
6.2. Oral Histology -	Orben
6.3. Oral histology -	James Avery
6.4. Oral Histology - Inheritance and development -	Vincent Provenza
6.5. Wheelers dental anatomy physiology and occlusion	
6.6. Human embryology -	Langman
6.7. Human embryology -	Larsen



6.8. General Histology –	Inderbirsingh
6.9. Gray's anatomy – 42th edition	
6.10. Scientific foundations of Dentistry –	Kramer/Irvin

MDS - BRANCH 7

PEDODONTICS AND PREVENTIVE DENTISTRY

Objectives

At the end of 3 years of training the candidate should be able to

- Create not only a good oral health in the child but also a good citizen tomorrow.
- Instill a positive attitude and behavior in children
- Understand the principles of prevention and preventive dentistry right from birth to adolescence
- Guide and counsel the parents in regards to various treatment modalities including different facets of preventive dentistry
- Prevent and intercept developing malocclusion

Skills

- Obtain proper clinical history, methodological examination of the child patient, perform essential diagnostic procedures and interpret them, and arrive at a reasonable diagnosis and treat appropriately
- Be competent to treat dental diseases which are occurring in child patient.
- Manage to repair and restore the lost / tooth structure to maintain harmony between both hard and soft tissues of the oral cavity.
- Manage the disabled children effectively and efficiently, tailored to the needs of individual requirement and conditions.

Attitudes

- Develop an attitude to adopt ethical principles in all aspects of Pedodontic practice.
- Professional honesty and integrity are to be fostered.
- Treatment care is to be delivered irrespective of the social status, cast, creed, and religion of the patients.
- Willingness to share the knowledge and clinical experience with professional colleagues.
- Willingness to adopt, after a critical assessment, new methods and techniques of Pedodontic management developed from time to time, based on scientific research, which are in the best interest of the child patient.
- Respect child patient's rights and privileges, including child patients right to information and right to seek a second opinion.



- Develop an attitude to seek opinion from allied medical and dental specialities, as and when required.

COURSE CONTENTS

First Year

PRECLINICAL EXERCISES

Apart from the didactic components, the student the following is the minimum preclinical exercises required to be completed in the first six months of commencement of the course.

1. Carving of all deciduous and permanent teeth.
2. Basic wire bending exercises.
 - 2.1. Straightening of 6" long 19G SS wire.
 - 2.2. Square of 1" side, Triangle of 1" side, Circle of 2" diameter.
 - 2.3. Clasps - 1 pair each
 - 2.3.1. $\frac{3}{4}$ clasp
 - 2.3.2. Full Clasp
 - 2.3.3. Triangular clasp
 - 2.3.4. Adam's clasp
 - 2.3.5. Modified Adam's clasp
 - 2.3.6. Duyzing's clasp
 - 2.3.7. Ball clasp
 - 2.4. Labial bows
 - 2.4.1. Short
 - 2.4.2. Long
 - 2.4.3. Robert's Retractor
 - 2.4.4. Fitted
 - 2.4.5. With reverse loop
 - 2.4.6. High with apron springs
 - 2.4.7. Mills retractor
 - 2.4.8. Split
 - 2.5. Springs
 - 2.5.1. Single cantilever
 - 2.5.2. Double cantilever
 - 2.5.3. Palatal canine retractor
 - 2.5.4. U-loop canine retractor
 - 2.5.5. Self-supporting canine retractor



- 2.5.6. Helical canine retractor
- 2.5.7. Bilateral acting finger spring
- 2.5.8. T spring
- 2.5.9. Coffin Spring
- 2.5.10. De-rotating spring
- 2.6. Basic Soldering exercises
 - 2.6.1. Ladder – 5” long with 4 rungs 1” long and 1” apart.
 - 2.6.2. Christmas Tree – 5” long with branches 1” apart.
- 2.7. Fabrication of:
- 2.8. Maxillary bite Plate/Hawleys’
- 2.9. Maxillary expansion screw appliance.
- 2.10. Canine retractor appliance.
- 2.11. All habit breaking appliances.
 - 2.11.1. Removable type.
 - 2.11.2. Fixed type.
 - 2.11.3. Partially fixed and removable.
- 2.12. Three myofunctional appliances should include a Function Regulator and Twin Block..
- 2.13. Making of inclined plane appliance.
 - 2.13.1. Acrylic inclined plane
 - 2.13.2. Stainless steel band inclined plate
- 3. Fabrication of space maintainers:
 - 3.1. Removable type. – Functional and non functional
 - 3.2. Fixed type – Band and loop, Transpalatal, Nance Arch holding device, Lingual arch.
 - 3.3. Fixed Space Regainer
 - 3.4. Removable space regainer
 - 3.5. Active.
 - 3.6. For guiding the eruption of first permanent molar.
 - 3.7. Functional space maintainer.
- 4. Basic spot welding exercises.
- 5. Collection of extracted deciduous and permanent teeth.
 - 5.1. Sectioning of teeth at various levels and planes.
 - 5.2. Drawing of sections and shapes of pulp.
 - 5.3. Performing ideal cavity preparation for various restorative materials for both deciduous and permanent teeth.
 - 5.4. Fabrication of various temporary and permanent restorations on fractured anterior teeth.
 - 5.5. Performing Pulpotomy, Pulpectomy, root canal treatment and Apexification procedures.
 - 5.6. Preparation of teeth for stainless steel crowns and full crowns.



- 5.7. Preparation of teeth for various types of crowns
- 5.8. Laminates/veneers
- 5.9. Bonding & banding exercise
6. Performing of behavioral rating and I.Q. tests for children.
7. Computation of:
 - 7.1. Caries index and performing various caries activity tests.
 - 7.2. Oral Hygiene Index.
 - 7.3. Periodontal Index.
 - 7.4. Fluorosis Index
8. Radiographs
 - 8.1. Taking of periapical, occlusal, bitewing radiographs of children.
 - 8.2. Developing and processing of films thus obtained.
 - 8.3. Cephalometric Radiographs – Tracing of soft tissues, dental and skeletal landmarks as observed on these radiographs, drawing of various planes and angles and profile studies at 3, 7, 11 and 14 years..
9. Performing Mixed Dentition Analysis and other prediction methods.
10. Setting of Teeth – Deciduous, Mixed and Permanent Dentition.
11. Fabrication of Special Trays, Feeding Plate, Screw Gag.
12. Models of ideal occlusion - Deciduous and Mixed dentition.
13. Library Dissertation– Topic for the library dissertation should be finalized and approved at the end of the first six months and two copies to be submitted to the Head of the Department at the end of the first year.
14. Drawing Album – To be submitted to the Head of the Department at the end of the first year.
 - 14.1. Table showing chronology of eruption of teeth.
 - 14.2. Table showing tooth dimensions.
 - 14.3. Table showing differences between primary, young permanent and permanent teeth.
 - 14.4. Diagrams of Tooth Morphology – Deciduous and Permanent teeth.
 - 14.5. Diagrams of Pulp morphology– Deciduous and Permanent teeth.
 - 14.6. Diagrams of Development of Dentition at different ages.
 - 14.7. Diagrams of Development of Occlusion at different ages.
 - 14.8. Isolation of teeth – Rubber Dam – Armamentarium and techniques.
 - 14.9. Modification of cavity preparation in deciduous teeth.
 - 14.10. Mixed Dentition Analysis – Principles and measurements.
 - 14.11. Principles of Brasing, soldering and Welding.
 - 14.12. Diagram showing cephalometric points, planes and angles.
 - 14.13. Behaviour Rating Scales
 - 14.14. Dental Anxiety rating scales.



14.15. Caries Index – DMF index and its variants.

15. Records of the Preclinical exercises to be approved by the guide and duly certified by the Head of the Department. Preclinical exercises to be displayed for the MDS final examination.

16. Start of dissertation.

17. Applied Professional Experience

17.1. Pediatrics – 1 week

17.2. Child Development Centre – 1 week

The student should participate in Hospital pediatric rounds, clinics and seminars. They should also learn to perform the routine physical examination on a child, as well as gain knowledge about normal developmental milestones, reflexes, immunization schedule, infant health care, differentiate between normal and abnormally developed child and discuss the general principles of medical care for acutely and chronically sick children as well as children with chromosomal syndromes.

17.3. Dental Radiology – 1 week

17.4. Oral Pathology – 1 week

18. Special Assignments

18.1. School Dental Health Programme – 1

18.2. Dental Camp -1

18.3. Practical application of Preventive dentistry concepts in a class of 35-50 children and Dental Health Education and Motivation. - 2

19. **Mini Project** – In the form of an epidemiological survey – Recording of any dental diseases on at least 100 children, computation of results and submission of report or a KAP study on any topic relevant to pediatric dentistry.

Second Year

1. This part of the programme focuses on providing the candidate with a further broad outline of theoretical, clinical and practical courses in Basic Pediatric and Preventive Dentistry.

2. Applied Professional Experience (APEX)

2.1. Anesthesia and Pediatric Surgery – 2 weeks

Training in general anesthesia, training in i.v., i.m., s.c. injections, learn to intubate a patient and monitor the patient's vital signs during GA., participate in seminars, pre and postoperative rounds.

2.2. Plastic Surgery – 2 weeks.

Training in basic principles and their application especially in comprehensive management of cleft lip and palate and other oral and maxillofacial anomalies with special emphasis on the role of Pediatric Dentist in the multidisciplinary team.

2.3. Trauma Centre Posting / Oral and Maxillofacial Surgery – 2 weeks

Learn to attend emergency calls with the principles of primary management.



3. Special Assignments

- 3.1. School Dental Health Programme – 1
- 3.2. Dental Camp -1
- 3.3. Practical application of Preventive dentistry concepts in a class of 35-50 children & Dental Health Education & Motivation - 4

Third Year

1. This part of the programme focuses on providing the candidate with a further broad outline of theoretical, clinical and practical courses in Advanced Clinical Pediatric and Preventive Dentistry.

The following are the papers for the Final MDS examination

Paper I – Growth and Development of The Facial skeleton including Preventive and Interceptive Orthodontics.

Paper II – Applied Psychology and Clinical Pedodontics.

Paper III – Preventive and Public Health Dentistry in children.

Paper IV – ESSAY with emphasis on Recent advances in Pedodontics.

The syllabus for the theory of the specialty of Pedodontics should cover the entire field of the subject and the following topics may be used as guidelines.

1. **Growth and Development:** Prenatal and Postnatal development of cranium, face, jaws, teeth and supporting structures. Chronology of dental development and development of occlusion. Dimensional changes in dental arches. Cephalometric evaluation of growth. Eruption and Exfoliation of teeth.
2. **Child Psychology:** Development and classification of behaviour, personality, intelligence in children, theories of child psychology, stages of psychological child development, fear anxiety, apprehension and its management.
3. **Behaviour Management:** Non-pharmacological and Pharmacological methods. Conscious Sedation, Deep Sedation and General Anaesthesia in Pediatric Dentistry. Including other drugs, Synergetic and Antagonistic actions of various drugs used in children.
4. Child Neglect and Abuse.
5. **Preventive Pedodontics:** Concepts, chairside preventive measures for dental diseases, high-risk caries including rampant and extensive caries – Recognition, features and Preventive Management, Pit and Fissure Sealants, Oral Hygiene measures, correlation of brushing with dental caries and periodontal diseases. Diet and Nutrition as related to dental caries. Dental Counseling.



6. **Dental Plaque:** Definition, Initiation, Pathogenesis, Biochemistry, Morphology and Metabolism.
7. **Microbiology and Immunology as related to oral diseases in children:** Basic concepts, Immune system in human body, Autoimmune diseases, Histopathology, Pathogenesis, Immunology of Dental caries, Periodontal diseases, Tumours, Oral mucosal lesions, etc.
8. **Gingival and Periodontal Diseases in children:**
 - 8.1. Normal Gingiva and Periodontium in children.
 - 8.2. Gingival and Periodontal Diseases – Etiology, Pathogenesis, Prevention and Management.
9. **Pediatric Conservative Dentistry:**
 - 9.1. Principles of Pediatric Operative Dentistry along with modifications of materials – past, current and advances including tooth coloured materials.
 - 9.2. Modifications required for cavity preparation in primary and young permanent teeth.
 - 9.3. Various isolation techniques.
 - 9.4. Restorations of decayed primary, young permanent and permanent teeth in children using various restorative materials like Glass Ionomer, Composites, Compomers, Silver amalgam and latest restorative materials.
 - 9.5. Basic and advanced knowledge about dentin bonding system and bonded restorations.
 - 9.6. Stainless steel, polycarbonate and Resin crowns/veneers and full metal crowns.
10. **Pediatric Endodontics:**
 - 10.1. Primary dentition – Diagnosis of Pulpal Diseases and their management – Pulp capping, Pulpotomy, Pulpectomy, Controversies and recent concepts.
 - 10.2. Young Permanent Teeth and Permanent Teeth – Pulp Capping, Pulpotomy, Apexogenesis, Apexification, Concepts, Techniques and Materials used for different procedures.
 - 10.3. Recent advances in Pediatric Endodontics.
11. Prosthodontic considerations in Pediatric Dentistry.
12. **Traumatic Injuries in Children:**
 - 12.1. Classifications and Importance.
 - 12.2. Sequelae and reaction of teeth to trauma.
 - 12.3. Management of Traumatized teeth with latest concepts.
13. **Preventive and Interceptive Orthodontics:**
 - 13.1. Concepts of occlusion and esthetics: Structure and Function of all anatomic components of occlusion, mechanics of articulations, recording of masticatory functions, diagnosis of occlusal dysfunction, relationship of TMJ anatomy and pathology and related neuromuscular physiology.
 - 13.2. A comprehensive review of the local and systemic factors in the causation of malocclusion.



- 13.3. Recognition and management of normal and abnormal developmental occlusions in primary, mixed and permanent dentitions in children (Occlusal Guidance).
- 13.4. Space Management – Etiology, Diagnosis of space problems, Analysis, Biomechanics, Space Maintenance and maintainers, Serial Extraction.
- 13.5. Biology of Tooth Movement, Physiologic Tooth resorption and exfoliation, Eruption – A comprehensive review of the principles of teeth movements, exfoliation, eruption of teeth. Review of contemporary literature. Histopathology of bone and periodontal ligament, molecular and ultra cellular consideration in tooth movement, physiologic tooth resorption and eruption.
- 13.6. Myofunctional appliances – Basic principles, Contemporary appliances; Design and Fabrication.
- 13.7. Removable Appliances - Basic principles, Contemporary appliances; Design and Fabrication.
- 13.8. Case selection and diagnosis in interceptive orthodontics – Cephalometrics, Image processing, Tracing, Radiation hygiene, Video Imaging and advanced cephalometric techniques.

14. Oral Habits in Children:

- 14.1. Definition, etiology and classification.
- 14.2. Diagnosis, clinical features and dentoalveolar effects of Digit Sucking, Tongue Thrusting, Mouth Breathing and various other oral habits.
- 14.3. Management of oral habits in children.

15. Dental Care of Children with Special Needs: Definition, Behavioural, Clinical Features and Management of Children with

- 15.1. Physically Handicapping Conditions.
 - 15.2. Mentally Compromising Conditions.
 - 15.3. Medically Compromising Conditions.
 - 15.4. Genetic Disorders.
16. Oral Manifestations of Systemic Conditions in Children and their management.
 17. Cross infection control in dental clinic/laboratory.
 18. Methods of sterilization and asepsis in clinics.
 19. Management of Minor Oral Surgical Procedures in Children.
 20. Dental Radiology as related to Pediatric Dentistry.

21. Cariology:

- 21.1. Historical Background
- 21.2. Definition, Etiology and Pathogenesis.
- 21.3. Caries pattern in Primary, Young Permanent and Permanent teeth in Children.



- 21.4. Rampant Caries, Early Childhood Caries and Extensive Caries – Definition, etiology, pathogenesis, Clinical features, Complications and Management.
- 21.5. Role of Diet and Nutrition in Dental Caries.
- 21.6. Cariogenicity of various foods.
- 21.7. Dietary modifications and Diet Counseling.
- 21.8. Caries Activity Tests, Caries Prediction, Caries Susceptibility Tests and their clinical applications.
22. **Pediatric Oral Medicine and Clinical Pathology:** Recognition and Management of Developmental Dental Anomalies, Teething Disorders, Stomatological conditions, Mucosal Lesions, Oral Infections, etc.
23. **Congenital Abnormalities in Children:** Definition, Classification, Clinical features and management.
24. Dental Emergencies in Children and their Management.
25. Dental Materials used in Pediatric Dentistry.
26. **Preventive Dentistry:**
 - 26.1. Definition
 - 26.2. Levels of Prevention.
 - 26.3. Different preventive measures used in Pediatric Dentistry including Fissure Sealants and Caries Vaccine.
 - 26.4. Role of fluorides
 - 26.5. Diet Counseling.
27. **Dental Health Education and School Dental Health Programmes:** Dental Health Concepts, Effects of Civilization and Environment, Dental Health Delivery System, Dental Health Surveys, Public Health measures related to children along with principles of children's Preventive Dentistry.
28. **School Dental Health programmes** – Incremental and Comprehensive Care.
29. **National Oral health Policy.**
30. Epidemiology of oral Diseases – Dental Caries, Gingival and periodontal diseases, malocclusion, dental fluorosis.
31. Oral Survey Procedures
 - 31.1. Planning
 - 31.2. Implementation
 - 31.3. WHO Basic Oral health methods.
 - 31.4. Indices for oral diseases.
32. **Fluorides:**
 - 32.1. Historical background.
 - 32.2. Systemic and Topical Fluorides.



- 32.3. Mechanism of Action.
- 32.4. Toxicity and Management.
- 32.5. Defluoridation techniques.
- 33. Medicolegal aspects in pediatric Dentistry with emphasis on informed consent.
- 34. **Case History Recording:** Outline of Principles of Examination, Diagnosis and Treatment Planning.
- 35. Epidemiology:**
 - 35.1. Concepts
 - 35.2. Methods of Recording and Evaluation of various oral diseases.
 - 35.3. Various National and Global trends of epidemiology of oral diseases.
- 36. Comprehensive Infant Oral Health Care.
- 37. Comprehensive cleft lip and palate care management with emphasis on counseling, feeding bone remodeling, speech rehabilitation.
- 38. Principles of Biostatistics, Research Methodology, Understanding of Computers and Photography.
- 39. Setting up of Pedodontic and Preventive Dentistry Clinic.
- 40. Emerging concepts in Pediatric Dentistry on scope of LASERS
- 41. Minimal Invasive Dentistry
- 42. Nanodentistry in Pediatric Dentistry.
- 43. Evidence Based Dentistry.
- 44. Genetics and Molecular Biology
- 45. Biomimetics and Smart Materials.
- 46. Tooth Banking
- 47. Implantology – Basic Principles.
- 48. Hospital based dentistry.
- 49. Changing Trends in Oral Diseases in Children.

TEACHING LEARNING ACTIVITIES

1. Seminars

During a 1 hour weekly seminar the student is required to review the assigned topic completely and present it in a compiled manner. Each seminar should be followed by an elaborate discussion to facilitate a complete learning. At the end of each seminar a detailed evaluation has to be carried out by each of the attending faculty and signed by the respective guide.

1.1. The topics for Basic Science seminars include

1.1.1. Evolution of jaws and teeth

1.1.2. Eruption and Shedding of Teeth,



- 1.1.3.Theories of Eruption
- 1.1.4.TM Joint
- 1.1.5.Haemostasis
- 1.1.6.Bleeding disorders
- 1.1.7.Regulation of Blood Calcium level.
- 1.1.8.Physiology of pain
- 1.1.9. Pain Pathway
- 1.1.10. Cranial Nerves
- 1.1.11. Pedologic Anatomy
- 1.1.12. Enamel, Dentine and Pulp.
- 1.1.13. Blood supply of head and neck.
- 1.1.14. Lymphatic drainage.
- 1.1.15. Oral Mucosa
- 1.1.16. Saliva.
- 1.1.17. Shock
- 1.1.18. Fear and its management.
- 1.1.19. Caries susceptibility and Caries Activity.
- 1.1.20. Syncope and its management.
- 1.1.21. Complications of LA.
- 1.1.22. Drug related emergencies.
- 1.1.23. Infection Control.
- 1.1.24. Prenatal growth and Development.
- 1.1.25. Postnatal growth and development.
- 1.1.26. Muscles of facial expression.
- 1.1.27. Biostatistics.
- 1.1.28. Aesthetic Restorations.
- 1.1.29. Amalgam and Amalgam controversies.
- 1.1.30. Theories of Child Psychology.
- 1.1.31. Anxiety rating scales.
- 1.1.32. Balanced diet.
- 1.1.33. Ethics in research.
- 1.1.34. Dental Health Survey.
- 1.1.35. Drug dosing.
- 1.1.36. Inferential Statistics.
- 1.1.37. Intraoral Radiographs.
- 1.1.38. Radiographic hazards.
- 1.1.39. Normal radiographic anatomy of the jaws and its structures.



- 1.1.40. Digital imaging.
 - 1.1.41. CBCT in pediatric dentistry.
 - 1.1.42. Bleeding disorders.
 - 1.1.43. Pediatric Oral Pathology.
 - 1.1.44. Developmental anomalies of the face.
 - 1.1.45. Developmental anomalies of the jaws.
 - 1.1.46. Biomedical waste management.
 - 1.1.47. Healing and Repair.
 - 1.1.48. Pulp and Pulpal Diseases.
 - 1.1.49. Antibiotics in Pediatric Dentistry.
 - 1.1.50. Analgesics in Pediatric Dentistry.
- 1.2. Basic and Advanced Speciality Seminars.

The topics for Basic Speciality and Advanced Speciality seminars include

1.2.1. Growth and Development

- 1.2.1.1. Basic concepts of growth and development of face (pattern variability, timing of growth influenced by various hereditary and environmental factors).
- 1.2.1.2. Principles and theories.
- 1.2.1.3. Cephalometric growth evaluation.
- 1.2.1.4. Human dentition, its development and changing patterns.
- 1.2.1.5. Normal occlusion and factors influencing functional development of occlusion.
- 1.2.1.6. Principles and practice of diagnosis of incipient malocclusion.

1.2.2. Child Psychology

- 1.2.2.1. Emotional development of the child and its scope in Pediatric Dentistry.
- 1.2.2.2. Concept of different theories of child psychology.
- 1.2.2.3. The origin and characteristics of fear, anxiety and phobia.
- 1.2.2.4. Psychometric measures of dental fear, anxiety and phobia.
- 1.2.2.5. Behavioural Sciences and its application in Pediatric dentistry.
- 1.2.2.6. Ephebodontics.

1.2.3. Oro dental diseases in Children

- 1.2.3.1. Indian and global prevalence of dental diseases and its changing trends.
- 1.2.3.2. Recent concepts of dental plaque.
- 1.2.3.3. Dental Caries and its recent concepts.
- 1.2.3.4. Principles and diagnosis of dental caries.
- 1.2.3.5. Management of high risk dental caries child.
- 1.2.3.6. Common periodontal diseases in children and their management.



1.2.3.7. Strategies for prevention of dental caries and periodontal diseases in children.

1.2.3.8. Caries vaccine.

1.2.4. Pediatric Operative Dentistry

1.2.4.1. Basis for pediatric restorative dentistry – how it differs from adult dentistry.

1.2.4.2. New era in conservative dentistry

1.2.4.2.1. Recent concept.

1.2.4.2.2. Aesthetic Dentistry

1.2.4.2.3. Recent trends in restorative materials for children.

1.2.4.2.4. Enamel hypoplasia and its management.

1.2.4.3. Rubber dam – facilitation for excellence.

1.2.4.4. Traumatized teeth and its management in children.

1.2.5. Pediatric Endodontics

1.2.5.1. Pulp and its pathophysiology.

1.2.5.2. Biological approach to pulp therapy.

1.2.5.3. Diagnosis and differential diagnosis including latest diagnostic aids.

1.2.5.4. Management using various recent materials.

1.2.6. Radiology in Pediatric Dentistry

1.2.6.1. Its scope in pediatric dentistry.

1.2.6.2. Digital radiography.

1.2.6.3. Lasers in dentistry.

1.2.7. Preventive and Interceptive Orthodontics

1.2.7.1. Preventive and Interceptive Orthodontics: Diagnosis and Significance in Pediatric Dentistry.

1.2.7.2. Pernicious oral habits, their prevention and management in children.

1.2.7.3. Interceptive procedures for the integrity of arch perimeter.

1.2.7.4. Functional jaw orthopedics in Pediatric Dentistry.

1.2.8. Preventive Dentistry

1.2.8.1. Principles of Epidemiology.

1.2.8.2. Various indices used for recording the dental and oral diseases in children.

1.2.8.3. Measures used for prevention and maintenance of oral and dental diseases in children.

1.2.8.4. Fluorides in dentistry.

1.2.8.5. Present Scenario of fluorides in various countries throughout the world.

1.2.8.6. Diet and its implication on oro-dental health.

1.2.8.7. Occlusal Sealants.



1.2.9. Special care Children

- 1.2.9.1. Differently abled Children – The concept of Attitude.
- 1.2.9.2. Hospital Dentistry for Medically compromised children.
- 1.2.9.3. Child with cleft lip and Palate.
- 1.2.9.4. Comprehensive preventive oral health care for differently abled children.

1.2.10. Pediatric Prosthodontics

- 1.2.10.1. Edentulous child and implications on the stomatognathic system.
- 1.2.10.2. Semi permanent restorations.
- 1.2.10.3. Prosthodontic rehabilitation of the child with cleft palate.

1.2.11. Pediatric Consideration in Oral Surgery.

CLINICAL REQUIREMENTS

The following is the minimum required quota to be completed before the candidate can be considered eligible to appear in the MDS Part II Examination.

1. Behaviour management of different age group children with complete records. - 17
2. Detailed case evaluation with complete records, treatment planning and presentation of cases with chairside discussion. - 17
3. Step by step chairside preventive dentistry scheduled for high risk children with gingival and periodontal diseases and Dental Caries. - 11
4. Practical Application of Preventive Dentistry concepts in a class of 35-50 children and Dental health Education and Motivation. - 7
5. Pediatric Conservative Dentistry with application of recent concepts.
 - 5.1. Management of Dental Caries

5.1.1. Occlusal Caries	-	50
5.1.2. Proximal Caries	-	100
5.1.3. Other Surfaces	-	100
 - 5.2. Management of Traumatized Anterior teeth - 15
 - 5.3. Aesthetic Anterior Restorations - 25
6. Pediatric Endodontic Procedures
 - 6.1. Deciduous Teeth

6.1.1. Pulpotomy	-	50
6.1.2. Pulpectomy	-	100
 - 6.2. Permanent Teeth

6.2.1. Posterior RCT	-	20
6.2.2. Anterior RCT	-	15
6.2.3. Apexification and Apexogenesis	-	20
7. Stainless Steel Crowns - 50
8. Other Crowns - 20

**9. Orthodontic Appliances**

9.1.	Fixed Space Maintainers	-	20
9.2.	Fixed Habit Breakers	-	10
9.3.	Removable Space Maintainers	-	15
9.4.	Removable Habit Breakers	-	15
9.5.	Removable appliance for correction of minor orthodontic problems	-	15
9.6.	Semi Fixed	-	5
9.7.	Myofunctional Appliances, including Twin Block and Function Regulator	-	5
9.8.	Fixed Appliance Therapy in selected cases in Children	-	2

10. Management of Cleft lip/palate patients

Prosthetic Rehabilitation

10.1.	Partial Dentures	-	10
10.2.	Feeding Plates	-	10
10.3.	Obturators	-	10

11. Surgical Management of Cysts of Dental Origin, Supernumerary teeth and Odontomes.**12. Other Minor Surgical Procedures** like Apicoectomy, Frenotomy, Frenectomy, Gingivectomy, Surgical Exposure of Teeth**13. Management of Fracture of the Jaws.****14. Comprehensive dental management** of the physically impaired, mentally compromised and medically compromised children.**15. Preventive measures** like Fluoride Applications, Pit and Fissure sealant applications with complete follow up and diet counseling.**16. Rotation Postings in other Departments:** It is mandatory that the students are posted on rotation in the following departments.

- 16.1. Pediatrics – 1 week
- 16.2. Child Development Centre – 1 week
- 16.3. Dental Radiology – 1 week
- 16.4. Oral Pathology – 1 week
- 16.5. Anesthesia and Pediatric Surgery – 2 weeks
- 16.6. Plastic Surgery – 2 weeks.
- 16.7. Trauma Centre Posting / Oral and Maxillofacial Surgery – 2 weeks

17. Special Assignments

17.1.	School Dental Health Programmes	-	3
17.2.	Dental Camps	-	2



18. Library Dissertation: Topic for the library dissertation should be finalized and approved by the end of the first six months and the same to be submitted at the end of the first year before appearing for the Part I examination. It should be approved by the guide and certified by the Head of the Department.

19. Conferences and Publication of Scientific Paper: During the MDS course the student should attend two National Conferences and attempts should be made to present at least two scientific papers and publish at least two scientific articles in an indexed journal relevant to the specialty.

20. Clinical work Requirements from 7 to 36 months

The following is the minimum clinical requirement to be completed before the candidate can be considered eligible to appear in the final M.D.S Examinations: -

No.	Clinical Work	Total	7 to 12 Months	13 to 24 Months	25 to 34 Months
1.	Behavior Management of different age groups children with complete records.	17	2	10	5
2.	Detailed Case evaluation with complete records, treatment planning and presentation of cases with chair side and discussion	17	2	10	5
3.	Step-by-step chair side preventive dentistry scheduled for high risk children with gingival and periodontal diseases & Dental Caries	11	1	5	5
4.	Practical application of Preventive dentistry concepts in a class of 35-50 children & Dental Health Education & Motivation.	7	1	4	2
5.	Pediatric Operative Dentistry with application of recent concepts (a). Management of Dental Caries				
	(I) Class I	50	30	10	10
	(II) Class II	100	40	50	10
	(III) Other Restorations	100	20	50	30
6.	(b). Management of traumatized anterior teeth	15	04	06	05
7.	(c) Aesthetic Restorations	25	05	10	10
	(d). Pediatric Endodontic Procedures-				
8.	Deciduous teeth				
	Pulpotomy	50	10	15	25
	Pulpectomy	100	20	30	50
	Permanent Molars-	20	03	07	10

	Permanent Incisor- Apexification & Apexogenesis	15 20	2 02	3 08	10 10
9.	Stainless Steel Crowns	50	10	20	20
10.	Other Crowns	20	05	05	10
11.	Fixed Space Maintainers Habit Breaking appliance	30	08	12	10
12.	Removable Space Maintainers Habit Breaking Appliance	30	08	12	10
13.	Functional Appliances	05	01	02	02
14.	Preventive measures like fluoride application, Pit and fissure sealants applications with complete follow up and diet counseling	20	08	08	04
15.	Special Assignments School Dental Health Programmes	03	01	01	01
16.	Camps	02	01	01	

Structured Training Schedule

First Year

- Preclinical Exercises within the first six months
- 3 seminars in basic sciences
- 2 seminars in the Specialty
- 10 Journal Clubs
- Basic training in Computers and Photography
- Library Dissertation Work
- Commencement of Dissertation Work.
- Attending CDE/Workshops/Advanced Courses
- Attending a State/National Conference and presentation of a Scientific Paper.
- Publication of a scientific paper
- Case Discussions – 2
- Clinical Teaching of Undergraduate students
- APEX Posting
 - Pediatrics – 1 week
 - Child Development Centre – 1 week
 - Dental Radiology – 1 week
 - Oral Pathology – 1 week



Second Year

- 5 seminars in Specialty.
- Assisting and guiding Third year BDS students during their clinical posting.
- Taking lectures for Third BDS students on selected topics.
- 10 Journal Clubs.
- 2 CPC
- Attending CDE/Workshops/Advanced Courses
- Attending a National Conference and presentation of a Scientific Paper.
- Completion of Dissertation.
- Publication of a scientific paper
- APEX Posting
 - Anesthesia and Pediatric Surgery – 2 weeks
 - Plastic Surgery – 2 weeks.
 - Trauma Centre Posting / Oral and Maxillofacial Surgery – 2 weeks

Third Year

- 5 Seminars on Recent Advances in Pedodontics and Preventive Dentistry.
- 2 CPC
- Attending CDE/Workshops/Advanced Courses
- Attending a National Conference and presentation of a Scientific Paper.
- Submission of Dissertation.

1. Scheme of Examination

M.D.S. Part II Examination

a. *Written Examination*

- | | | |
|------|-----------------------------------|--|
| i. | Number of papers | -4 |
| ii. | Duration | -3 hours each |
| iii. | Maximum marks per paper | -100 |
| iv. | Distribution of marks per paper - | The type of questions in the three papers will be two long essay questions carrying 20 marks each and six short essay questions each carrying ten marks. There will be no options in the questions of the first four papers. |
| v. | Title of the papers- | <p><u>Paper I</u> – Growth and Development of the Facial skeleton including Preventive and Interceptive Orthodontics.</p> <p><u>Paper II</u> – Applied Psychology and Clinical Pedodontics.</p> |



Paper III -Preventive and Public Health Dentistry in children.

Paper IV -Essay with Emphasis on recent advances in Pedodontics.

b. Practical/Clinical Examination

- | | | |
|-------------|---|-------------|
| i. Duration | - | Two days |
| ii. Time | - | 9am to 4pm. |
| iii. Marks | - | 400 |

Day I

1. Exercise I - Case Discussion, Pulp Therapy i.e. Pulpectomy on a Primary Molar.
2. Exercise 2 - Case Discussion, Crown preparation on a Primary Molar for Stainless steel crown and cementation of the same.
3. Exercise 3 - Case discussion, band adaptation for fixed type of space maintainer and- impression making.

Day II - Evaluation of Fixed Space Maintainer and Cementation.

Distribution of Marks for the Practicals

- | | |
|--|------------------|
| 1. Case Discussion, Pulp Therapy i.e. Pulpectomy on a Primary Molar. - 150 marks | |
| 1.1. Case Discussion | 40 marks |
| 1.2. Rubber Dam application | 20 marks |
| 1.3. Working length X-ray | 40 marks |
| 1.4. Obturation : | 50 marks |
| 2. Case Discussion, Crown preparation on a Primary Molar for Stainless steel crown and cementation of the same. - 100 marks | |
| 2.1. Case discussion | 20 marks |
| 2.2. Crown Preparation | 40 marks |
| 2.3. Crown selection and Cementation | 40 marks |
| 3. Case discussion, band adaptation for fixed type of space maintainer and-impresion making. - 150 marks | |
| 3.1. Case discussion | 30 marks |
| 3.2. Band adaptation | 40 marks |
| 3.3. Impresion | 40 marks |
| 3.4. Evaluation of Fixed Space Maintainer and Cementation : | 40 marks |
| TOTAL | 400 marks |

C. Viva Voce : _____ **200 Marks**



iii. Viva voce

160 marks

All examiners will conduct viva-voce conjointly on candidate's comprehension, analytical approach, expression, interpretation of data and communication skills.

iv. Pedagogy Exercise:

40 marks

A topic will be given at the beginning of the clinical examination and will have to be presented for 8-10 minutes.

Practical/Clinical and Viva Voce Examination

Day	Time	Duration	Exercise
Day I	9am - 10am	1 hour	Detailed Case Examination
	10am - 11.30am	1 ½ hours	Pulpal Treatment
	11.30am - 1pm	1 ½ hours	Orthodontic Appliance (Band Adaptation & Impression)
	2pm - 3.30pm	1 ½ hours	Stainless Steel Crown
	3.30pm - 4.00pm	½ hour	Fabrication of Appliance
Day II	9am - 10am	1 hour	Delivery of Appliance
	10am onwards		Dissertation presentation/Pedagogy and Viva voce





LIST OF ESSENTIAL AND RECOMMENDED REFERENCE BOOKS

- | | |
|---|---------------------|
| 1. Dentistry for the Handicapped Child | Kenneth E. Wessels |
| 2. Dental Management of the Child Patient | Hannelore T.Loevy |
| 3. Development of Dentition | Van der Linden |
| 4. Dentistry of the Child & Adolescent | Mac Donald & Avery |
| 5. Dentistry for the Adolescent | Castaldy & Brass |
| 6. Essentials of Dental Caries – The Disease and its management | Kidd-Joysten |
| 7. Endodontics | Nicholls |
| 8. Endodontology – Biologic considerations | Samuel Seltzer |
| 9. Fluoride in Preventive Dentistry | Melberg, Louis Ripa |
| 10. Fundamentals of Pediatric Dentistry | Mathewson |
| 11. Manual of Pedodontics | Andlow & Rock |
| 12. Minor tooth movement in children | Joseph M. Sim |
| 13. Nutrition in Preventive Dentistry | Nizel |
| 14. Principles & Practice of Orthodontics | Graber |
| 15. Pediatric Dentistry – Scientific foundations | Stewart & Wei |
| 16. Pediatric Dentistry – Infancy through Adolescence | Pinkham |
| 17. Pediatric Dentistry – Total Patient Care | Wei |
| 18. Treatment of Traumatized incisor in the child patient | Ronald Johnson |
| 19. Cariology Today | Guggenheim |
| 20. Orthodontics – Current Principles & Techniques | Graber & Swain |
| 21. Cariology | Ernest Newbrun |
| 22. Pediatric Operative Dentistry | Kennedy |
| 23. Synopsis of Orthodontics | Rani |
| 24. Handbook of Local Anaesthesia | Malamed |
| 25. Community Dental Health | Jong |



- | | |
|---|--------------------|
| 26. Handbook of Clinical Pedodontics | Snawder |
| 27. Growing up Cavity Free | Moss |
| 28. Dentistry for the Preschool Child | Davies |
| 29. Dentistry for Children | Brauer & Hisley |
| 30. Practical Treatment Planning for the Pedodontic Patient | Blinkhein |
| 31. Nutrition in Clinical Practice | Nizel |
| 32. The Human Dentition Before Birth | Kraus & Jordan |
| 33. Appropriate Uses of Fluorides for Human Health | J.J.Murray (WHO) |
| 34. Fluoride in Preventive Dentistry – Theory & Clinical Practice | Mellberg & Ripa |
| 35. Trace Elements & Dental Diseases | Curzon |
| 36. Fluorides in Caries Prevention | Murray, Rugg-Gunn |
| 37. A Symposium on Preventive Dentistry | Muhler |
| 38. Antibiotic – Antimicrobial Use in Dental Practice | Newmann |
| 39. Applied Dental Materials | McCabe |
| 40. Cross Infection Control in General Practice | Croser & Davies |
| 41. Congenital Deformities | Gordon, Gause |
| 42. Caries Resistant Teeth | Wolstenholm |
| 43. Dental Materials - Properties & Manipulation | Craig |
| 44. Dental Caries | Silverstone |
| 45. Dentistry for the Special Patient | Davidoff |
| 46. Fixed Orthodontic Appliances | Williams |
| 47. Hand Book of Facial Growth | Enlow |
| 48. Human Embryology | Inderbir Singh |
| 49. Orthodontic Cephalometry | Athanasίου |
| 50. Preventive Dentistry | Forrest |
| 51. Study of Tooth Shapes- A systematic Approach | Grundler |
| 52. Radiographic Cephalometry | Jacobson |
| 53. Comprehensive textbook of Psychiatry | Kaplan |
| 54. Science of Dental Materials | Skinner |
| 55. Rubber Dam in Clinical Practice | Reid |
| 56. Diagnosis of the Orthodontic Patient | McDonald & Ireland |
| 57. Fixed Orthodontic Appliances – Principles & Practice | Issacson & Thom |
| 58. Decision making in Dental Treatment Planning | Hall & Roberts |
| 59. Plaque & Calculus Removal | Cochran, Brunsvold |
| 60. Community Oral Health | Pine |
| 61. Primary & Emergency Dental Care | Figures & Lamb |
| 62. Principles of Dental Treatment Planning | Morris |

63. A practical Guide to Technology in Dentistry	Jedynakiewicz
64. The Art & Science Of Operative Dentistry	Sturdevant
65. Endodontic Therapy	Weine
66. Endodontics	Ingle
67. Endodontics in Clinical Practice	Harty
68. Pathways of the Pulp	Cohen
69. Esthetic Composite Bonding	Jordan
70. Esthetic Restorations	Mula
71. Modern Concepts in the Diagnosis & Treatment of Fissure Caries	Paterson & Watts
72. Dentin & Pulp in Restorative Dentistry	Brannstrom
73. Oral Development & Histology	Tencate
74. Textbook of Oral Pathology	Shafer
75. Oral Pathology	Ash
76. An Introduction to Fixed Appliances	Isaccson
77. Dental Care for Handicapped Patients	Hunter
78. Clinical Pedodontics	Finn

LIST OF JOURNALS

1. ASDC Journal of Dentistry for Children
2. Pediatric Dentistry
3. International Journal of Pediatric Dentistry
4. Journal of Clinical Pediatric Dentistry
5. International Journal of Clinical Pediatric Dentistry
6. Journal of Dentistry for Children
7. Journal of the Indian Society of Pedodontics and Preventive Dentistry.
8. Australian Dental Journal
9. British Dental Journal
10. Dental Clinics of North America
11. Endodontics & Dental Traumatology
12. International Dental Journal
13. International Endodontic Journal
14. JADA
15. Journal of Dental Research
16. Journal of Dentistry
17. Journal of Endodontics
18. Journal of Indian Dental Association
19. Advanced Dental Research



BRANCH 8

ORAL MEDICINE AND RADIOLOGY

OBJECTIVES:

- Masterly knowledge for the proper evaluation, diagnosis and management of oral disease.
- Knowledge to diagnose and treat all oral complaints that may reflect either local oral disease or oral manifestations of systemic problems.
- Knowledge of thorough evaluation, and dental management of physiologically compromised patients.
- Basic knowledge of general medical and dental therapeutics.
- Knowledge of the various investigations required, basic principles of imageology, radiation physics, various roetgenographic techniques and their interpretation, basics of therapeutic radiation.

At the conclusion of the course, the candidate shall acquire proficiency and skill

- In diagnosis of oral diseases and systems review
- In planning and performing the appropriate lab tests and radiographic techniques
- To formulate and conduct research projects and skill in training students in the field.

At the conclusion of the course, the candidate should have developed an attitude or responsibility to educate the patient on the disease process, its prevention and treatment and also the ability to impart his knowledge and skill to others effectively.

COURSE CONTENT

The syllabus for the theory of Oral Medicine and Radiology should cover the entire field of the subject and the following topics may be used as guidelines.

M.D.S. Part II**ORAL MEDICINE**

1. General principles of patient examination, systems review, procedures for diagnosis and examination of specific lesions.
2. Diagnostic laboratory investigations:
 - 2.1. Routine: Collection of samples, laboratory investigative procedures, normal values interpretation of results.
 - 2.2. Special Laboratory Investigations: Blood Chemistry, Sialochemistry, Serology.
3. Microbiology, Immunology, Histology, Cytology.
4. Culture techniques: Collection, presentation and transportation of specimens.



5. Biopsy - types and procedures
6. Chronic oral sensory disorders mainly orofacial pain, dysgeusia.
7. Diseases of pulp and periapical tissues, caries.
8. Diseases of periodontium
9. Developmental disturbances of oral and paraoral structures. Odontological diseases.
10. Disorders of temporomandibular joint
11. Disease of the tongue
12. Salivary gland disease
13. Pigmentary disturbances of oral and paraoral region
14. Benign and malignant tumors affecting the oral cavity
15. Cysts of odontogenic origin
16. Tumors of odontogenic origin
17. Acute and chronic infections of oral and paraoral structures. Bacterial, viral and Mycotic infection. Spread of oral infection: oral sepsis and its implications.
18. Metabolic, endocrine and nutritional disorders
19. Immunological disease
20. Bleeding and clotting disorders; Hematological disease
21. Primary and secondary mucosal lesions
22. Premalignant and malignant mucosal lesions
23. Red and white lesions, ulcerative, vesiculobullous lesions
24. Dermatologic, sexually transmitted disease, oral manifestations and management
25. Systemic disease: Oral manifestations and management of
 - 25.1. Diseases of the respiratory system
 - 25.2. Dermatologic diseases
 - 25.3. Hematological diseases
 - 25.4. Immunologic diseases
 - 25.5. Endocrine disease
 - 25.6. Neurologic disease
 - 25.7. Cardiovascular diseases
 - 25.8. Hepatic disease
 - 25.9. Renal disease
 - 25.10. G.I.T diseases
 - 25.11. Reproductive diseases
 - 25.12. Muscular disease
 - 25.13. Urogenital diseases
 - 25.14. Psychological disease
 - 25.15. Geriatric diseases



- 25.16. Nutritional diseases
- 25.17. Ophthalmologic disease
- 25.18. E.N.T. diseases
- 26. Psychosomatic oral lesions
- 27. Occupational Hazards
- 28. General principles of patient care in admitted cases and hospital dentistry
- 29. Therapeutics in oral medicine
 - 29.1. Medical management of oral disease
 - 29.2. Drugs commonly used in Dentistry – analgesics, anti inflammatory drugs, antibiotic, steroids, vitamins, minerals, topically used drugs, mouth washes, dentifrices, and desensitizing agents
 - 29.3. Drugs commonly used for medical problems
 - 29.4. Drug interactions
 - 29.5. Oral manifestations of drug reactions and their management
 - 29.6. Medical emergencies in dentistry
- 30. Legal considerations in Dentistry
- 31. Forensic Odontology

RADIOLOGY

1. General Physics, Radiobiology, Radiotherapy

1.1. Fundamentals of Dental Radiology

1.1.1. Origin of dental radiology, Historical aspect of radiology.

1.1.2. Radiation physics, Electromagnetic spectrum. Production and properties of X-rays.

1.1.3. Dental X-ray machine parts and factors affecting production of X-ray

1.1.4. X-ray film (intra oral and extra oral)

1.1.5. Film processing – Dark room procedures, Chemicals, processing errors & rectification.

1.1.6. Radiation Biology.

1.2. General Physics

1.3. Radioactivity, radioactive materials, electromagnetic spectrum, production and properties of X-rays, gamma rays, interaction of x-rays with matter and its effects. Measures and units of measurement, elementary knowledge of electronics.

1.4. Radiobiology

1.5. General principles, biological effects of radiation, departmental protection, protection measures, filters and filtration, personnel monitoring, dosimetry.

1.6. Radiotherapy

1.7. Physical principles of radiotherapy, types of therapy source, patient dosage, beam modification, collimations and beam direction devices. Radioactive isotopes.



- 1.8. Diagnostic Radiology - Physical basis of diagnostic radiology geometric factors, x-ray absorption effects, control of scattered radiation image receptors, image processing, properties of image receptors, Conventional radiography normal land marks,
- 1.8.1. Contrast Radiography – Sialography, Arthrography
- 1.8.2. Xeroradiography - Process of xeroradiography, Dental Application of xeroradiography
- 1.8.3. Tomography - Principles of Tomography, Conventional Tomography, Curved surface tomography (pantomography) – Evolution, Principles, Interpretation, Panoramic variants, Computed tomography, systems components, interpretation, Dental application. CBCT, PET, SPECT - Dental application, Three dimensional computed tomography
- 1.8.4. Cephalometric Radiography
- 1.8.5. Teleradiography, Telemedicine
- 1.8.6. Ultrasonography - Principles, Dental application
- 1.8.7. Magnetic Resonance imaging in Dentistry, Basic concepts of analyzing magnetic resonance images.

2. Radiographic Principles and Techniques

- 2.1. Intra oral radiography
- 2.1.1. Periapical
- 2.1.2. Bite -wing
- 2.1.3. Occlusal
- 2.1.4. Tube shift technique
- 2.1.5. In endodontics
- 2.1.6. In pedodontics
- 2.1.7. Ideal radiograph
- 2.1.8. Defective radiographs
- 2.2. Extra oral radiography – All routine, modified and special views
- 2.2.1. Of TM joint
- 2.2.2. Of maxillary sinus
- 2.2.3. In oral and maxillofacial injuries
- 2.2.4. Localization techniques
- 2.3. Contrast radiography
- 2.3.1. Sialography
- 2.3.2. Arthrography
- 2.3.3. Angiography
- 2.4. Tomography
- 2.4.1. Panoramic radiography



2.4.2. Computed tomography

3. Radiographic interpretation

- 3.1. Fundamental principles of radiographic interpretation.
- 3.2. Normal radiographic anatomy of teeth jaws and normal variations.
- 3.3. Developmental variations and abnormalities of teeth and jaws.
- 3.4. Acquired abnormalities of teeth and anomalies of eruption.
- 3.5. Radiology in – dental caries, - Periodontal diseases
- 3.6. Radiolucent lesions of jaw bones.
- 3.7. Mixed lesions of jaw bones
- 3.8. Radio-opaque lesions of jaw bones.
- 3.9. Cysts of oral cavity
- 3.10. Tumours of oral cavity
- 3.11. Fibro-osseous lesions
- 3.12. Jaw bone changes
 - 3.12.1. After tooth extraction, trauma radiation
 - 3.12.2. In malignant diseases
 - 3.12.3. Infection of oral cavity
 - 3.12.4. Metabolic and endocrine disease
 - 3.12.5. Hematological and other systemic disease
- 3.13. Radiology in
 - 3.13.1. TMJ diseases
 - 3.13.2. Maxillary sinus pathologies
 - 3.13.3. Oral and Maxillofacial injuries
 - 3.13.4. Salivary gland disease
- 3.14. Principles and technique of therapeutic radiation
- 3.15. Osteodystropies
- 3.16. Recent advances in
 - 3.16.1. Radiology
 - 3.16.2. Digital radiology
 - 3.16.3. Computed tomography
 - 3.16.4. Radio-isotopes
 - 3.16.5. PET.

PROCEDURAL AND OPERATIVE SKILLS:

(The numbers mentioned are minimum to be performed by each candidate)

1st Year

1. Examination of Patient - Case history recordings - 100
2. FNAC - 50



3. Biopsy - 50
FNAC and Biopsy - Observe, Assist and Perform under supervision (for three years)
4. Intra - oral radiographs- Perform and interpret -100
5. 5 seminars in basic sciences
6. Journal Clubs
7. Library Dissertation Work
8. Commencement of Dissertation Work.
9. Attending CDE/Workshops/Advanced Courses
10. Attending a State/National Conference and presentation of a Scientific Paper.
11. Publication of a scientific paper

2nd year

1. Dental treatment to medically compromised patient- 50
- Observe, assist, and perform under supervision
2. Extra - oral radiographs, digital radiography - 50
- Observe, assist and perform under supervision
3. Intra - oral radiograph-Perform and interpret -100

Operative skills:

1. Giving intra - muscular and intravenous injections
2. Administration of oxygen and life saving drugs to the patients
3. Performing basic CPR and certification by Red Cross
4. Should have attended a minimum of 15 days posting in the following departments.
 - 4.1.Dermatology and Venereal disease
 - 4.2.General Radiology
 - 4.3.Radiation Oncology / Imageology
 - 4.4.General Medicine
5. 10 seminars in Specialty.
6. Guiding Third year BDS students during their clinical posting.
7. Taking lectures for BDS students on selected topics-10hours.
8. 10 Journal Clubs.
9. Attending CDE/Workshops/Advanced Courses
10. Attending a National Conference and presentation of a Scientific Paper.
11. Completion and Submission of Dissertation.
12. Publication of a scientific paper

3rd Year

1. Perform independently-Case history: Routine cases -100
2. Documenting of Interesting Cases - 25



3. Intra - oral Radiographs - 100
4. Extra-oral radiographs of different views -50
5. 10 Seminars on Recent Advances in Dentistry.
6. Attending CDE/Workshops/Advanced Courses
7. Attending a National Conference and presentation of a Scientific Paper.

Monitoring Learning Progress

It is essential to monitor the learning progress to each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also the students to evaluate themselves. The monitoring to be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using checklists that assess various aspects


Library Dissertation: Topic for the library dissertation should be finalized and approved by the end of the first six months and the same to be submitted at the end of the first year before appearing for the Part I examination. It should be approved by the guide and certified by the Head of the Department.

Conferences and Publication of Scientific Paper: During the MDS course the student should attend two National Conferences and attempts should be made to present at least two scientific papers and publish at least two scientific articles in an indexed journal relevant to the specialty.

The student is expected to maintain a detailed log book of work done on each day of his/her MDS course and should produce it for evaluation on the day of Practical/Clinical Examination.

Requirements to be met by the candidate to appear for Part II examination

1. The candidate should have successfully passed the part I examination.
2. The candidate should have completed three years training course with a minimum of 80% attendance each year of the course at the time of appearing for the examination.
3. Selection of topic for dissertation should be done within 9 months of the first year and the completed dissertation should be submitted to KUHS six months before the proposed date of examination.
4. Should have attended 15 days posting in the following departments.
 - 4.1. Dermatology and Venereal disease
 - 4.2. General Radiology
 - 4.3. Radiation Oncology / Imageology
 - 4.4. General Medicine.
5. Produce a clinical record with photographs and investigation reports of 15 cases of interest.
6. Produce a record of radiographs of different radiographic techniques
7. Should have undertaken treatment and follow up study of 10 patients with chronic mucosal lesions.

- 
8. Should have attended and presented a paper at state/national conference.
 9. Should have at least two publications.
 10. Should have 10 hours of undergraduate teaching experience.
 11. Should present a compilation of a minimum of 15 seminars the seminars presented over the course of three years.
 12. All records and accounts of work performed by the candidate shall be assessed and approved by the guide for the postgraduate programme.

MDS PART II

MDS Part II examination shall consist of:

Paper I: Oral Diagnosis

Aetiology and pathogenesis of disease, differential diagnosis and laboratory investigations.

Paper II: Oral Medicine and Therapeutics

Epidemiology of oral disease

Systemic diseases necessitating dental management

General principles of Radiotherapy, Chemotherapy, Forensic Odontology

Paper III: Radiology

Radiographic techniques including all recent advances

Radiological interpretation of disease of oral and para oral structures.

Paper IV: Essay on Oral Medicine and Radiology with Emphasis to recent trends.

Each paper will be based on the relevant aspect (diagnosis, management or imaging) of the topics outline in the syllabus.

*The topics assigned to the different papers are generally evaluated under those sections. However a strict division of the subject may not be possible and some overlapping of topics is inevitable. Students should be prepared to answer overlapping topics.

SCHEME OF EXAMINATION: MDS PART II

The candidate shall be assessed on the basis of the written examination and practical examination and viva voce.

Written examination shall comprise of the four above-mentioned papers, each of three hours duration and maximum marks of 100 each. There will be no options in the questions of the first three papers. The fourth paper will be a three hour essay in which a choice between two questions will be given. It will include all components of course content.

Practical examination (Total Marks 400) will be two days duration comprising of:

Day I: Detailed examination of a long case	- 100 marks
Case presentation of two short cases – 35 marks x 2	- 70 marks
Two spotters – 15 marks x 2	- 30 marks
Exercise in various radiographic techniques	
Two intraoral radiographs – 20 marks x 2	- 40 marks



One Occlusal and Bitewing Radiograph – 25 marks x 2	- 50 marks
Two extraoral radiograph including technique and interpretation –30 marks x 2	- 60 marks
Day II: Discussion of long case with all required relevant investigation reports.	- 50 marks
Assessment of the various records presented by the candidate	
Dissertation defense / Pedagogy and Viva Voce	- 200 marks
Viva voce – 30 mts duration	



LIST OF ESSENTIAL AND RECOMMENDED REFERENCE BOOKS

Oral Medicine

1. Burket's Oral Medicine – Diagnosis and Treatment –Matin S ,Greenberg 8,9&10,11 ed.
2. A Text book of Oral pathology , Shafer W G ,et al
3. Oral Diseases of the tropics – Prabhu & Wilson
4. Oral and maxillofacial pathology -- Neveille B W et al
5. Internal Medicine for Dentistry – Louis F Rose& Donald Kaye
6. Differential Diagnosis of oral lesions – Wood N K & Goaz P W.
7. Oral Cancer –Jatin Shah
8. Medical Problems in Dentistry –Scully & Cawson

Radiology

1. Fundamental Physics of Radiology -Merdith W J& Massey J B
2. Clarks positioning in Radiography -- RA Swallow
3. Text of Dental and Maxillofacial Radiology – Freny R Karjodkar
4. Panoramic Radiology-Langland O E et al
5. Text book of Oral radiology – White and Pharoah



6. Principles and practice in oral radiographic interpretation – Worth H M
7. Hand Book of signs in Dental and Maxillofacial Radiology- Wood R E
8. Principals and Interpretation ,In Oral Radiology -Goaz P W&White S C.
9. Maxillofacial Imaging –Angilo M Delbaso
10. Principles of Dental Imaging –Baltimore Williams & Wilkins
11. Fundamentals of Dental Radiography-Mason Hing L R

LIST OF ESSENTIAL AND RECOMMENDED JOURNALS

1. Journal of Oral Pathology, Oral Surgery, Oral medicine and Endodontics
2. Journal of Oral Pathology and Medicine
3. Journal of Indian Academy of Oral Medicine and Radiology
4. Journal of American Dental Association
5. British Dental Journal
6. Quintessence International
7. Journal of Canadian Dental Association
8. Dental Clinics of North America
9. Lancet Oncology
10. Journal of Dental Research
11. Journal of Cancer Research and Therapeutics
12. International Journal of cancer
13. Journal of Head Neck Pathology
14. American Journal of Roentgenology
15. Radiologic clinics of North America
16. Journal of Head and Neck imaging
17. Dento Maxillofacial Radiology.

BRANCH 9 – PUBLIC HEALTH DENTISTRY

1. Objectives

At the end of 3 years of training the candidate should be able to:

1.1. Knowledge

- 1.1.1. Apply basic sciences knowledge regarding etiology, diagnosis and management of the prevention, promotion and treatment of all the oral conditions at the individual and community level.
- 1.1.2. Identify social, economic, environmental and emotional determinants in a given individual patient or a community for the purpose of planning and execution of Community Oral Health Program.



- 1.1.3. Ability to conduct Oral Health Surveys in order to identify all the oral health problems
- 1.1.4. Affecting the community and find solutions using multi - disciplinary approach.
- 1.1.5. Ability to act as a consultant in community Oral Health, teach, guide and take part in research (both basic and clinical), present and publish the outcome at various scientific conferences and journals, both national and international level.

1.2. Skills

The candidate should be able to

- 1.2.1. Take history, conduct clinical examination including all diagnostic procedures to arrive at diagnosis at the individual level and conduct survey of the community at state and national level of all conditions related to oral health to arrive at community diagnosis. Plan and perform all necessary treatment, prevention and promotion of Oral Health at the individual and community level.
- 1.2.2. Plan appropriate Community Oral Health Program, conduct the program and evaluate, at the community level.
- 1.2.3. Ability to make use of knowledge of epidemiology to identify causes and appropriate preventive and control measures.
- 1.2.4. Develop appropriate person power at various levels and their effective utilization.
- 1.2.5. Conduct survey and use appropriate methods to impart Oral Health Education.
- 1.2.6. Develop ways of helping the community towards easy payment plan, and followed by evaluation for their oral health care needs.
- 1.2.7. Develop the planning, implementation, evaluation and administrative skills to carry out successful community Oral Health Programs.

1.3. Values:

- 1.3.1. Adopt ethical principles in all aspects of Community Oral Health Activities.
- 1.3.2. To apply ethical and moral standards while carrying out epidemiological researches.
- 1.3.3. Develop communication skills, in particular to explain the causes and prevention of oral diseases to the patient.
- 1.3.4. Be humble and accept the limitations in his knowledge and skill and to ask for help from colleagues when needed and promote teamwork approach.
- 1.3.5. Respect patient's rights and privileges including patients right to information and right to seek a second opinion.



COURSE CONTENTS
SYLLABUS

The syllabus for the theory of Public Health Dentistry should cover the entire field of the subject and the following topics may be used as guidelines.

M.D.S. Part II – (Third Year)

1. Paper I - Preventive Dentistry, Behavioural Sciences, Nutrition and Health Economics

1.1. Behavioural sciences

1.1.1. Introduction, definition, components scope and use of behavioural science, sociology psychology, anthropology, health systems and society, family socialization and health

1.2. Nutrition

1.2.1. Introduction, classification the effect of nutrition and diet on dental health, value of teeth in nutrition, guidelines for nutrition, diet counseling and dietary advice

1.2.2. Prevention of oral and dental disease- Introduction –in general

1.3. Health economics

1.3.1. Principles, community oral health on economic perspective

1.3.2. Types of economic analysis-cost –minimization, cost benefit, cost effectiveness, cost utility

2. Paper II - Public Health

2.1. Public Health

2.1.1. Definition, concepts and philosophy of dental health

2.1.2. History of public health in India and at international level

2.1.3. Terminologies used in public health

2.2. Health

2.2.1. Definition, concepts and philosophy of health

2.2.2. Health indicators

2.2.3. Community and its characteristics and relation to health

2.3. Disease

2.3.1. Definition, concepts.

2.3.2. Multifactorial causation, natural history, risk factors

2.3.3. Disease control and eradication, evaluation and causation, infection of specific diseases

2.3.4. Vaccines and immunization

2.4. General Epidemiology

2.4.1. Definition and aims, general principles

2.4.2. Multifactorial causation, natural history, risk factors

2.4.3. Methods in epidemiology, descriptive, analytical, experimental and classic epidemiology of specific diseases, uses of epidemiology



- 2.4.4. Duties of epidemiologist
- 2.4.5. General idea of method of investigating chronic diseases, mostly non-infectious nature, epidemic, endemic, and pandemic.
- 2.4.6. Ethical conversation in any study requirement
- 2.4.7. New knowledge regarding ethical subjects
- 2.4.8. Screening of diseases and standard procedures used
- 2.5. Environmental Health:
 - 2.4.9. Impact of important components of the environment of health
 - 2.4.10. Principles and methods of identification, evaluation and control of such health hazards
 - 2.4.11. Pollution of air, water, soil, noise, food
 - 2.4.12. Water purification, international standards of water
 - 2.4.13. Domestic and industrial toxins, ionizing radiation
 - 2.4.14. Occupational hazards
 - 2.4.15. Waste disposal- various methods and sanitation
- 2.6. Public Health Education:
 - 2.6.1. Definition, aims, principles of health education
 - 2.6.2. Health education, methods, models, contents, planning health education programs
- 2.7. Public Health Practice and Administration System In India
- 2.8. Ethics And Jurisprudence
 - 2.8.1. Basic principles of law
 - 2.8.2. Contract laws- dentist - patient relationships & Legal forms of practice
 - 2.8.3. Dental malpractice
 - 2.8.4. Person identification through dentistry
 - 2.8.5. Legal protection for practicing dentist.
 - 2.8.6. Consumer protection act
- 2.9. Nutrition In Public Health:
 - 2.9.1. Study of science of nutrition and its application to human problem e Nutritional surveys and their evaluations
 - 2.9.2. Influence of nutrition and diet on general health and oral health, dental caries, periodontal disease and oral cancers
 - 2.9.3. Dietary constituents and cariogenicity e Guidelines for nutrition
- 2.10. Behavioral Sciences:
 - 2.10.1. Definition and introduction
 - 2.10.2. Sociology: social class, social group, family types, communities and social relationships, culture, its effect on oral health.



2.10.3. Psychology: definition, development of child psychology, anxiety, fear and phobia, intelligence, learning, motivation, personalities, fear, dentist-patient relationship, modeling and experience

2.11. Hospital Administration:

2.11.1. Departmental maintenance, organizational structures

2.11.2. Types of practices

2.11.3. Biomedical waste management

2.12. Health Care Delivery System:

2.12.1. International oral health care delivery systems - Review

2.12.2. Central and state system in general and oral health care delivery system if any

2.12.3. National and health policy

2.12.4. National health programme

2.12.5. Primary health care - concepts, oral health in PHC and its implications

2.12.6. National and international health organizations

2.12.7. Dentists Act 1928, Dental council of India, Ethics, Indian Dental Association

2.12.8. Role of W.H.O. and Voluntary organizations in Health Care for the Community

2.13. Oral Biology And Genetics:

2.13.1. A detailed study of cell structure

2.13.2. Introduction to Genetics, Gene structure, DNA, RNA

2.13.3. Genetic counseling, gene typing

2.13.4. Genetic approaches in the study of oral disorders

2.13.5. Genetic Engineering - Answer to current health problems

3. Paper III: Dental Public Health

3.1. Dental Public Health:

3.1.1. History

3.1.2. Definition and concepts of dental public health

3.1.3. Differences between clinical and community dentistry

3.1.4. Critical review of current practice

3.1.5. Dental problems of specific population groups such as chronically ill, handicapped and institutionalized group

3.2. Epidemiology of Oral Diseases and Conditions

3.2.1. Dental caries, gingival, periodontal disease malocclusion, dental Fluorosis, oral cancer, TMJ disorders and other oral health related problems.

3.3. Oral Survey Procedures:

3.3.1. Planning

3.3.2. Implementation

3.3.3. WHO basic oral health methods 1997



- 3.3.4.Indices for dental diseases and conditions
- 3.3.5.Evaluation
- 3.4.Delivery of Dental Care
 - 3.4.1.Dental person power - dental auxiliaries
 - 3.4.2.Dentist - population ratios,
 - 3.4.3.Public dental care programs
 - 3.4.4.School dental health programs- Incremental and comprehensive care
 - 3.4.5.Private practice and group practice
 - 3.4.6.Oral health policy - National and international policy
- 3.5.Payment for Dental care
 - 3.5.1.Prepayment
 - 3.5.2.Post-payment
 - 3.5.3.Reimbursement plans
 - 3.5.4.Voluntary agencies
 - 3.5.5.Health insurance
- 3.6.Evaluation of Quality of Dental care
 - 3.6.1.Problems in public and private oral health care system program
 - 3.6.2.Evaluation of quality of services, governmental control
- 3.7.Preventive Dentistry
 - 3.7.1.Levels of prevention
 - 3.7.2.Preventive oral health programs screening, health education and motivation
 - 3.7.3.Prevention of all dental diseases-dental caries, periodontal diseases, oral cancer, malocclusion and Dentofacial anomalies
 - 3.7.4.Role of dentist in prevention of oral diseases at individual and community level.
 - 3.7.5.Fluoride
 - 3.7.5.1. -History
 - 3.7.5.2. -Mechanism of action
 - 3.7.5.3. -Metabolism
 - 3.7.5.4. -Fluoride toxicity
 - 3.7.5.5. -Fluorosis
 - 3.7.5.6. -Systemic and topical preparations
 - 3.7.5.7. -Advantages and disadvantages of each
 - 3.7.5.8. -Update regarding Fluorosis
 - 3.7.5.9. -Epidemiological studies
 - 3.7.5.10. -Methods of fluoride supplements
 - 3.7.5.11. -Defluoridation techniques
 - 3.7.6.Plaque control measures-



3.7.6.1. -Health Education

3.7.6.2. -Personal oral hygiene

3.7.6.3. -Tooth brushing technique

3.7.6.4. -Dentifrices, mouth rinses

3.7.7. Pit and fissure sealant, ART

3.7.8. Preventive oral health care for medically compromised individual

3.7.9. Update on recent preventive modalities

3.7.10. Caries vaccines

3.7.11. Dietary counseling

3.8. Practice Management

3.8.1. Definition

3.8.2. Principles of management of dental practice and types

3.8.3. Organization and administration of dental practice

3.8.4. Ethical and legal issues in dental practice

3.8.5. Current trends

1. Structured Training Schedule

1. First Year

1.1. Seminars

1.1.1. Five seminars in basic sciences subject,

1.1.2. To conduct 10 journal clubs

1.1.3. Library assignment on assigned topics - 2

1.1.4. Submission of synopsis for dissertation-within 9 months

1.1.5. Periodic review of dissertation at two monthly intervals

1.2. Clinical Training

1.2.1. Clinical assessment of patient

1.2.2. Learning different criteria and instruments used in various oral indices - 5 cases each

1.2.2.1. Oral Hygiene Index - Greene and Vermillion

1.2.2.2. Oral Hygiene Index - Simplified

1.2.2.3. DMF - DMF (T), DMF (S)

1.2.2.4. Def

1.2.2.5. Fluorosis Indices - Dean's Fluorosis Index, Tooth Surface Index for Fluorosis, Thylstrup and Fejerskov Index

1.2.2.6. Community Periodontal Index (CPI)

1.2.2.7. Plaque Index-Silness and Loe

1.2.2.8. WHO Oral Health Assessment Form -1997

1.2.2.9. Carrying out treatment (under comprehensive oral health care) of 10 patients - maintaining complete records.



1.3. Field Programme:

- 1.3.1. Carrying out preventive programs and health education for school children of the adopted school.
- 1.3.2. School based preventive programs-
 - 1.3.2.1. Topical Fluoride application-Sodium Fluoride, Stannous Fluoride, Acidulated Phosphate Fluoride preparations and Fluoride varnishes, Fluoride mouth rinses
 - 1.3.2.2. Pit and Fissure Sealant - chemically cured (GIC), light cured
 - 1.3.2.3. Minimal Invasive Treatment-Preventive Resin Restorations (PRR), Atraumatic Restorative Treatment (ART)
 - 1.3.2.4. Organizing and carrying out dental camps in both urban and rural areas.
- 1.3.3. Visit to slum, water treatment plant, sewage treatment plant, and Milk dairy, Public Health Institute, Anti-Tobacco Cell, Primary Health Center and submitting reports.
- 1.3.4. In addition the postgraduate shall assist and guide the under graduate students in their clinical and field programs.

2. Second Year

- 2.1. Seminars
 - 2.1.1. Seminars in Public Health and Dental Public Health topics
- 2.2. Conducting journal clubs
- 2.3. Short term research project on assigned topics - 2
- 2.4. Periodic review of dissertation at monthly reviews
- 2.5. Clinical Training-Continuation of the clinical training
 - 2.5.1. Clinical assessment of patient
- 2.6. Learning different criteria and instruments used in various oral indices
 - 2.6.1. Oral Hygiene Index - Greene and Vermillion
 - 2.6.2. Oral Hygiene Index - Simplified
 - 2.6.3. DMF - DMF (T), DMF (S)
 - 2.6.4. Def t/s
 - 2.6.5. Fluorosis Indices - Dean's Fluorosis Index, Tooth Surface Index for Fluorosis, Thylstrup and Fejerskov Index
 - 2.6.6. Community Periodontal Index (CPI)
 - 2.6.7. Plaque Index-Silness and Loe
 - 2.6.8. WHO Oral Health Assessment Form -1987
 - 2.6.9. Carrying out treatment (under comprehensive oral health care) of 10 patients - maintaining complete records
- 2.7. Field Program - Continuation of field program
- 2.8. Carrying out school dental health education



2.9. School based preventive programs-

2.9.1. Topical Fluoride application - Sodium Fluoride, Stannous Fluoride, Acidulated Phosphate Fluoride preparations and Fluoride varnishes, Fluoride mouth rinses

2.9.2. Pit and Fissure Sealant - chemically cured (GIC); light cured

2.9.3. Minimal Invasive Treatment - Preventive Resin Restorations (PRR), Atraumatic Restorative Treatment (ART)

2.9.4. Organizing and carrying out dental camps in both urban and rural areas.

2.10. Assessing oral health status of various target groups like School children, Expectant mothers Handicapped, Underprivileged, and geriatric populations. Plan dental manpower and financing dental health care for the above group.

2.11. Application of the following preventive measures in clinic - 10 Cases each.

Topical Fluoride application - Sodium Fluoride, Stannous Fluoride, Acidulated Phosphate Fluoride preparations and Fluoride varnishes.

Pit and Fissure Sealant

2.12. Planning total health care for school children in an adopted school:

Periodic surveying of school children

Incremental dental care

Comprehensive dental care

2.13. Organizing and conducting community oral health surveys for all oral condition - 3 surveys

2.14. In addition the postgraduate shall assist and guide the under graduate students in their clinical and field programs

2.15. To take lecture classes (2) for Undergraduate students in order to learn teaching method (pedagogy) on assigned topic.

3. Third Year:

3.1. Seminars

3.1.1. Seminars on recent advances in Preventive Dentistry and Dental Public Health

3.2. Critical evaluation of scientific articles - 10 articles

3.3. Completion and submission of dissertation

3.4. Clinical Training

- Clinical assessment of patient

3.5. Learning different criteria and instruments used in various oral indices - 5 each

- Oral Hygiene Index - Greene and Vermillion
- Oral Hygiene Index - Simplified
- DMF - DMF (T), DMF (S)
- Def t/s
- Fluorosis Indices - Dean's Fluorosis Index, Tooth Surface Index for Fluorosis



- Thylstrup and Fejerskov Index
 - Community Periodontal Index (CPI)
 - Plaque Index-Silness and Loe
 - WHO Oral Health Assessment Form -1987
 - Carrying out treatment (under comprehensive oral health care) of 10 patients - maintaining complete records
- 3.6. Carrying out school dental health education
- 3.7. School based preventive programs-
- Topical Fluoride application - Sodium Fluoride, Stannous Fluoride, Acidulated Phosphate Fluoride preparations and Fluoride varnishes.
 - Pit and Fissure Sealant
 - Minimal Invasive Techniques - Preventive Resin Restorations (PRR), Atraumatic Restorative Treatment (ART)
- 3.8. To take lecture classes (2) for Undergraduate students in order to learn teaching methods (pedagogy) on assigned topic
- 3.9. Exercise on solving community health problems -10 problems
- 3.10. Application of the following preventive measures in clinic -10 cases each.
- Topical Fluoride application - Sodium Fluoride, Stannous Fluoride, Acidulated Phosphate Fluoride preparations
 - Pit and Fissure sealants
- 3.11. Dental - health education training of school teachers, social workers, health workers,
- 3.12. Posting at dental satellite centers/ nodal centers
- 3.13. Visit to slum, water treatment plant, sewage treatment plant, milk diary, public health institute, anti tobacco cell, primary health centre and submit reports.
- 3.14. Organizing and carrying out dental camps in both urban and rural areas.
- 3.15. In addition the post graduate shall assist and guide the under graduate students in their clinical and field programs
- Before completing the third year M.D.S., a student must have attended two national conferences. Attempts should be made to present two scientific papers, publication of a scientific article in a journal.

Monitoring Learning Process:

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using checklists that assess various aspects. Checklists are given in Section IV.



Scheme of Examination

A. Theory

400 Marks

Written examination shall consist of 4 question papers each of three hour duration. Marks for each paper shall be 100. Paper I,II, and III shall consist of two long essays of 20 marks each and 6 short essays of 10 marks each. Paper IV will be on Essay. Questions on recent advances may be asked in any or all the papers.

Distribution of topics for each paper will be as follows:

PAPER-I : Preventive Dentistry, Behavioural Sciences and Nutrition.

PAPER II: Public Health

PAPER-III: Dental Public Health

PAPER-IV: Essay

Topics of current interest in community oral health.

The topics assigned to the different papers are generally evaluated under those sections. However a strict division of the subject may not be possible and some overlapping of topics is inevitable. Students should be prepared to answer overlapping topics.

B. Practical / Clinical Examination : 400 Marks

1. Clinical examination of at least 2 patients representing the community- includes history, main complaints, examination and recording of the findings, using indices for the assessment of oral health and presentation of the observation including diagnosis, comprehensive treatment planning. (100 Marks -1 ½ Hrs)
2. Performing
 - a. One of the treatment procedures as per treatment plan. (Restorative, surgical, rehabilitation)
 - b. Preventive oral health care procedure.
 - c. One of the procedures specified in the curriculum (100 Marks -1 ½ Hrs)
3. Critical evaluation of a given research article published in an international journal. (100 Marks -1 hr)
4. Problem solving – a hypothetical oral health situation existing in a community is given with sufficient data. The student as a specialist in community dentistry is expected to suggest practical solutions to the existing oral health situation of the given community. (100 Marks -1 ½ Hrs)

C. Viva-Voce

(200 marks)

All examiners will conduct viva-voce conjointly on candidate's comprehension, analytical approach, expression, interpretation of data and communication skills.

Pedagogy Exercise

A topic shall be given to each candidate in the beginning of clinical examination. He/she is asked to make a presentation on the topic for 8-10 minute





RECOMMENDED BOOKS

1. Dentistry, dental practice and community by Striffler DF
2. Primary preventive dentistry by Harris N & Christen AG
3. Community dental health by Jong AW
4. Principles of dental public health vol I part 1 &2 vol 2 by Dunning JM
5. Dental public health: an introduction to community dentistry by Slack G.L.
6. Fluoride in dentistry by Fejerskar Ok & Etal Ed
7. Fluorides & dental caries by Tiwari A
8. Text book of preventive and social medicine by Mahajan BK & Gupta Mc
9. Dental health education by Who Expert Committee
10. Metabolism and toxicity of fluoride vol I by Whitford GM.
11. Epidemiology bio-statistics and preventive medicine by Jekel JF & Etal
12. Introduction to oral preventive medicine: a programme for the first clinical experience by Muhlemann HR
13. Text book of preventive medicine by Stallard CE
14. Handbook of dental jurisprudence and risk management by Pollack BR ED
15. Fluorides and human health by World Health Organisation
16. Appropriate use of fluorides for human health by Murry JJ ED
17. Community health by Green LW
18. Prevention of dental diseases by Murry JJ ED
19. Color atlas of forensic dentistry by Whittaker DK & DAC Donald DG
20. Health research design and methodology by Okolo EN
21. Oxford text book of public health vol.3 by Holland WW & Et Al
22. Guidelines for drinking water quality vol 1 recommendations by WHO



23. Introduction to Bio-statistics by Mahajan B.K.
24. Guidelines for drinking water quality vol. 2 health criteria & other supporting information by WHO
25. Dentistry, dental practice and the community by Burt BA & Et Al
26. Occupational hazards to dental staff by Scully C
27. Forensic dentistry by Cameron JM
28. Research methodology: methods & techniques Kothari R
29. Law & ethics in dentistry by Shear J & Walters L
30. Health research methodology : a guide for training in research methods (western pacific education in action series no.5) by WHO
31. Community oral health by Pine CM
32. Park's text book of preventive and social medicine by Park K
33. Epidemiology, bio-statistics and preventive medicine by Katz DI
34. Oral health surveys basic methods by WHO
35. Essentials of preventive and community dentistry by Peter S
36. Fluorides in caries prevention by Murray JI ED
37. Preventive dentistry by Forrest John O
38. Fluorine and fluorides: a report by World Health Organisation
39. Planning and evaluation of public dental health services: a technical report by World Health Organization
40. Prevention methods and programmes for oral diseases: a technical report by World Health Organization
41. Community periodontal index of treatment needs development, field-testing and statically evaluation by World Health Organization
42. Planning oral health services by World Health Organization
43. Guide to epidemiology and diagnosis of oral mucosal diseases and conditions by World Health Organization
44. Community dentistry (Hand book series vol 8) by Silberman SI & Tryon AF.ED.

LIST OF RECOMMENDED JOURNALS

1. Journal of Community Dentistry and Oral Epidemiology
2. Journal of Public Health Dentistry
3. Fluoride Journal of International Society
4. Journal of Community Dental Health
5. Journal of Fluoride research
6. Journal of Clinical Preventive Dentistry



SECTION IV - MONITORING LEARNING PROCESS

CHECKLISTS AND LOGBOOK

CHECKLIST 1

Model Checklist for Evaluation of Preclinical Exercises

Name of Student:

Date:

Name of the Faculty-in-charge:

Name of Exercise

Sl. No:	Items for observation during evaluation	Score
1	Quality of Exercise	
2	Ability to answer to questions	
3	Punctuality in submission of exercise	
4	TOTAL SCORE	

Performance	Score
Poor	0
Below Average	1
Average	2
Good	3
Very good	4

Signature of Faculty-in-charge



CHECKLIST 2

Model Checklist for Evaluation of Journal Review / Seminar Presentation

Name of Student:

Date:

Name of the Faculty/Observer:

Name of Journal / Seminar:

Sl. No:	Items for observation during evaluation	Score
1	Relevance of Topic	
2	Appropriate Cross references	
3	Completeness of Preparation	
4	Ability to respond to questions	
5	Effectiveness of Audio-visual aids used	
6	Time Scheduling	
7	Clarity of Presentation	
8	Overall performance	
9	TOTAL SCORE	

Performance	Score
Poor	0
Below Average	1
Average	2
Good	3
Very good	4

Signature of Faculty/Observer



CHECKLIST 3

Model Checklist for Evaluation of Clinical Case and Clinical Work

Name of Student:

Date:

Name of the Faculty/Observer:

Sl. No:	Items for observation during evaluation	Score
1	History	
	Elicitation	
	Completeness	
2	Examination	
	General Examination	
	Extraoral examination	
	Intraoral examination	
3	Provisional Diagnosis	
4	Investigation	
	Complete and Relevant	
	Interpretation	
5	Diagnosis	
	Ability to defend diagnosis	
6	Differential Diagnosis	
	Ability to justify differential diagnosis	
7	Treatment Plan	
	Accuracy	
	Priority order	
8	Management	
9	Overall Observation	
	Chair side manners	
	Rapport with patient	
	Maintenance of Case Record	
	Quality of Clinical Work	
	Presentation of Completed Case	
10	TOTAL SCORE	

Performance	Score
Poor	0
Below Average	1
Average	2
Good	3
Very good	4

Signature of Faculty/Observer



CHECKLIST 4

Model Checklist for Evaluation of Library Dissertation Work

Name of Student:

Date:

Name of the Faculty/Guide:

Sl. No:	Items for observation during evaluation	Score
1	Interest shown in selecting topic	
2	Relevance of Topic	
3	Preparation of Proforma	
4	Appropriate review	
5	Appropriate Cross references	
6	Periodic consultation with guide	
7	Completeness of Preparation	
8	Ability to respond to questions	
9	Quality of final output	
9	TOTAL SCORE	

Performance	Score
Poor	0
Below Average	1
Average	2
Good	3
Very good	4

Signature of Faculty/Guide



CHECKLIST 5

Model Checklist for Evaluation of Dissertation Work

Name of Student:

Date:

Name of the Faculty/Guide/Co-guide:

Sl. No:	Items for observation during evaluation	Score	Performance	Score
1	Interest shown in selecting topic		Poor	0
2	Relevance of Topic		Below Average	1
3	Preparation of Proforma		Average	2
4	Appropriate review		Good	3
5	Appropriate Cross references		Very good	4
6	Periodic consultation with guide/co- guide			
7	Depth of Analysis / Discuss			
8	Ability to respond to questions			
9	Department Presentation of findings			
10	Quality of final output			
	TOTAL SCORE			

Signature of Faculty/Guide/Co-guide



CHECKLIST- 6

CONTINUOUS EVALUATION OF DISSERTATION WORK BY GUIDE/CO-GUIDE

Name of the Trainee:

Date

Name of the Faculty/Observer:

Sl.No.	Items for observation during presentation	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Periodic consultation with guide / co- guide					
2.	Regular collection of case material					
3.	Depth of Analysis / Discussion					
4.	Department presentation of findings					
5.	Quality of final output					
6.	Others					
	Total score					

Signature of the guide / co-guide



CHECKLIST - 7

OVERALL ASSESSMENT SHEET

Name of the College:

Date:

Name of Department:

Check List No	PARTICULARS	Name of trainee		
		First Year	Second Year	Third Year
1	Preclinical Exercises			
2.	Journal Review Presentation			
3.	Seminars			
4	Library dissertation			
5.	Clinical work			
6-	Clinical presentation			
7.	Teaching skill practice			
8.	Dissertation			
	TOTAL			

Signature of HOD**Signature of Principal**

The above overall assessment sheet used along with the logbook should form the basis for certifying satisfactory completion of course of study, in addition to the attendance requirement.

Key:**Mean score:** Is the sum of all the scores of checklists 1 to 6



LOG BOOK

DEPARTMENT OF

MDS Programme

LOG BOOK OF

NAME.....

BIODATA OF THE CANDIDATE

EXPERIENCE BEFORE JOINING P.G. COURSE

DETAILS OF POSTING :

- **FIRST YEAR**
- **SECOND YEAR**
- **THIRD YEAR**

DETAILS OF LEAVE AVAILED

PRECLINICAL EXERCISES

LIBRARY DISSERTATION

RESEARCH WORK

PARTICIPATION IN CONFERENCES – CDE PROGRAMMES

DETAILS OF PARTICIPATION IN ACADEMIC PROGRAMME

SEMINARS /SYMPOSIA PRESENTED

JOURNAL CLUBS

TEACHING ASSIGNMENTS – UNDERGRADUATES / PARAMEDICAL.

SPECIAL DUTIES (IF ANY)

INTERNAL ASSESSMENT

DAILY ACTIVITIES RECORD (BLANK PAGES)

ONE PAGE FOR EACH MONTH X 36 PAGES

MISCELLANEOUS

SUMMARY



LOGBOOK-3

DIAGNOSTIC AND OPERATIVE PROCEDURES PERFORMED

Name

Admission Year:

College:

Date	Name	OP No.	Procedure	Category O, A, PA, PI

Key:**O** - WASHED UP AND OBSERVED - INITIAL 6 MONTHS OF ADMISSION**A** - ASSISTED A MORE SENIOR SURGEON - 1 YEAR MDS**PA** - PERFORMED PROCEDURE UNDER THE DIRECT SUPERVISION OF A SENIOR SURGEON - II YEAR MDS**PI** - PERFORMED INDEPENDENTLY - III YEAR MDS



SECTION V

GUIDELINES FOR DISSERTATION WRITING

Protocol of Dissertation Writing

Synopsis:

It is an introducing write up submitted for approval of a dissertation and is not written for publication. It should be framed according to the following format.

1. Introduction ---- Two or three sentences to introduce the subject.
2. Significance ---- Which should explain the reason for choosing the topic, the main reason may be;
 - i. A common ailment
 - ii. Rare but interesting problem
 - iii. Inadequately studied aspect of a disease.
 - iv. An innovation.
3. Method of working ---- which should explain criteria for selection and exclusion, controls, blind, double blind trial, method of tabulation and calculations, use of computers and duration of follow up.
4. A brief resume of the existing literature on the subject with references.
5. Copy of the Performa which will be used.
 - Before starting work on the dissertation, a research protocol or synopsis on the topic should be submitted for approval.
 - The research protocol should be of about 1200 words (4-5 pages of A- 4 size) on the topic highlighting important aspects of the study including its purpose, material and methods. The research protocol should be submitted with a covering letter signed by the candidate and guide.

Guide and Coguide:

- The work on and writing of dissertation / dissertation should be done under the direct guide approved by the University.
- A guide must be an active PG teacher and qualified as per DCI and the University norms.
- Guide must have at least four years of post fellowship experience in the relevant specialty.
- If the candidate changes the guide, candidate should immediately inform the university or its authorized campus or representative in writing.



- When the dissertation is completed, the guide, Head of the Department and Head of the institution must endorse it through certification.

RECOMMENDED FORMAT FOR A RESEARCH PROTOCOL*

* www.who.int/rpc/research_ethics/format_rp/en/index.html

1. GENERAL INFORMATION

- 1.1. Protocol title, protocol identifying number (if any), and date.
- 1.2. Name and address of the sponsor/funder.
- 1.3. Name and title of the investigator(s) who is (are) responsible for conducting the research, and the address and telephone number(s) of the research site(s), including responsibilities of each.
- 1.4. Name(s) and address(es) of the clinical laboratory(ies) and other medical and/or technical department(s) and/or institutions involved in the research

2. RATIONALE & BACKGROUND INFORMATION

The Rationale specifies the reasons for conducting the research in light of current knowledge. It should include a well documented statement of the need/problem that is the basis of the project, the cause of this problem and its possible solutions. It is the equivalent to the introduction in a research paper and it puts the proposal in context. It should answer the question of why and what: why the research needs to be done and what will be its relevance. The magnitude, frequency, affected geographical areas, ethnic and gender considerations, etc of the problem should be followed by a brief description of the most relevant studies published on the subject.

3. REFERENCES (OF LITERATURE CITED IN PRECEDING SECTIONS)

4. STUDY GOALS AND OBJECTIVES

Goals are broad statements of what the proposal hopes to accomplish. They create a setting for the proposal. Specific objectives are statements of the research question(s). Objectives should be simple (not complex), specific (not vague), and stated in advance (not after the research is done). After statement of the primary objective, secondary objectives may be mentioned. *In short, aims are the goal set and objectives are the measurements which we undertake in order to achieve the aims.*

5. STUDY DESIGN

The scientific integrity of the study and the credibility of the study data depend substantially on the study design and methodology. The design of the study should include information on the type of study, the research population or the sampling frame, and who can take part (e.g. inclusion and



exclusion criteria, withdrawal criteria etc.), and the expected duration of the study. *It is important to include information on how the sample size was calculated and the assumptions underpinning it. The power and significance level specified in the calculation should be stated, together with what is considered an 'important' difference between the groups. If possible the source of data used in sample size estimations should be referenced. The sample size must provide sufficient numbers in the smallest group investigated to achieve a reasonable probability of addressing the objectives of the study. It is impossible to conclude anything worthwhile from an underpowered study.*

(The same study can be described in several ways, and as complete a description of the study as possible should be provided. For example, a study may be described as being a basic science research, epidemiologic or social science research, it may also be described as observational or interventional; if observational, it may be either descriptive or analytic, if analytic it could either be cross-sectional or longitudinal etc. If experimental, it may be described as a controlled or a non controlled study. The link below provides more information on how to describe a research study.

6. METHODOLOGY

The methodology section is the most important part of the protocol. It should include detailed information on the interventions to be made, procedures to be used, measurements to be taken, observations to be made, laboratory investigations to be done etc. If multiple sites are engaged in a specified protocol, methodology should be standardized and clearly defined. Interventions should be described in detail, including a description of the drug/device/vaccine that is being tested. Interventions could also be in the realm of social sciences for example providing training or information to groups of individuals.

Procedures could be biomedical (collection of blood or sputum samples to develop a diagnostic test), or in the realm of social sciences (doing a questionnaire survey, carrying out a focus group discussion as part of formative research, observation of the participant's environment, etc.). Standardized and/or documented procedures/techniques should be described and bibliographic references, if not provided earlier should be provided. Instruments which are to be used to collect information (questionnaires, FGD guides, observation recording form, case report forms etc.) must also be provided.

In the case of a randomized controlled trial additional information on the process of randomization and blinding, description of stopping rules for individuals, for part of the study or entire study, the procedures and conditions for breaking the codes etc. should also be described.

A graphic outline of the study design and procedures using a flow diagram must be provided. This should include the timing of assessments.

7. SAFETY CONSIDERATIONS

The safety of research participants is foremost. Safety aspects of the research should always be kept in mind and information provided in the protocol on how the safety of research participants will be ensured. This can include procedures for recording and reporting adverse events and their



follow-up, for example. It is useful to remember that even administering a research questionnaire can have adverse effects on individuals.

8. FOLLOW-UP

The research protocol must give a clear indication of what follow up will be provided to the research participants and for how long. This may include a follow up, especially for adverse events, even after data collection for the research study is completed.

9. DATA MANAGEMENT AND STATISTICAL ANALYSIS

The protocol should provide information on how the data will be managed, including data handling and coding for computer analysis, monitoring and verification. The statistical methods proposed to be used for the analysis of data should be clearly outlined, including reasons for the sample size selected, power of the study, level of significance to be used, procedures for accounting for any missing or spurious data etc. For projects involving qualitative approaches, specify in sufficient detail how the data will be analysed.

10. QUALITY ASSURANCE

The protocol should describe the quality control and quality assurance system for the conduct of the study, follow up by clinical monitors, data management etc.

11. EXPECTED OUTCOMES OF THE STUDY

The protocol should indicate how the study will contribute to advancement of knowledge, how the results will be utilized, not only in publications but also how they will likely affect health care, health systems, or health policies.

12. DISSEMINATION OF RESULTS AND PUBLICATION POLICY

The protocol should specify not only dissemination of results in the scientific media, but also to the community and/ or the participants, and consider dissemination to the policy makers where relevant. Publication policy should be clearly discussed- for example who will take the lead in publication and who will be acknowledged in publications, etc.

13. DURATION OF THE PROJECT

The protocol should specify the time that each phase of the project is likely to take, along with a detailed month by month timeline for each activity to be undertaken.

14. PROBLEMS ANTICIPATED

This section should discuss the difficulties that the investigators anticipate in successfully completing their projects within the time frame stipulated and the funding requested. It should also offer possible solutions to deal with these difficulties.

15. PROJECT MANAGEMENT

This section should describe the role and responsibility of each member of the team

16. ETHICS



The protocol should have a description of ethical considerations relating to the study. This should not be limited to providing information on how or from whom the ethics approval will be taken, but this section should document the issues that are likely to raise ethical concerns. It should also describe how the investigator(s) plan to obtain informed consent from the research participants (the informed consent process).

17. INFORMED CONSENT FORMS

The approved version of the protocol must have copies of informed consent forms (ICF), both in English and the local language in which they are going to be administered. However translations may be carried out after the English language ICF(s) have been approved by the ERC. If the research involves more than one group of individuals, for example healthcare users and healthcare providers, a separate specifically tailored informed consent form must be included for each group. This ensures that each group of participants will get the information they need to make an informed decision. For the same reason, each new intervention also requires a separate informed consent form.

18. BUDGET

The budget section should contain a detailed item-wise breakdown of the funds requested for, along with a justification for each item.

19. OTHER SUPPORT FOR THE PROJECT

This section should provide information about the funding received or anticipated for this project from other funding organizations.

20. COLLABORATION WITH OTHER SCIENTISTS OR RESEARCH INSTITUTIONS

21. LINKS TO OTHER PROJECTS

22. CURRICULUM VITAE OF INVESTIGATORS

The CV of the Principal investigator and each co-investigators should be provided. In general each CV should not be more than one page, unless a complete CV is specifically requested for.

23. OTHER RESEARCH ACTIVITIES OF THE INVESTIGATORS

The Principal investigator should list all current research projects that he/she is involved in, the source of funding of those projects, the duration of those projects and the percentage of time spent on each.

24. FINANCING AND INSURANCE

Financing and insurance if not addressed in a separate agreement, and where relevant should be described.



DISSERTATION

It is a detailed discourse on a subject specialty submitted for a higher degree in a university.

Topic of dissertation:

This can be done in consultation with the candidate and the guide. Topic already taken up in the past years should preferably be avoided. The request for topic can be channeled through the guide, stating guide's willingness to directly supervise the candidate's work and approval of his / her proposed work and its topic.

Candidate can select and topic of his / her own interest which must be most prevalent in the community, as a rare disorder will not be accepted by the university, depending upon the specialty, one must identify a subject of one's future interest.

Dissertation details:

- Dissertation should be of 100-150 pages of A-4 sized paper. Hard bound.
- Typed on one side with 1.5 line spacing.
- To allow for binding, the left-hand margin must be 1.5". Other margins should be 1.0".
- There should be no typographical or spelling mistakes.
- Each and every page should be serially numbered in the lower right corner.
- Photographs charts, tables are interspersed with the text, and other illustrations are given separately at the end.
- These are numbered and also marked in the text.
- Abbreviations should never be used. Only standard abbreviations should be used and while using them the word for which it stands for should be mentioned like Acute Myocardial Infraction (AMI), Coronary Artery Disease (CAD), because PID may mean 'Pelvic Inflammatory Disorders' or 'Prolapsed Intervertebral Disc' while the candidate might have used it for 'Paediatric Infractions Diseases'.
- Graphs and illustrations should be used as these are more convenient to follow.
- Information given in the graphs and illustrations should not be repeated in the text.
- Computer print outs must be visible. Use of dot matrix printers must be avoided.
- Abbreviations like Pts, +ve, -ve, wks, Mths, yrs should not be used, full words like Patients, Positive, Negative, weeks, Months and years should be written.
- Candidate should have to be specific and précised and nothing should be left to imagination. e.g., the statement 'majority of the patients in this study were below the age of 40 years' should preferably be written as '70% of the patients were below the age of 40 years'.
- In the beginning of a sentence or a paragraph, always write the figures in words.
- If the number of case studied are too small to have any statistical significance, may be rejected by university.



- In case of suspicion or fraudulent data or dissertation material, university can ask the raw data of the study from the candidate and detail from the institution where such a study has been conducted.
- Poorly typed dissertation will not accepted by the university.
- Spelling errors, grammatical goofs, language mistakes might become the basis for rejection of even properly arranged dissertation material with good technical data.
- Each section of dissertation like Introduction, Patients and Methods, Results, Discussion and References should start on a separate page.
- Title page should have the complete title or topic of dissertation, name of the candidate along with his/her academic qualifications, Institutional attachment and postal address.
- Language used should be simple, direct and precise.
- Direct quotations should be minimally used.
- When used, quotations should be within inverted commas and should always be acknowledged.
- Unacknowledged adaptation, too many quotations or too much text book material will be discredited.
- Collection of old clinical records by others, in which the candidate has not taken part, will not be acceptable.
- Photographs should be sharp, glossy colour / black and white prints sized 5" X 3" the letters, numbers and symbols should be clear.
- The number of the photograph should be indicated on top of the figure with an arrow to identify upside of the picture.
- Paper clips should not be used as they spoil the pictures.
- Figures should not be bent or mounted on cardboard.
- In case, the photographs of some persons are used, either the subjects must not be identifiable or their pictures must be accompanied by written permission to use their photograph.
- Free hand or typed written lettering will not be acceptable.
- If a figure has been published already, due acknowledgement to the original source should be made.
- Legends of illustrations must be typed on a separate page.
- All the photographs and illustrations should preferably be drawn in equal size.
- Tables should not be submitted as photographs.
- Data used from published or unpublished source should be acknowledged.
- There should be no blank space in the table.



- Graphs can be used as an alternative to tables but there should be no duplication in data, in graph and tables.
- Charts and tables should be understandable so that if presented, they could impart total information without reference to the text.
- Photomicrographs should have internal scale marks.
- Symbols, arrows or letters used should contrast with the background.
- Measurements of length, height, weight and volume should be reported in metric units (meter, kilogram or liter) or their decimal multiples.
- Temperatures should be given in degree Celsius. Blood pressure should be given in millimeters of mercury.
- All haematological and clinical chemistry measurements should be reported in metric system in terms of International System of units (SI).
- For uniformity, it was suggested that the colour of the hard bind of the dissertation for all branches of MDS course in the purview of KUHS shall be dark brown with letters of gold colour.
- The title, author, and year of study should be imprinted or embossed on the spine of the book.
- Three hard copies and one soft copy of the dissertation thus prepared shall be submitted to KUHS on the 29th month of commencement of the course / 31st Oct. of the 3rd academic year, whichever falls first.

Title Page:

- Title page should include the topic of dissertation, first' middle' initial' and last name of the author (candidate), highest academic degree of the candidate, name of the guide with his/her highest academic degree, name of the department and institution where the work was done, the date of the submission of dissertation and the name of the university.
- Title should never contain any abbreviation, chemical formulae, propriety names, Jargon and the like.

Review of the Literature:

- It is an essential part.
- It should be a collective review and critique in the candidates own words of various viewpoints supported by relevant data.
- The review should be properly referenced.
- The method of citing references in the text and listing cited references at the end of the text are describe in succeeding paragraphs.



Abstract -should not be more than 150 words. It should contain the essence of introduction, the purpose of study, the methods, specific results, their statistical significance and the main conclusions.

Structured Abstract-Should not be more than 250 words and the pattern should contain objective, design, setting, patients/subjects/material, intervention, main outcome measures, result and conclusion.

Design- concise methodology according to the type of study chosen should be given.

- Study may be retrospective when it is based on past patients and their records or prospective when certain patients are selected and followed over a period of time.
- Selection of patients could be random or based on certain criteria.
- The method of data collection is related both to aims and objectives of the problem being studied and to the research design being followed.
- Basic method of data collection are by observation, interviews, questionnaires, measurements, project techniques or by using written information from existing records and reports.
- After collection, collected data should be critically analyzed.

Data analysis is the process by which the researcher summarizes and interprets data to conclude to various references.

- Qualitative data should be summarized as rate, ratios, proportions and percentages, while quantitative data should be summarized by other measures e.g. mean, median, mode, standard deviation, standard error.

Interpretation of data summaries is extracting the meaning from the data.

- Data can be presented in various ways like tables, graphs(linear or logarithmic axes), bar charts, pie charts, histograms, pictograms, scatter diagrams, etc depending upon the nature of data.

Result should be in logical sequence with the main results being stated first.

- Data should be reported in sufficient detail to justify the conclusions.
- Results and conclusions are best arrived through mathematics.

Discussion of the result of the study should be examined and interpreted, and implication and limitations described.

- Similarities and differences between the finding of the study and those of others should be brought out and explained through a review of the literature.

Conclusion:

- This should be the last section of the text in which conclusion or inferences drawn on the basis of the results of study are described. The conclusion should be linked with the objectives or purpose of the study. Recommendations for the need or implications for further research may be included.



- Conclusions and recommendations should be in conformity with the results.

Ethics –

- In any research on human beings, each potential subject must be adequately informed of the aims, methods, anticipated benefits and potential hazards of the study.
- The doctor should obtain the subjects freely given informed consent, preferably in writing.
- Basic human rights should not be violated.
- Confidentiality of subjects must be maintained.
- Names and Initials of patients in the study or their hospital numbers should not be used especially in an illustrative material.

Acknowledgements

- It can be added at the beginning or at the end of the dissertation.
- Names of the colleagues, statistician, the computer operator and spouse if applicable while highlighting one's gratefulness to the guide.
- Work on dissertation should be started as soon as possible after receiving approval of topic and synopsis by the university.
- The topic and research methodology should be the same as approved in the research protocol.
- When the dissertation / dissertation is completed and before it is submitted, the guide must endorse it through certification.
- Three hard copies and 1 soft copy of dissertation should be submitted to the University with the prescribed fee.
- If the dissertation is not submitted on time, the candidate will have to submit his/her dissertation for the next coming session.
- Under unusual circumstances which are fully justified, delay up to maximum of two weeks may be permitted. In this case, late fee per week as prescribed by the University will have to be paid by the candidate.
- After submission, the dissertation is examined by Assessors/Reviewers approved by the university. After assessment, the dissertation may be accepted as such or returned to the candidate with the comments of the assessors for making changes or corrections according to the assessor's comments. In such a case, the candidate should resubmit the dissertation as soon as possible after making the required amendments. OR dissertation may be rejected, in which case the reasons for not accepting it will be communicated to the candidate based on which the candidate may be required to amend or correct the dissertation or parts of it, or rewrite the entire dissertation.



- When approved, a certificate of approval of the dissertation will be issued by the university (will be pasted on dissertation)
- After its submission and approval, the dissertation becomes the property of the university.
- Once the dissertation is submitted, it cannot be submitted to any other institution for any other postgraduate diploma or degree.

Annexes:

- Detailed description of any material used should not be included in the main text to avoid distraction.
- One or more annexes may be added.
- All annexes can be included only when they increase the understanding or evaluation of the study.

References:

- Uniform requirements style (the Vancouver style) is based largely on an ANSI standard style adapted by the NLM for its databases.
- Unpublished observations and personal communications should not be included in the references.
- While writing references, accuracy in the spellings must be ensured for names, title of the article, name of the journal or the book, year of publication, volume number and page number as each reference is of critical importance.
- In case of books, the number of edition, the publisher's name and the name of the city where publisher is located must be mentioned.
- Index medium is a standard source of references.
- References cited only in tables, figures or legends should be numbered in accordance with the sequence established by the first identification in the text of the particular table or figure.
- Avoid using abstracts references.
- A reference may be accompanied by brief and relevant quotation from the text.

Study Design:

Prospective studies ---- Such studies start with the cause and move forward to the effect.

Retrospective Studies ---- These are backward looking in that they start with the effect and go back to the cause. Major advantage of this study is that the data have already been collected. But these are many disadvantages e.g. the data may have gaps or be incomplete, lost, damaged or inaccessible, or the recorder may not have been willing or able to observe and record accurately, without bias.

Descriptive Studies ---- In this, researcher assembles new characteristics of an individual, a group, a situation or a phenomenon or examines the frequency with which an event occurs or is



associated with another event. Descriptive studies are of two types ---- **Cross sectional studies** --- if the observations are made at one point and **longitudinal studies** ---- if the observations are repeated on the same group of patients / community over a prolonged period of time.

Cohort Study ---- Subjects of the population called cohorts are followed over time to use if they develop disease.

Cohort studies are either **prospective or retrospective**.

In prospective study exposed and unexposed individuals are followed at regular intervals to learn about the development and extent of disease. It is an observational study of a group of people with a special characteristic or disease who are followed – up over a period of time to detect new events. Comparison may be made with a control group. No interventions are normally applied to the groups.

Cross sectional study ---- It is a study for a survey of the frequency of disease, risk factors or other characters in a defined population at one particular time.

Intervention Study ---- Experimental studies or clinical trials are referred as intervention studies. These can also be viewed as **prospective cohort studies**, because the participants are identified on the basis of their exposure status and followed to determine whether they develop the disease and what is the effect of study drug.

Therapeutic trial ---- This is conducted among patients with a particular disease to determine the ability of recurrence or decrease risk of death from that disease.

Prevention trial ---- This type of study involves the evaluation of an agent or procedure for reducing the risk of developing disease among those who are free from that condition. Thus a preventive trial can be conducted among healthy individuals.

- **Plagiarism** is a serious offense. Using someone else's ideas or phrasing and representing those ideas or phrasing as our own, either on purpose or through carelessness, without crediting the source, is known as plagiarism. "Ideas or phrasing" includes written or spoken material, of course — from whole papers and paragraphs to sentences, and, indeed, phrases — but it also includes statistics, lab results, art work, etc. "Someone else" can mean a professional source, such as a published writer or critic in a book, magazine, encyclopedia, or journal; an electronic resource such as material we discover on the World Wide Web; from another student at our school or anywhere else; a paper-writing "service" (online or otherwise) which offers to sell written papers for a fee.

Reporting a plagiarizer and filing charges against a student can be a painful, time-consuming experience for faculty but the worst course of action is to turn a blind eye to students who plagiarize. Ignoring plagiarism undermines the value of education, it undermines the university, and it undermines the academic community -- including the faculty member's career. Hence measures should be taken right from the beginning of the course to discuss plagiarism as a moral and ethical issue.



SECTION VI

APPLICATION FORMS

1. Application for Registration of Protocol/Dissertation
2. Proforma for Recognition as PG Teacher
3. Application for Change of Guide

**KERALA UNIVERSITY OF HEALTH AND ALLIED SCIENCES**

MEDICAL COLLEGE P.O., THRISSUR – 680 596

PROFORMA FOR SUBMISSION OF MDS DISSERTATION PROPOSAL/ SYNOPSIS

Name of the College	
Department	
Name of the Guide and Designation with College Address	
Contact Mobile No. and email id of the Guide	
Name of the PG course with Subject	

(Through Proper Channel Only)

To

The Registrar

KUHS, Trichur

Sub:- Submission of the Protocol / Synopsis of Dissertation

Respected Sir/Madam

I,(name as in the admission register) registered for
(course & subject) in the..... (year) batch under the guidance of
..... (Name of the Guide with Designation, Dept &
College).

I am due to appear for(course with subject)in(Year and month).
I am submitting the Title of the Synopsis of Dissertation as mentioned below & as suggested
by my aforesaid Guide.

Title of Dissertation-

Certificate : Certified that the Institutional ethics committee met onapproved the
proposal of the dissertation as per letter no..... Dated

Kindly accept and register my Title of Synopsis of Dissertation

*(Candidate name and signature)**(Name of Guide & Signature)**(Name of HOD and signature with Dept. seal)*

.....
(Signature & Seal of the Principal)



Affix Photo

KERALA UNIVERSITY OF HEALTH AND ALLIED SCIENCES
MEDICAL COLLEGE P.O., THRISSUR - 680 596

PROFORMA FOR RECOGNITION OF POST GRADUATE TEACHER

[Read the instructions carefully before filling up the proforma]

1. NAME:

(in block letters)

2. DATE OF BIRTH:

AGE:

(Attested copy of SSLC marks card / proof of date of birth to be enclosed)

3. PRESENT DESIGNATION:

4. DEPARTMENT:

5. ADDRESS:

COLLEGE ADDRESS

Phone:

Hospital:

College

Fax:

PRESENT RESIDENTIAL ADDRESS

Phone:

Mobile:

Email:

6. QUALIFICATION:

(Attested Xerox copies of all the certificates to be enclosed)

Sl No.	Name of the Degree and Specialization	Year of Passing	Name of the University and Place	Apex body recognition
UG				
PG				
Ph.D.				

Designation	Name of the Institution	Duration of teaching		Subject / 's Taught
		UG From -- To	PG From -- To	
Total teaching experience				



Total teaching experience	Before PG ____ After PG ____ Total ____
----------------------------------	--

7. Teaching Experience

Note:

1. Only full time teaching in a teaching institution affiliated to KUHS / other universities established by law in India is considered as teaching experience.
2. Attested copies of appointment order, relieving order, service certificate, promotion order & PG degree, Dental Council registration certificate etc., to be enclosed to claim teaching experience.
3. Qualifications and eligibility for appointment and promotion shall be as per Govt. of Kerala and DCI guidelines.
4. Application is to be submitted through proper channel.
5. The envelope should be super scribed as 'Proforma for Recognition as Post Graduate Teacher.

8. Any other relevant information: (Attach a separate sheet)

(Regarding additional qualifications, achievements, publications awards etc.,)

Declaration by the Teacher

I hereby declare that the above information provided by me is true and correct. I shall take the sole responsible for any wrong information provide and liable for any action taken by the university.

Place :

Date :

Signature of the Teacher

Endorsement by the Principal

The information provided by the teacher is verified from the office records and found to be correct. He/She is eligible to be recognized as a PG teacher to guide the dissertation work of PG students as per the latest Govt. of Kerala and DCI regulations.

Place :

Date :

Signature of the Principal

INSTRUCTIONS:

1. The Prescribed Performa must be duly filled by the applicant in his own handwriting and submitted to the university through the principal's office.
2. The Principal should verify all the information provided especially the date of birth, qualification, experience, and service details before sending the proforma to the university.
3. Ensure that attested copies of all relevant documents are furnished along with the application.
4. The Principal will be held responsible for any false information provided.
5. Incomplete and incorrect applications and applications with false information will be rejected and they are liable for disciplinary action by the university.



KERALA UNIVERSITY OF HEALTH AND ALLIED SCIENCES

MEDICAL COLLEGE P.O., THRISSUR - 680 596

**POST GRADUATE DISSERTATION - PROFORMA TO BE
SUBMITTED FOR CHANGE OF GUIDE**

(Please Note: Change of guide is permitted only if the guide leaves the college or retires or dies.)

Date:

A. Particulars of Candidate, and Existing Guide

Candidate's Name & Address :

Name of the Institution :

Course of Study & Subject :

Date of Admission to Course :

Title of the Topic :

Name & Designation of Existing Guide :

Signature of the Candidate :

B. PARTICULARS OF PROPOSED GUIDE

Name & Designation of proposed Guide :

Has the proposed guide been recognized as PG teacher by KUHS: Yes / No

If yes, please furnish the particulars of university letter & If No, Please send his/her proforma for recognition as PG teacher

Signature of the proposed Guide :

Name & Designation of Co-Guide :

Signature of the Co-Guide :



C: Endorsement for change of guide

1. Remarks and Signature of the HOD :

2. Reason for change of guide : Resigned / Retired/ any others

3. Remarks and Signature of the Principal :



SECTION VII

TEMPLATE FOR SOFTCOPY SUBMISSION OF DISSERTATION IN THE FORM OF CD ROM

Template

for the softcopy submission of

Dissertations/Theses

in the form of CD/DVD

INSTRUCTIONS TO CANDIDATES

Although your dissertation or dissertation may be prepared on a computer, consider the following requirements for meeting the standards.

PAPER

Use only one side of high-quality, plain white (unlined in any way) bond paper, minimum 20-lb weight, and 8-1/2" x 11" in size. Erasable paper should not be used.

Type Size and Print

Select fonts type Times New Roman and size of 12 characters. The size of the titles should be 14 and Bold, the size of subtitles should be 12 and bold. Print should be letter quality or laser (not dot matrix) printing with dark black characters that are consistently clear and dense. Use the same type of print and print size throughout the document.

Pagination



Number all of the pages of your document, including not only the principal text, but also all plates, tables, diagrams, maps, and so on. Roman numerals are used on the preliminary pages (pages up to the first page of text) and Arabic numerals are used on the text pages. The numbers themselves can be placed anywhere on the page, however they should be consistent.

Spacing

Use 1.5 spacing except for long quotations, footnotes, and endnotes, which are single-spaced.

Margins

To allow for binding, the left-hand margin must be 1.5". Other margins should be 1.0". Diagrams, photographs, or facsimiles in any form should be a standard page size, or if larger, folded so that a free left-hand margin of 1.5" remains and the folded sheet is not larger than the standard page.

Photographs

Professional quality colour/black-and-white photographs are necessary for clear reproduction.

File Format

Dissertation or Dissertations format should be in .docx (MS Word Document) or PDF (portable Document format), Image files in JPG or TIFF format and Audio Visual in AVI (Audio video interleave), GIF, MPEG (moving picture expert) files format.

Labeling on CD

CD-ROM Labeling should be standard and should contain title, subtitle, name of the candidate, degree name, subject name, guide name, name of the department, college, place and year.



College Emblem

<-----**Title**----->

<-----**Subtitle**----->

by

Name of the Candidate

Dissertation Submitted to the
Kerala University of Health Sciences, Thrissur, Kerala.

In partial fulfillment
of the requirements for the degree of

Degree Name

in

Branch - Subject Name

Under the guidance of

Name of the Guide

Name of the Department

Name of the College

Place

Year



DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation entitled "**<-----Title-----
->**" is a bonafide and genuine research work carried out by me under the guidance of **Name & designation of the Guide.**

Date :

SIGNATURE OF THE CANDIDATE

PLACE:



CERTIFICATE BY THE GUIDE

This is to certify that the dissertation entitled "**<-----Title----->**" is a bonafide research work done by **Name of the Candidate** in partial fulfillment of the requirement for the degree of **Degree Name**.

Date :

PLACE:

Signature of the Guide

Name



ENDORSEMENT BY THE HOD, PRINCIPAL/HEAD OF THE INSTITUTION

This is to certify that the dissertation entitled "<-----**Title**-----> "
is a bonafide research work done by **Name of the Candidate** under the guidance of **Name & designation of the Guide**.

Seal & Signature of the HOD

Seal & Signature of the Principal

Name

Name

Date :

Date :

PLACE:

PLACE:



INSTITUTION ETHIC COMMITTEE CERTIFICATION



ACKNOWLEDGMENT

Not lengthy. Avoid Superlatives.

Date :

Signature of the Candidate

Place:

Name



LIST OF ABBREVIATIONS USED
(in alphabetical order)



ABSTRACT
(Max. 200-300 words)

Background & Objectives

Methods

Results

Interpretation & Conclusion

Keywords
(Max. 10)

Keywords shall be chosen from MeSH (Medical Subject Headings)
(Each keyword should be separated by semicolon)



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1. INTRODUCTION



2. AIMS AND OBJECTIVES



3. REVIEW OF LITERATURE



4. METHODOLOGY



5. RESULTS



6. DISCUSSION



7. CONCLUSION



8. SUMMARY



9. BIBLIOGRAPHIC REFERENCES

(Vancouver Format only)

REFERENCE LIST AT END OF PAPER

References should be numbered consecutively in the order in which they are first mentioned in the text; they **should not** be listed alphabetically by author or title or put in date order.

PRINTED PUBLICATIONS

Book

Example:

Neal MJ. Medical pharmacology at a glance. Oxford: Blackwell Scientific; 1987.

Rinsgivent MK, Bond D. Gerontology and leadership skills for nurses. 2nd ed. Albany (NY): Delmar Publishers; 1996.

Note: Where there are more than six authors list the first six names, followed by et al. (and others).

Government publication/Corporate author

Example:

Department of Health. Saving lives: our healthier nation. London: Stationery Office; 1999 (Cm 4386).

Institute of Medicine (US). Looking at the future of the Medicaid program. Washington: The Institute; 1992.

Report

Example:

Confidential enquiries into stillbirths and deaths in infancy. 5th Report. London: Stationery Office; 1998.

Chief Medical Officer's Committee on Medical Aspects of Food. Nutritional aspects of the development of cancer. London: Stationery Office; 1998. (Department of Health report on health and social subjects 48.)

Conference paper in published proceedings

Example:

Bengtsson S, Solheim BG. Enforcement of data protection, privacy and security in medical informatics. In: Lun KC, Degoulet P, Piemme TE, Rienhoff O, editors. MEDINFO 92. Proceedings of the 7th World Congress on Medical Informatics; 1992 Sep 6-10; Geneva, Switzerland. Amsterdam: North-Holland; 1992. p.1561-5.

**Journal article**

Example:

You CH, Lee KY, Chey YW, Menguy R. Electrogastrographic study of patients with unexplained nausea, bloating and vomiting. *Gastroenterology* 1980;79:311-4.

Vega KJ, Pina I, Krevsky B. Heart transplantation is associated with an increased risk for pancreatobiliary disease. *Ann Intern Med* 1996 Jun 1;124 (11):980-3.

Parkin DM, Clayton D, Black RJ, Masuyer E, Friedl HP, Ivanov E, et al. Childhood leukaemia in Europe after Chernobyl: 5 year follow-up. *Br J Cancer* 1996;73:1006-12.

Cancer in South Africa [editorial]. *S Afr MEd J* 1994;84:15.

Note:

Journal titles which are just a single word are not abbreviated.

The titles of other journals should be abbreviated according to the style used in *Index Medicus*. Consult the *List of Journals Indexed in Index Medicus*, published in the January issue of *Index Medicus*. The list can also be obtained through the NLM's web site (<http://www.nlm.nih.gov>).

Newspaper article

Example:

Lee G. Hospitalizations tied to ozone pollution: study estimates 50,000 admissions annually. *The Washington Post* 1996 Jun 21; Sect. A:3 (col. 5).

Electronic media**Individual works**

Example:

CDI, clinical dermatology illustrated [monograph on CD-ROM]. Reeves JRT, Maibach H. CMEA Multimedia Group, 2nd ed. Version 2.0. San Diego: CMEA; 1995.

Journal article

Example:

Morse SS. Factors in the emergence of infectious diseases. *Emerg Infect Dis* [serial online] 1995 Jan-Mar [cited 1996 Jun 5];1(1):[24 screens]. Available from: URL: <http://www.cdc.gov/ncidod/EID/eid.htm>

Computer File

Example:

Hemodynamics III: the ups and downs of hemodynamics [computer program]. Version 2.2. Orlando (FL): Computerized Educational Systems; 1993.

Website (Including the access date)



10. ANNEXURES

Proforma



SECTION VIII

ICMR GUIDELINES FOR BIOMEDICAL RESEARCH

In order to achieve smooth progress of research, while preventing exploitation of human subjects, it is mandatory that every proposal on biomedical research involving human subjects be cleared by an appropriately constituted institutional ethics committee. The ethics committee is also responsible for regular monitoring of the compliance of the ethical guidelines of the approved protocols, till the same are completed. The Indian Council for Medical Research (ICMR) Ethical Guidelines for Biomedical Research on Human subjects expects that all institutions in India which carry out any form of research involving human beings should follow the guidelines to protect the safety and well being of all subjects which is available at www.icmr.nic.in.

FORMING AN INSTITUTIONAL ETHICS COMMITTEE AND DUTIES OF IEC

It is mandatory that all proposals on biomedical research involving human participants should be cleared by an appropriately constituted Institutional Ethics Committee (IEC), also referred to as Institutional Review Board (IRB), Ethics Review Board (ERB) and Research Ethics Board (REB) in other countries, to safeguard the welfare and the rights of the participants. There are also independent ethics committees [IEC(Ind)] functioning outside institutions for those researchers who have no institutional attachments or work in institutions with no ethics committee. The Ethics Committees are entrusted not only with the initial review of the proposed research protocols prior to initiation of the projects but also have a continuing responsibility of regular monitoring of the approved programmes to foresee the compliance of the ethics during the period of the project. Such an ongoing review shall be in accordance with the international guidelines wherever applicable and the Standard Operating Procedures (SOP) of the WHO available at www.who.int

BASIC RESPONSIBILITIES

The basic responsibility of an Institutional Ethics Committee (IEC) is to ensure a competent review of all ethical aspects of the project proposals received by it in an objective manner. IECs should provide advice to the researchers on all aspects of the welfare and safety of the research participants after ensuring the scientific soundness of the proposed research through appropriate Scientific Review Committee. In institutions where this is lacking, the IEC may take up the dual responsibility of review of both, the scientific content and ethical aspects of the proposal. It is advisable to have separate Committees for each, taking care that the scientific review precedes the scrutiny for ethical issues. The scientific evaluation should ensure technical appropriateness of the proposed study. The IECs should specify in writing the authority under which the Committee is established.



Special situations

Small institutions could form alliance with other IECs or approach registered IEC(ind). Large institutions/Universities with large number of proposals can have more than one suitably constituted IECs for different research areas for which large number of research proposals are submitted. However, the institutional policy should be same for all these IECs to safeguard the research participant's rights. A sub-committee of the main IEC may review proposals submitted by undergraduate or post-graduate students or if necessary, a committee may be separately constituted for the purpose, which will review proposals in the same manner as described above.

The responsibilities of an IEC can be defined as follows :-

1. To protect the dignity, rights and well being of the potential research participants.
2. To ensure that universal ethical values and international scientific standards are expressed in terms of local community values and customs.
3. To assist in the development and the education of a research community responsive to local health care requirements.

COMPOSITION

The IECs should be multidisciplinary and multisectorial in composition. Independence and competence are the two hallmarks of an IEC. The number of persons in an ethics committee should be kept fairly small (8 - 12 members). It is generally accepted that a minimum of five persons is required to form the quorum without which a decision regarding the research should not be taken. The IEC should appoint from among its members a Chairman who should be from outside the Institution and not head of the same Institution to maintain the independence of the Committee. The Member Secretary should be from the same Institution and should conduct the business of the

Committee. Other members should be a mix of medical/ non-medical, scientific and non-scientific persons including lay persons to represent the differed points of view.

The composition may be as follows:-

1. Chairperson
2. One - two persons from basic medical science area
3. One - two clinicians from various Institutes
4. One legal expert or retired judge
5. One social scientist/ representative of non-governmental voluntary agency
6. One philosopher/ ethicist/ theologian
7. One lay person from the community
8. Member Secretary

As per revised Schedule Y of Drugs & Cosmetics Act, 1940, amended in 2005, the ethics committee approving drug trials should have in the quorum at least one representative from the following groups:



1. One basic medical scientist (preferably one pharmacologist).
2. One clinician
One legal expert or retired judge
4. One social scientist/ representative of non-governmental organisation/philosopher/ ethicist/ theologian or a similar person
5. One lay person from the community.

The Ethics Committee (EC) can have as its members, individuals from other institutions or communities with adequate representation of age and gender to safeguard the interests and welfare of all sections of the community/society. If required, subject experts could be invited to offer their views, for instance, a pediatrician for pediatric conditions, a cardiologist for cardiac disorders etc. Similarly, based on the requirement of research area, for example HIV, genetic disorders *etc.* it is desirable to include a member from specific patient groups in the Committee.

TERMS OF REFERENCE

The Terms of References should include Terms of Appointment with reference to the duration of the term, the policy for removal, replacement, resignation procedure, frequency of meetings, and payment of processing fee to the IEC for review, honorarium/ consultancy to the members/ invited experts *etc.* and these should be specified in the SOP which should be made available to each member. Every IEC should have its own written SOPs according to which the Committee should function. The SOPs should be updated periodically based on the changing requirements. The term of appointment of members could be extended for another term and a defined percentage of members could be changed on regular basis. It would be preferable to appoint persons trained in bioethics or persons conversant with ethical guidelines and laws of the country. Substitute member may be nominated if meetings have been continuously missed by a member due to illness or other unforeseen circumstances. For this the criteria for number of missed meetings may be defined in the SOP.

TRAINING

The EC members should be encouraged to keep abreast of all national and international developments in ethics through orientation courses on related topics by its own members or regular training organized by constituted body(ies), so that they become aware of their role and responsibilities. For drug trial review it is preferable to train the IEC members in Good Clinical Practice. Any change in the regulatory requirements should be brought to their attention and they should be aware of local, social and cultural norms, as this is the most important social control mechanism. .

REGULATION



Once the legislation of guidelines occurs which is currently under active consideration by the Ministry of Health, a Biomedical Research Authority will be set up under the proposed Bill on Biomedical Research on Human Participants (Promotion and Regulation) which would require that all IECs register with this Authority. It will also evaluate and monitor functioning of the IECs, and develop mechanisms for enforcing accountability and transparency by the institutions.

REVIEW PROCEDURES

The IEC should review every research proposal on human participants before the research is initiated. It should ensure that a scientific evaluation has been completed before ethical review is taken up. The Committee should evaluate the possible risks to the participants with proper justification, the expected benefits and adequacy of documentation for ensuring privacy, confidentiality and the justice issues. The IEC's member-secretary or secretariat shall screen the proposals for their completeness and depending on the risk involved categorise them into three types, namely, exemption from review, expedited review and full review (see below for explanation). Minimal risk would be defined as one which may be anticipated as harm or discomfort not greater than that encountered in routine daily life activities of general population or during the performance of routine physical or psychological examinations or tests. However, in some cases like surgery, chemotherapy or radiation therapy, great risk would be inherent in the treatment itself, but this may be within the range of minimal risk for the research participant undergoing these interventions since it would be undertaken as part of current every day life. An investigator cannot decide that her/his protocol falls in the exempted category without approval from the IEC. All proposals will be scrutinised to decide under which of the following three categories it will be considered :

1. Exemption from review

Proposals which present less than minimal risk fall under this category as may be seen in following situations :

- i. Research on educational practices such as instructional strategies or effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

Exceptions:

- i. When research on use of educational tests, survey or interview procedures, or observation of public behavior can identify the human participant directly or through identifiers, and the disclosure of information outside research could subject the participant to the risk of civil or criminal or financial liability or psychosocial harm.
- ii. When interviews involve direct approach or access to private papers.

2. Expedited Review



The proposals presenting no more than minimal risk to research participants may be subjected to expedited review. The Member- Secretary and the Chairperson of the IEC or designated member of the Committee or Subcommittee of the IEC may do expedited review only if the protocols involve -

1. Minor deviations from originally approved research during the period of approval (usually of one year duration).
2. Revised proposal previously approved through full review by the IEC or continuing review of approved proposals where there is no additional risk or activity is limited to data analysis.
3. Research activities that involve only procedures listed in one or more of the following categories :

Clinical studies of drugs and medical devices only when -

- 3.1. Research is on already approved drugs except when studying drug interaction or conducting trial on vulnerable population or
- 3.2. Adverse Event (AE) or unexpected Adverse Drug Reaction (ADR) of minor nature is reported.
4. Research involving clinical materials (data, documents, records, or specimens) that have been collected for non-research (clinical) purposes.
5. When in emergency situations like serious outbreaks or disasters a full review of the research is not possible, prior written permission of IEC may be taken before use of the test intervention. Such research can only be approved for pilot study or preliminary work to study the safety and efficacy of the intervention and **the same participants should not be included** in the clinical trial that may be initiated later based on the findings of the pilot study.

5.1. Research on interventions in emergency situation

When proven prophylactic, diagnostic, and therapeutic methods do not exist or have been ineffective, physicians may use new intervention as investigational drug (IND) / devices/ vaccine to provide emergency medical care to their patients in life threatening conditions. Research in such instance of medical care could be allowed in patients -

- 5.1.1. When consent of person/ patient/ responsible relative or custodian/ team of designated doctors for such an event is not possible. However, information about the intervention should be given to the relative/ legal guardian when available later;
- 5.1.2. When the intervention has undergone testing for safety prior to its use in emergency situations and sponsor has obtained prior approval of DCGI;
- 5.1.3. Only if the local IEC reviews the protocol since institutional responsibility is of paramount importance in such instances.
- 5.1.4. If Data Safety Monitoring Board (DSMB) is constituted to review the data.

5.2. Research on disaster management

A disaster is the sudden occurrence of a calamitous event at any time resulting in substantial material damage, affecting persons, society, community or state(s). It may be periodic, caused by



both nature and humans and creates an imbalance between the capacity and resources of the society and the needs of the survivors or the people whose lives are threatened, over a given period of time. It may also be unethical sometimes not to do research in such circumstances. Disasters create vulnerable persons and groups in society, particularly so in disadvantaged communities, and therefore, the following points need to be considered when reviewing such research:

- 5.2.1. Research planned to be conducted after a disaster should be essential culturally sensitive and specific in nature with possible application in future disaster situations.
- 5.2.2. Disaster-affected community participation before and during the research is essential and its representative or advocate must be identified.
- 5.2.3. Extra care must be taken to protect the privacy and confidentiality of participants and communities.
- 5.2.4. Protection must be ensured so that only minimal additional risk is imposed.
- 5.2.5. The research undertaken should provide direct or indirect benefits to the participants, the disaster-affected community or future disaster-affected population and a priori agreement should be reached on this, whenever possible, between the community and the researcher.
- 5.2.6. All international collaborative research in the disaster-affected area should be done with a local partner on equal partnership basis.
- 5.2.7. Transfer of biological material, if any, should be as per Government rules taking care of intellectual property rights issues.


3. Full Review

All research presenting with more than minimal risk, proposals/ protocols which do not qualify for exempted or expedited review and projects that involve vulnerable population and special groups shall be subjected to full review by all the members. While reviewing the proposals, the following situations may be carefully assessed against the existing facilities at the research site for risk/benefit analysis:

- 3.1. Collection of blood samples by finger prick, heel prick, ear prick, or venipuncture:
 - 3.1.1. From healthy adults and non-pregnant women who weigh normal for their age and not more than 500 ml blood is drawn in an 8 week period and frequency of collection is not more than 2 times per week;
 - 3.1.2. From other adults and children, where the age, weight, and health of the participants, the collection procedure, the amount of blood to be collected, and the frequency with which it will be collected has been considered and not more than 50 ml or 3 ml per kg, whichever is lesser is drawn in an 8 week period and not more than 2 times per week;



- 3.1.3. from neonates depending on the haemodynamics, body weight of the baby and other purposes not more than 10% of blood is drawn within 48 – 72 hours. If more than this amount is to be drawn it becomes a risky condition requiring infusion/blood transfusion;
- 3.1.4. prospective collection of biological specimens for research purposes by noninvasive means. For instance:
- 3.1.4.1. Skin appendages like hair and nail clippings in a non-disfiguring manner;
 - 3.1.4.2. Dental procedures - deciduous teeth at time of exfoliation or if routine patient care indicates a need for extraction of permanent teeth; supra and subgingival dental plaque and calculus, provided the collection procedure is not more invasive than routine prophylactic scaling of the teeth;
 - 3.1.4.3. Excreta and external secretions (including sweat);
 - 3.1.4.4. Uncannulated saliva collected either in an unstimulated fashion or stimulated by chewing gum or by applying a dilute citric solution to the tongue;
 - 3.1.4.5. Placenta removed at delivery;
 - 3.1.4.6. Amniotic fluid obtained at the time of rupture of the membrane prior to or during labor;
 - 3.1.4.7. Mucosal and skin cells collected by buccal scraping or swab, skin swab, or mouth washings;
 - 3.1.4.8. Sputum collected after saline mist nebulization and bronchial lavages.
- 3.2. Collection of data through noninvasive procedures routinely employed in clinical practice. Where medical devices are employed, they must be cleared/ approved for marketing, for instance -
- 3.2.1. Physical sensors that are applied either to the surface of the body or at a distance and do not involve input of significant amounts of energy into the participant or an invasion of the participant's privacy;
 - 3.2.2. Weighing or testing sensory acuity;
 - 3.2.3. Magnetic resonance imaging;
 - 3.2.4. Electrocardiography, echocardiography; electroencephalography, thermography, detection of naturally occurring radioactivity, electroretinography, ultrasound, diagnostic infrared imaging, Doppler blood flow,
 - 3.2.5. Moderate exercise, muscular strength testing, body composition assessment, and flexibility testing where appropriate given the age, weight, and health of the individual.
- 3.3. Research involving clinical materials (data, documents, records, or specimens) that will be collected solely for non-research (clinical) purposes.

- 
- 3.4. Collection of data from voice, video, digital, or image recordings made for research purposes.
 - 3.5. Research on individual or group characteristics or behavior not limited to research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

SUBMISSION OF APPLICATION

The researcher should submit an application in a prescribed format along with the study protocol as prescribed in SOP of IEC concerned. The protocol should include the following : -

1. The title with signature of Principal Investigator (PI) and Coinvestigators as attestation for conducting the study.
2. Clear research objectives and rationale for undertaking the investigation in human participants in the light of existing knowledge.
3. Recent curriculum vitae of the Investigators indicating qualification and experience.
4. Participant recruitment procedures and brochures, if any.
5. Inclusion and exclusion criteria for entry of participants.
6. Precise description of methodology of the proposed research, including sample size (with justification), type of study design (observational, experimental, pilot, randomized, blinded *etc.*), intended intervention, dosages of drugs, route of administration, duration of treatment and
7. Details of invasive procedures if any.
8. Plan to withdraw or withhold standard therapies in the course of research.
9. Plan for statistical analysis of the study.
10. Procedure for seeking and obtaining informed consent with sample of patient information sheet and informed consent forms in English and local languages.
11. Safety of proposed intervention and any drug or vaccine to be tested, including results of relevant laboratory, animal and human research.
12. For research involving more than minimal risk, an account of management of such risk or injury.
13. Proposed compensation and reimbursement of incidental expenses and management of research related and unrelated injury/ illness during and after research period.
14. An account of storage and maintenance of all data collected during the trial.
15. Plans for publication of results - positive or negative - while maintaining the privacy and confidentiality of the study participants.
16. A statement on probable ethical issues and steps taken to tackle the same like justification for washout of standard drug, or the use of placebo control.



17. All other relevant documents related to the study protocol like investigator's brochure for trial on drugs/ devices/ vaccines/ herbal remedies and statement of relevant regulatory clearances.
18. Agreement to comply with national and international Good Clinical Practices (GCP) protocols for clinical trials.
19. Details of Funding agency/ Sponsors and fund allocation.
20. For international collaborative study details about foreign collaborators and documents for review of Health Ministry's Screening Committee(HMSC) or appropriate Committees under other agencies/ authority like Drug Controller General of India (DCGI)
21. For exchange of biological material in international collaborative study a MoU/ Material Transfer Agreement between the collaborating partners.
22. A statement on conflict-of-interest (COI), if any.

DECISION MAKING PROCESS

The IEC should be able to provide complete and adequate review of the research proposals submitted to them. It should meet periodically at frequent intervals to review new proposals, evaluate annual progress of ongoing ones, review serious adverse event (SAE) reports and assess final reports of all research activities involving human beings through a previously scheduled agenda, amended wherever appropriate. The following points should be considered while doing so :

1. The decision must be taken by a broad consensus after the quorum requirements are fulfilled to recommend / reject / suggest modification for a repeat review or advice appropriate steps. The Member Secretary should communicate the decision in writing to the PI.
- 2 .If a member has conflict-of-interest (COI) involving a project then s/he should submit this in writing to the chairperson before the review meeting, and it should also be recorded in the minutes.,
- 3 .If one of the members has her/his own proposal for review or has any COI then s/he should withdraw from the IEC while the project is being discussed
4. A negative decision should always be supported by clearly defined reason
- 5 .An IEC may decide to reverse its positive decision on a study if it receives information that may adversely affect the risk/ benefit ratio.
6. The discontinuation of a trial should be ordered if the IEC finds that the goals of the trial have already been achieved midway or unequivocal results are obtained.
7. In case of premature termination of study, notification should include the reasons for termination along with the summary of results conducted till date.
8. The following circumstances require the matter to be brought to the attention of IEC:
 - a. any amendment to the protocol from the originally approved protocol with proper justification;



- b. serious and unexpected adverse events and remedial steps taken to tackle them;
- c. any new information that may influence the conduct of the study.

9 .If necessary, the applicant/investigator may be invited to present the protocol or offer clarifications in the meeting. Representative of the patient groups or interest groups can be invited during deliberations to offer their viewpoint.

10. Subject experts may be invited to offer their views, but should not take part in the decision making process. However, her / his opinion must be recorded.

11. Meetings are to be minuted which should be approved and signed by the Chairperson/ alternate Chairperson/ designated member of the committee.

REVIEW PROCESS

The method of review should be stated in the SOP whether the review should be done by all reviewers or by primary reviewer(s) in which case a brief summary of the project with informed consent and patient information sheet, advertisements or brochures, if any, should be circulated to all the other members.

The ethical review should be done in formal meetings and EC should not take decisions through circulation of proposals. The committee should meet at regular intervals and should not keep a decision pending for more than 3 - 6 months, which may be defined in the SOP.

PERIODIC REVIEW

The ongoing research may be reviewed at regular intervals of six months to one year as may be specified in the SOP of the ethics committee.

CONTINUING REVIEW


The IEC has the responsibility to continue reviewing approved projects for continuation, new information, adverse event monitoring, follow-up and later after completion if need be.

INTERIM REVIEW

Each IEC should decide the special circumstances and the mechanism when an interim review can be resorted to by a sub-committee instead of waiting for the scheduled time of the meeting like re-examination of a proposal already examined by the IEC or any other matter which should be brought to the attention of the IEC. However, decisions taken should be brought to the notice of the main committee.

MONITORING

Once IEC gives a certificate of approval it is the duty of the IEC to monitor the approved studies, therefore an oversight mechanism should be in place. Actual site visits can be made especially in the event of reporting of adverse events or violations of human rights. Additionally, periodic status reports must be asked for at appropriate intervals based on the safety concerns and this should be specified in the SOP of the IEC. SAE reports from the site as well as other sites are reviewed by EC



and appropriate action taken when required. In case the IEC desires so, reports of monitoring done by the sponsor and the recommendations of the DSMB may also be sought.

RECORD KEEPING

All documentation and communication of an IEC are to be dated, filed and preserved according to written procedures. Strict confidentiality is to be maintained during access and retrieval procedures. The following records should be maintained for the following:

1. The Constitution and composition of the IEC;
2. Signed and dated copies of the latest the curriculum vitae of all IEC members with records of training if any;
3. Standing operating procedures of the IEC;
4. National and International guidelines;
5. Copies of protocols submitted for review;
6. All correspondence with IEC members and investigators regarding application, decision and follow up;
7. Agenda of all IEC meetings;
8. Minutes of all IEC meetings with signature of the Chairperson;
9. Copies of decisions communicated to the applicants;
10. Record of all notification issued for premature termination of a study with a summary of the reasons;
11. Final report of the study including microfilms, CDs and Video recordings.


It is recommended that all records must be safely maintained after the completion/ termination of the study for a period of 3 years if it is not possible to maintain the same for more than that due to resource crunch and lack of infrastructure.

ADMINISTRATION AND MANAGEMENT

A full time secretariat and space for keeping records is required for a well functioning IEC. The members could be given a reasonable compensation for the time spared for reviewing the proposals. A reasonable fees can be charged to cover the expenses related to review and administrative processes. Every institution should allocate reasonable amount of funds for smooth functioning of the IEC.

SPECIAL CONSIDERATIONS

While all the above requirements are applicable to biomedical research as a whole irrespective of the specialty of research, there are certain specific concerns pertaining to specialised areas of research which require additional safe guards / protection and specific considerations for the IEC to take note of. Examples of such instances are research involving children, pregnant and lactating



women, vulnerable participants and those with diminished autonomy besides issues pertaining to commercialisation of research and international collaboration. The observations and suggestions of IEC should be given in writing in unambiguous terms in such instances.

GENERAL ETHICAL ISSUES

All the research involving human participants should be conducted in accordance with the four basic ethical principles, namely autonomy (respect for person / participant) beneficence, non-maleficence (do no harm) and justice. The guidelines laid down are directed at application of these basic principles to research involving human participants. The Principal Investigator is the person responsible for not only undertaking research but also for observance of the rights, health and welfare of the participants recruited for the study. S/he should have qualification and competence in biomedical research methodology for proper conduct of the study and should be aware of and comply with the scientific, legal and ethical requirements of the study protocol.

I. INFORMED CONSENT PROCESS

1. Informed Consent of Participants :

For all biomedical research involving human participants, the investigator must obtain the informed consent of the prospective participant or in the case of an individual who is not capable of giving informed consent, the consent of a legal guardian. Informed consent protects the individual's

freedom of choice and respect for individual's autonomy and is given voluntarily to participate in research or not. Adequate information about the research is given in a simple and easily understandable unambiguous language in a document known as the **Informed Consent Form with Participant/ Patient Information Sheet**. The latter should have following components as may be applicable :

1. Nature and purpose of study stating it as research
2. Duration of participation with number of participants
3. Procedures to be followed
4. Investigations, if any, to be performed
5. Foreseeable risks and discomforts adequately described and whether project involves more than minimal risk
6. Benefits to participant, community or medical profession as may be applicable
7. Policy on compensation
8. Availability of medical treatment for such injuries or risk management
9. Alternative treatments if available
10. Steps taken for ensuring confidentiality
11. No loss of benefits on withdrawal
12. Benefit sharing in the event of commercialization



13. Contact details of PI or local PI/Co-PI in multicentric studies for asking more information related to the research or in case of injury

14. Contact details of Chairman of the IEC for appeal against violation of rights 15. Voluntary participation

16. If test for genetics and HIV is to be done, counseling for consent for testing must be given as per national guidelines

17. Storage period of biological sample and related data with choice offered to participant regarding future use of sample, refusal for storage and receipt of its results

A copy of the participant/patient information sheet should be given to the participant for her/ his record. The informed consent should be brief in content highlighting that it is given of free will or voluntarily after understanding the implications of risks and benefits and s/he could withdraw without loss of routine care benefits. Assurance is given that confidentiality would be maintained and all the investigations/ interventions would be carried out only after consent is obtained. When the written consent as signature or thumb impression is not possible due to sensitive nature of the project or the participant is unable to write, then verbal consent can be taken after ensuring its documentation by an unrelated witness. In some cases ombudsman, a third party, can ensure total accountability for the process of obtaining the consent. Audio-visual methods could be adopted with prior consent and adequate precaution to ensure confidentiality, but approval of EC is required for such procedures. For drug trials, if the volunteer can give only thumb impression then another thumb impression by the relative or legal custodian cannot be accepted and an unrelated witness to the project should then sign.

Fresh or re-consent is taken in following conditions :

1. Availability of new information which would necessitate deviation of protocol.
2. When a research participant regains consciousness from unconscious state or is mentally competent to understand the study. If such an event is expected then procedures to address it should be spelt out in the informed consent form.
3. When long term follow-up or study extension is planned later.
4. When there is change in treatment modality, procedures, site visits.
5. Before publication if there is possibility of disclosure of identity through data presentation or photographs (which should be camouflaged adequately).

Waiver of consent

Voluntary informed consent is always a requirement for every research proposal. However, this can be waived if it is justified that the research involves not more than minimal risk or when the participant and the researcher do not come into contact or when it is necessitated in emergency situations elaborated in the previous Chapter. If such studies have protections in place for both privacy and confidentiality, and do not violate the rights of the participants then IECs may waive off the requirement for informed consent in following instances:



- i. When it is impractical to conduct research since confidentiality of personally identifiable information has to be maintained throughout research as may be required by the sensitivity of the research objective, *eg.*, study on disease burden of HIV/AIDS.
- ii. Research on publicly available information, documents, records, works, performances, reviews, quality assurance studies, archival materials or third party interviews, service programs for benefit of public having a bearing on public health programs, and consumer acceptance studies.
- iii. Research on anonymised biological samples from deceased individuals, left over samples after clinical investigation, cell lines or cell free derivatives like viral isolates, DNA or RNA from recognised institutions or qualified investigators, samples or data from repositories or registries *etc.*
- iv. In emergency situations when no surrogate consent can be taken.

2. Obligations of investigators regarding informed consent: The investigator has the duty to -

- i. communicate to prospective participants all the information necessary for informed consent. Any restriction on participant's right to ask any questions related to the study will undermine the validity of informed consent;
- ii. exclude the possibility of unjustified deception, undue influence and intimidation. Although deception is not permissible, if sometimes such information would jeopardize the validity of research it can be withheld till the completion of the project, for instance, study on abortion practices;
- iii. seek consent only after the prospective participant is adequately informed. The investigator should not give any unjustifiable assurances to prospective participant, which may influence the her/his decision to participate;
- iv. obtain from each prospective participant a signed form as an evidence of informed consent (written informed consent) preferably witnessed by a person not related to the trial, and in case the participant is not competent to do so, a legal guardian or other duly authorised representative;
- v. take verbal consent when the participant refuses to sign or give thumb impression or cannot do so. This can then be documented through audio or video means;
- vi. take surrogate consent from the authorized relative or legal custodian or the institutional head in the case of abandoned institutionalized individuals or wards under judicial custody;
- vii. renew or take fresh informed consent of each participant under circumstances described earlier in this chapter;
- viii. if participant loses consciousness or competence to consent during the research period as in Alzheimer or psychiatric conditions, surrogate consent may be taken from the authorized person or legal custodian.
- ix. The investigator must assure prospective participants that their decision to participate or not will not affect the patient - clinician relationship or any other benefits to which they are entitled.




3. Essential information for prospective research participants : Before requesting an individual's consent to participate in research, the investigator must provide the individual with the following information in the language she or he is able to understand which should not only be scientifically accurate but should also be sensitive/ adaptive to their social and cultural context :

- i. the aims and methods of the research;
- ii. the expected duration of the participation;
- iii. the benefits that might reasonably be expected as an outcome of research to the participant or community or to others;
- iv. any alternative procedures or courses of treatment that might be as advantageous to the participant as the procedure or treatment to which s/he is being subjected;
- v. any foreseeable risk or discomfort to the participant resulting from participation in the study;
- vi. right to prevent use of her/ his biological sample (DNA, cell-line, etc.) at any time during the conduct of the research;
- vii. the extent to which confidentiality of records could be maintained ie., the limits to which the investigator would be able to safeguard confidentiality and the anticipated consequences of breach of confidentiality;
- viii. responsibility of investigators;
- ix. free treatment for research related injury by the investigator and/ institution and sponsor(s);
- x. compensation of participants for disability or death resulting from such injury;
- xi. insurance coverage if any, for research related or other AEs;
- xii. freedom of individual / family to participate and to withdraw from research any time without penalty or loss of benefits which the participant would otherwise be entitled to;
- xiii. the identity of the research teams and contact persons with address and phone numbers;
- xiv. foreseeable extent of information on possible current and future uses of the biological material and of the data to be generated from the research and if the material is likely to be used for secondary purposes or would be shared with others, clear mention of the same;
- xv. risk of discovery of biologically sensitive information and provision to safeguard confidentiality;
- xvi. publication, if any, including photographs and pedigree charts.

The quality of the consent of certain social and marginalized groups requires careful consideration as their agreement to volunteer may be unduly influenced by the Investigator.

II. COMPENSATION FOR PARTICIPATION

Participants may be paid for the inconvenience and time spent, and should be reimbursed for expenses incurred, in connection with their participation in research. They may also receive free medical services. When this is reasonable then it cannot be termed as benefit. During the period of research if the participant requires treatment for complaints other than the one being studied



necessary **free ancillary care** or appropriate referrals may be provided. However, payments should not be so large or the medical services so extensive as to make prospective participants consent readily to enroll in research against their better judgment, which would then be treated as undue inducement. All payments, reimbursement and medical services to be provided to research participants should be approved by the IEC.

Care should be taken :

- i. when a guardian is asked to give consent on behalf of an incompetent person, no remuneration should be offered except a refund of out of pocket expenses;
- ii. when a participant is withdrawn from research for medical reasons related to the study the participant should get the benefit for full participation;
- iii. when a participant withdraws for any other reasons s/he should be paid an amount proportionate to the amount of participation.

III. CONFLICT OF INTEREST

A set of conditions in which professional judgment concerning a primary interest like patient's welfare or the validity of research tends to be or appears to be unduly influenced by a secondary interest like non-financial (personal, academic or political) or financial gain is termed as Conflict of Interest (COI). Academic institutions conducting research in alliance with industries/ commercial companies require a strong review to probe possible conflicts of interest between **scientific responsibilities of researchers and business interests**. g{. ownership or part-ownership of a company developing a new product). In cases where the review board/ committee determines that a conflict of interest may damage the scientific integrity of a project or cause harm to research participants, the board/ committee should advise accordingly. Significant financial interest means anything of monetary value that would reasonably appear to be a significant consequence of such research including salary or other payments for services like consulting fees or honorarium per participant; equity interests in stocks, stock options or other ownership interests; and intellectual property rights from patents, copyrights and royalties from such rights. The investigators should declare such conflicts of interest in the application submitted to IEC for review. Institutions and IECs need self-regulatory processes to monitor, prevent and resolve such conflicts of interest. The IEC can determine the conditions for management of such conflicts in its SOP manual. Prospective participants in research should also be informed of the sponsorship of research, so that they can be aware of the potential for conflicts of interest and commercial aspects of the research. Those who have also to be informed of the secondary interest in financial terms should include the institution, IEC, audience when presenting papers and should be mentioned when publishing in popular media or scientific journals. Undue inducement through compensation for individual participants, families and populations should be prohibited. This prohibition however, does not include agreements with individuals, families, groups, communities or populations that foresee technology



transfer, local training, joint ventures, provision of health care reimbursement, costs of travel and loss of wages and the possible use of a percentage of any royalties for humanitarian purposes. Undue compensation would include assistance to related person(s) for transport of body for cremation or burial, provision for insurance for unrelated conditions, free transportation to and fro for examination not included in the routine, free trip to town if the participants are from rural areas, free hot meals, freedom for prisoners, free medication which is generally not available, academic credits and disproportionate compensation to researcher / team/ institution. However, in remote and inaccessible areas some of the features mentioned above may be a necessity and culture specific. Therefore, the IEC should examine this on a case-by-case basis, as some of these elements may be justifiable for collecting vital data for national use or necessary to find if some interventions may significantly have direct impact on health policies.

IV. SELECTION OF SPECIAL GROUPS AS RESEARCH PARTICIPANTS

i. *Pregnant or nursing women* : Pregnant or nursing women should in no circumstances be the participant of any research unless the research carries no more than minimal risk to the fetus or nursing infant and the object of the research is to obtain new knowledge about the foetus, pregnancy and lactation. As a general rule, pregnant or nursing women should not be participants of any clinical trial except such trials as are designed to protect or advance the health of pregnant or nursing women or foetuses or nursing infants, and for which women who are not pregnant or nursing would not be suitable participants.

a. The justification of participation of these women in clinical trials would be that they should not be deprived arbitrarily of the opportunity to benefit from investigations, drugs, vaccines or other agents that promise therapeutic or preventive benefits. Example of such trials are, to test the efficacy and safety of a drug for reducing perinatal transmission of HIV infection from mother to child, trials for detecting foetal abnormalities and for conditions associated with or aggravated by pregnancy etc. Women should not be encouraged to discontinue nursing for the sake of participation in research and in case she decides to do so, harm of cessation of breast-feeding to the nursing child should be properly assessed except in those studies where breast feeding is harmful to the infant. Compensation in terms of supplying supplementary food such as milk formula should be considered in such instances.

b. Research related to termination of pregnancy : Pregnant women who desire to undergo Medical Termination of Pregnancy (MTP) could be made participants for such research as per The Medical Termination of Pregnancy Act, GOI, 1971.

c. Research related to pre-natal diagnostic techniques : In pregnant women such research should be limited to detect the foetal abnormalities or genetic disorders as per the Prenatal Diagnostic Techniques (Regulation and Prevention of Misuse) Act, GOI, 1994 and not for sex determination of the foetus.



- ii. Children :** Before undertaking trial in children the investigator must ensure that -
- a. children will not be involved in research that could be carried out equally well with adults;
 - b. the purpose of the research is to obtain knowledge relevant to health needs of children. For clinical evaluation of a new drug the study in children should always be carried out after the phase III clinical trials in adults. It can be studied earlier only if the drug has a therapeutic value in a primary disease of the children;
 - c. a parent or legal guardian of each child has given proxy consent;
 - d. the assent of the child should be obtained to the extent of the child's capabilities such as in the case of mature minors from the age of seven years up to the age of 18 years.;
 - e. research should be conducted in settings in which the child and parent can obtain adequate medical and psychological support;
 - f. interventions intended to provide direct diagnostic, therapeutic or preventive benefit for the individual child participant must be justified in relation to anticipated risks involved in the study and anticipated benefits to society;
 - g. the child's refusal to participate in research must always be respected unless there is no medically acceptable alternative to the therapy provided/ tested, provided the consent has been obtained from parents / guardian;
 - h. interventions that are intended to provide therapeutic benefit are likely to be at least as advantageous to the individual child participant as any available alternative interventions;
 - i. the risk presented by interventions not intended to benefit the individual child participant is low when compared to the importance of the knowledge that is to be gained.
- iii. Vulnerable groups :** Effort may be made to ensure that individuals or communities invited for research be selected in such a way that the burdens and benefits of the research are equally distributed.
- a. research on genetics should not lead to **racial inequalities**;
 - b. persons who are **economically or socially disadvantaged** should not be used to benefit those who are better off than them;
 - c. rights and welfare of **mentally challenged and mentally differently able persons** who are incapable of giving informed consent or those with behavioral disorders must be protected. Appropriate proxy consent from the legal guardian should be taken after the person is well informed about the study, need for participation, risks and benefits involved and the privacy and confidentiality procedures. The entire consent process should be properly documented;
 - d. adequate justification is required for the involvement of participants such as prisoners, students, subordinates, employees, service personnel etc. who have **reduced autonomy** as research participants, since the consent provided may be under duress or various other compelling reasons.



V. ESSENTIAL INFORMATION ON CONFIDENTIALITY FOR PROSPECTIVE RESEARCH PARTICIPANTS

Safeguarding confidentiality - The investigator must safeguard the confidentiality of research data, which might lead to the identification of the individual participants. Data of individual participants can be disclosed under the following circumstances :

- a. only in a court of law under the orders of the presiding judge or
- b. there is threat to a person's life or
- c. in cases of severe adverse reaction may be required to communicate to drug registration authority or
- d. if there is risk to public health it takes precedence over personal right to privacy and may have to be communicated to health authority.

Therefore, the limitations in maintaining the confidentiality of data should be anticipated and assessed and communicated to appropriate individuals or authorities as the case may be.

VI. COMPENSATION FOR ACCIDENTAL INJURY

Research participants who suffer physical injury as a result of their participation are entitled to financial or other assistance to compensate them equitably for any temporary or permanent impairment or disability. In case of death, their dependents are entitled to material compensation.

Obligation of the sponsor to pay :- The sponsor whether a pharmaceutical company, a government, or an institution, should agree, before the research begins, in the *a priori* agreement to provide compensation for any physical or psychological injury for which participants are entitled or agree to provide insurance coverage for an unforeseen injury whenever possible.

An Arbitration committee or appellate authority could be set up by the institution to decide on the issue of compensation on a case-by-case basis for larger trials where such a step is feasible. Alternately an institution can also establish such a committee to oversee such claims, which would be common for projects being undertaken by it.

Compensation for **ancillary care** for unrelated illness as free treatment or appropriate referrals may also be included in the *a priori* agreement with the sponsors whenever possible.

VII. POST - TRIAL ACCESS

The Helsinki Declaration of the World Medical Assembly (WMA), 2000 states that at the end of the trial every participant should be assured of access to the best proven prophylactic, diagnostic and therapeutic methods identified by the study. This led to a lot of debate globally on account of lack of even basic drugs in most of the developing countries. The Declaration of the WMA in 2004 reaffirmed "its position that it is necessary during the study planning process to identify post-trial access by study participants to prophylactic, diagnostic and therapeutic procedures identified as beneficial in the study or access to other appropriate care. Post-trial access arrangements or other



care must be described in the study protocol so the ethical review committee may consider such arrangements during its review." Therefore, whenever possible I\EC should consider such an arrangement in the *a priori* agreement. Sometimes more than the benefit to the participant, the community may be given benefit in indirect way through improving their living conditions, establishing counseling centers, clinics or schools, and giving education on maintaining good health practices. For smaller scale or student projects post trial benefit to the participants may not be feasible but keeping in mind the post trial responsibility conscious efforts should be made by the guides and the institution to initiate steps to continue to support and give better care to the participants.

VIII. INTERNATIONAL COLLABORATION / ASSISTANCE IN BIO-MEDICAL / HEALTH RESEARCH

Research in biomedical and health areas has gained greater momentum only by the second half of the 20th Century, especially since the 1960s, the scope of international co-operation and collaboration assumed such proportions as to have exploitative connotations with commercial and human dimensions. On the one hand, collaboration in medical research suggests an interest in a humane and civil society, while on the other it could give the impression of experimentation on the population of one country by another. Different levels of development in terms of infrastructure, expertise, social and cultural perceptions, laws relating to intellectual property rights etc., necessitate an ethical framework to guide such collaboration. The same concerns are applicable even when there is no formal collaboration between countries, but the research is undertaken with assistance from international organisations as sponsors (Governmental like National Institutes of Health, USA, non-Governmental like Bill & Melinda Gates Foundation, Ford Foundation or others like WHO, UNICEF, UNAIDS,etc.).

Special Concerns

1. Given the magnitude and severity of the health problems in different countries, capacity building to address ethical issues that arise out of collaborative research must be promoted on a priority basis. Strategies should be implemented so that various countries and communities can practise meaningful self-determination in health development and can ensure the scientific and ethical conduct of research.
2. The collaborating investigators, institutions and countries can function as equal partners with sponsors even when in a vulnerable position by building appropriate safeguards. Community representatives should be involved early enough while designing the protocol and in a sustained manner during the development, implementation, monitoring and dissemination of results of research.
3. Careful consideration should be given to protect the dignity, safety and welfare of the participants when the social contexts of the proposed research can create foreseeable conditions



for exploitation of the participants or increase their vulnerability to harm. The steps to be taken to overcome these should be described and approval taken from concerned IEC/IndEC.

4. Every adult participant in the research should voluntarily give informed consent and child her/his assent as may be applicable.

5. As different kinds of research (epidemiological studies, clinical trials, product development, behavioural and social science oriented research *etc.*) have their own particular scientific requirements and specific ethical challenges, the choice of study populations for each type of study should be justified in advance in scientific and ethical terms regardless of the place from where the study population is selected. Generally, early clinical phases of research, particularly of drugs, vaccines and devices, should be conducted in communities that are less vulnerable to harm or exploitation. However, for valid scientific and public health reasons, if sufficient scientific and ethical safeguards are ensured it may be conducted in any phase after obtaining relevant regulatory clearances.

6. The nature, magnitude, and probability of all foreseeable harms resulting from participation in a collaborative research programme should be specified in the research protocol and explained to the participants as fully as can be reasonably done. Moreover, the modalities by which to address these, including **provision for the best possible nationally available care** to participants who experience adverse reactions to a vaccine or drug under study, compensation for injury related to the research, and referral for psychosocial and legal support if necessary, need to be described.

7. The research protocol should outline the benefits that persons / communities / countries participating in such research should experience as a result of their participation. Care should be taken so that these are not presented in a way that unduly influences freedom of choice in participation. The burden and the benefit should be equally borne by the collaborating countries.

8. Guidelines, rules, regulations and cultural sensitivities of all countries participating in collaborative research projects should be respected, especially by researchers in the host country and the sponsor country. These could be with reference to intellectual property rights, exchange of biological materials (human, animal, plant or microbial), data transfer, security issues, and issues of socially or politically sensitive nature. In this context, it is essential for researchers to follow the GOI notification on “Exchange of Human Biological Material for Biomedical Research” issued on 19.11.97 and obtain appropriate regulatory clearances as prevalent in the country for international collaboration and EC approval from all trial sites before the initiation of research.

IX. RESEARCHER'S RELATIONS WITH THE MEDIA AND PUBLICATION PRACTICES

Researchers have a responsibility to make sure that the public is accurately informed about results without raising false hopes or expectations. It should also not unnecessarily scare the people. Researchers should take care to avoid talking with journalists or reporters about preliminary findings as seemingly promising research that subsequently cannot be validated or could lead to



misconcepts if reported prematurely. Or, the results of research may be reported in such a way that it would seem that the human application is round the corner, only to be told later by the researchers that considerable time has to pass before these findings can be translated into tools for human use. In such circumstances, retractions most often do not appear in the media. Therefore, it is important to avoid premature reports and publicity stunts. The best safeguard against inaccurate reporting is for the researcher to talk to media on condition that the reporter submit a full written, rather than oral version, of what will be reported, so that it enables the researcher to make necessary corrections, if needed, prior to publication. Investigator's publication plans should not threaten the privacy or confidentiality of participants, for example publication of pedigrees in the report on research in genetics can result in identification of study participants. It is recommended that a clear consent for publication be obtained besides the consent for participation in research or treatment and such a consent should preferably be obtained on two different occasions and not as a blanket one at the commencement of the study. Maintenance of confidentiality while publishing data should be taken care of. In case there is need for publication / presentation of photographs/ slides / videos of participant (s), prior consent to do so should be obtained. Identification features should be appropriately camouflaged. The same safeguard should be observed for video coverage. With regard to authorship, the International Committee of Medical Journal Editors (ICJME) has laid down criteria based on credit and accountability. Only those who make substantial contribution to the article and take responsibility for the published matter can be co-authors. Plagiarism or falsification of data and authorship are important ethical issues in publications. The term 'misconduct in research' means fabrication, falsification, plagiarism, selective omission of data and claiming that some data are missing, ignoring outliers without declaring it, not reporting data on side effects/ adverse reactions in a clinical trial, publication of post-hoc analysis without declaring it, gift authorship, not citing others' work, not disclosing conflict of interest, redundant publication, and failure to adequately review existing research. The Commission on Research Integrity in US created by US Congress addresses the scientific, ethical, social and legal issues involving scientific misconduct in research. Consolidated standards of reporting trials (CONSORT) guidelines have been prescribed for publishing results of clinical research especially RCTs (Randomized Controlled Trials) and are available at <http://www.consortstatement.org>.
