

HAPPENINGS

A KUHS PUBLICATION ON
RECENT ADVANCES



A SAMAGRAM INITIATIVE

Issue - 1



Message from Vice Chancellor

'Happenings -A KUHS Publication on Recent Advances' is an important initiative for strengthening the status of each stream of Health Science especially to assess what has happened in the past, and what is in store for us in the future. This book is the collection of most promising happening in Health Science speciality in the last decade (2010-19). This is an ongoing initiative. Hence, all are welcome to contribute.

I am expressing my deep sense of appreciation for the sincere efforts of all those participated in this initiative.

Prof. (Dr.) M.K.C. Nair, DSc

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'Happenings': A Publication from KUHS on Recent Advances

1. Stream	Ayurveda
2. Speciality	Panchakarma
3. Date	25/09/2019
4. Title	Effect of Shodanapoorvaka Snehapana (Internal oleation done as a preoperative procedure to Purification therapy) on lipid profile before and after the procedure
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Title

Effect of Shodanapoorvaka Snehapana (Internal oleation done as a preoperative procedure to Purification therapy) on lipid profile before and after the procedure.

SOURCE

- Dissertations on snehapana submitted to Kerala University in 2012 by Dr A Ramya, under the guidance of Dr G Vinod kumar, Dr Laila AS, Dept of Panchakarma, Govt Ayurveda College, Thiruvananthapuram.¹
- Effect of snehapana (Internal Oleation) on lipids – A Critical Review - by Dr. Vasant Patil, Prof. M.S. Baghel, A.B. Thakar²
- Effect of Snehapana on the lipid profile in the patients of rheumatic & neurological disorders.³

RELEVANCE

In the present society, there is a misunderstanding that intake of ghee or any unctuous material results in increased cholesterol which can harm the body. It is many a times difficult to convince the patient for shodana poorvaka snehapana which is an important preparation for the intended purificatory therapy either vamana (Therapeutic Emesis) or virechana (Therapeutic purgation). The possibilities of understanding health issues through weeklies and magazines lead to half-baked knowledge among the public which becomes a hindrance to the physician in executing effective treatment. Convincing the fellow scientific community from other streams also becomes a need of the hour. Thus this work is undertaken.

The Article

SHODANANGA SNEHAPANA

- Shodana snehapana is the most important poorvakarma to be done before shodana
- The medicine for snehapana usually ghee preparation and oil preparations are selected according to the condition of the patient considering his physiology and pathology.
- The medicine is administered to the patient in a specific physiological state of digested previous meal but without appetite, felt by lightness of body, proper evacuation of urine and micturition
- The snehapana is continued till some specific symptoms called samyak snigdha lakshana is seen in patient which indicates the optimum action of snehapana as intended in the pathology.
- The snehapana is stopped followed by sudation and purification.

LIPID PROFILE and SHODANANGA SNEHAPANA

- The lipid profile was tested before snehapana, soon after snehapana and after shodana
- In all the mentioned studies the results were tested statistically.
- There was significant decrease in total cholesterol, LDL, triglycerides, VLDL in group during intervention.¹
- The studies conducted as mentioned in source² revealed the effect on the lipid profile remained almost similar irrespective of the drug used and there was no significant increase in any parameter
- Increase in dietary intake of lipid can change intestinal mucosal texture
- Feedback mechanism in the methodology of shodana snehapana may result in lowered intestinal absorption of cholesterol.

- Such a procedure also may result in Increased excretion of bile acids
- The specific pattern of the procedure as mentioned in Samhitha reg Shodananga Snehapana have a significant role in maintaining the lipid profile of the individual.
- The understanding of the Koshta of the patient , the agni of the patient plays the significant role in deciding the dosage for snehapana of the patient.
- The personalized approach of the ayurvedic system understanding the biology ,physiology and pathology of the individual helps in preventing any kind of adverse affects at the patient level if done systematically as laid down in shastra.

SOME CONTEMPRORY STUDIES WRT TO GHEE INTAKE AND OBSERVATIONS

- The rat study from south Dakota state university brooklings USA reveals the intake of dietary lipids more than 10 % will increase the intestinal secretions , reduces absoption and support evacuation.⁴
- The study on The effect of ghee on serum lipid profile and microsomal lipid peroxidation at Ohio University ,Columbus ,USA showed that in the 10% ghee supplemented diet fed group there was No significant effect over Total cholesterol,lipid peroxidation,liver microsomal lipid peroxide levels . The study made a finding “ These positive research findings support the beneficial effects of ghee as outlined in ancient ayurvedic texts and the therapeutic use of ghee for thousands of years in ayurvedic system of medicine ”⁵
- The work on The effect of dietary ghee-on blood and liver lipids at central food technological research institute , Mysore Karnataka in rats revealed Significant dose dependent decrease in TC,LDL,VLDL and triglycerides when ghee levels>2.5%,When ghee level in diet was at 10% PUFA in liver lipids and serum reduced. The work conclude with a note that Consumption upto 10% ghee in diet has positive effect on serum lipid profiles in wistar rats, and Consumption of ghee upto 10% of diet do not elevate risk factors of CVA⁶
- A study from Isafahan University of Medical Science Iran on 129 healthy subjects 3 groups with hydrogenated ,liquid and ghee oil diet for 40 days observed Ghee reduced TGL and increased HDL.⁷

SOME SIGNIFICANT PUBLISHED OBSERVATIONS

- “Asian indians prevoiusly had a low incidence of CHD and for generations using ghee in their cooking,which is low in PUFA .The epidemic of CHD started in india 2 to 3 decades ago when traditional ghee was replaced by oils rich in TFA which comprise 40%vanaspathi ”³
- Significantly lower prevalance of CAD in men who consumed higher amounts of ghee in rural rajasthan.⁹
- A Study on Association of dietary ghee intake in CHD &risk factor in rural male observed Increased prevalance of CAD with intake of ghee plus vegetable ghee in diet And lower Risk with consumption of ghee alone A significant observation on Association of vanaspathi and animal ghee intake as risk for CAD in rural and urban population was observed.⁸

CONCLUSION

The Shodanga Snehapana involving intake of unctuous substances like ghee is having no adverse effect wrt to the lipid profile of the individual as misunderstood by the public and other non ayurvedic fraternity.

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2 . Effect of snehapan(Internal Oleation)on lipids –A Critical Review- by Dr.Vasant Patil ,Prof. M.S.Baghel , A.B. Thakar Article published in Ancient science of life(2009 Oct-Dec; 29(2): 32–39.)

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5. The effect of ghee on serum lipid profile and microsomal lipid peroxidation Hari sharma Xiaying Zang Chandradhar dwivedi etal(2010),Centre for integrative medicine and dept of pathology,The ohio state university Columbus,USA

6. by Kumar mv,Sambaiah ,Lokesh-1999 Dept of biochemistry and nutrition ,Central food technological research institute Mysore Karnataka

Effect of hydrogenated ,liquid, and ghee oils on serum lipid profiles Nahsin,Masood,Gholam ali naderil et al 2010

Dept of Nutrition

Isfahan Cardiovascular Research center Isfahan university of medical science Isfahan , Iran

8 Dietary fats and habits and susceptibility of Asian Indians to NIDDM & Atherosclerotic Heart disease Raheja B S(1991) Journal of Diabetic Association of India

9. Association of dietary ghee intake in CHD & risk factor in rural male Gupta R, Prakash H 1997 Journal of indian medical association

10 Association of vanaspathi and animal ghee intake as risk for CAD in rural and urban population Singh RB,Niaz MA,Ghosh S. 1996

‘Happenings’: A Publication from KUHS on Recent Advances

FACING SHEET OF ARTICLE

1. Stream	Dental
2. Specialty	Pediatric & Preventive Dentistry
3. Date	1/10/2019
4. Title	Regenerative Endodontics in young permanent tooth
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Title: Regenerative endodontics in young permanent tooth

Source: Original articles

Why it's relevant:

Regenerative endodontics is an exciting advancement in the field of Pediatric Endodontics. A recently erupted traumatized young permanent tooth has always posed challenges to the clinician due to the incomplete apical root end closure. The problem becomes more grave when the tooth turns non vital and the root length is not sufficient. Traditional methods of apexification or more recent methods of immediate apexification becomes unsuccessful because both these methods fail to induce root lengthening and can result only in root end closure. Regenerative endodontics focus on revitalization of stem cells of apical papilla (SCAP) to help in regaining the vitality of root pulp so that root lengthening is achieved which can then taken up for traditional root canal treatment

Article text

- Regenerative endodontic procedures are defined as biologically based procedures designed to replace damaged structures, including dentin and root structures as well as cells of pulp dentin complex.
- Three aspects of root maturation needs to be considered namely,
 1. root elongation
 2. increase in dentin wall thickness
 3. root end closure
- All these 3 objectives are achievable in vital traumatised immature tooth by a procedure called apexogenesis
- Treatment done on a non vital young permanent tooth is called apexification. Traditional apexification or more recent immediate apexification with materials like MTA or biodentin can only do apical closure. Other two objectives are not met.
- There was no treatment option for a traumatised young permanent tooth with a short root and non vital pulp till recently.
- Iwaya et al in 2001 rekindled interest in regenerative endodontics by doing revascularization in an immature permanent tooth with apical periodontitis and sinus tract.
- Clinical steps in regenerative endodontics is given by American association of endodontists in 2016

- Steps involved are

1. first appointment

- (1) Local anesthesia/rubber dam isolation/access opening

- (2) Irrigation with 1.5% 20ml sodium hypochlorite and dry the canals

- (3) Place triple antibiotic paste a mix of ciprofloxacin, metonidazole, minocycline 1:1:1 for canal disinfection and seal the cavity

2. second appointment (after 1-4 weeks)

- (1) Local anesthesia without adrenaline and access opening

- (2) Irrigation with 17% EDTA and dry with paper points

- (4) Create bleeding into canal by over instrumenting into apical space using k fille .Bleeding has to reach till CEJ. Alternatively Platelet rich plasma (PRP) or platelet rich fibrin (PRF) or PRF membrane could be used as scaffold

- (5) Place a resorbable material like colla plug over the blood clot.

- (6) Triple seal with MTA/biodentin ,GIC and composite. Usually apical maturation takes place in 1-1.5 years

- Stem cells of apical papilla (SCAP) when stimulated migrates into disinfected canal space and get attached to scaffolds like blood clot, PRF or PRP. It gets converted to odontoblast like tissue and start lining pulp dentin complex. This lays down dentin like hard tissue. Hence root maturation like in vital tooth takes place by increasing root length, increasing dentin wall thickness and apical closure. Once root maturation gets completed, the case can be further taken up for traditional root canal treatment and crown.

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- 2 Louis M. Lin, Bill Kahler. A review of regenerative endodontics: current protocols and future directions. *J Istanbul Univ Fac Dent*. 2017; 51(3 Suppl 1): S41-S51.

- 3 Madhu Santhakumar, Shivsankar Yayathi, N Retnakumari. A clinicoradiographic comparison of the effects of platelet-rich fibrin gel and platelet-rich fibrin membrane as scaffolds in the apexification treatment of young permanent teeth *Journal of Indian society of Pedodontics and Preventive Dentistry*. 2018; 36 (1); 65-70

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FACING SHEET OF ARTICLE

1. Stream	Dental
2. Specialty	Oral Pathology
3. Date	1/10/2019
4. Title	Happenings in Oral Pathology
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Happenings in Oral Pathology

I. Digital pathology: Current applications and challenges for oral pathologists.¹

- By the invention of whole slide imaging, field of digital pathology has exploded and is currently regarded as one of the most promising avenues of diagnostic medicine.
- Digital pathology(DP) is an image-based information system, in which the glass slides are captured with a scanning device to provide a high-resolution digital image, that can be viewed, managed, shared and analyzed on a computer monitor.
- Applications/ Benefits:
 1. Has revolutionized educational sector. DP ensures quality education, similar learning opportunities, multiple access of the slide for all students by standardization of course content.
 2. Can improve quality of analysis by team annotation of slides, zoomed in and multiple angle views and thereby reducing errors
 3. Easy storage and faster access to archived data
 4. Cost effective over time
 5. Telepathology, i.e. Electronic transmission of digital images for an expert opinion.
- Challenges/Hurdles:²
 1. Standardization of digital imaging and archiving is required
 2. Greater obstacles in implementing digital pathology technologies in low-resource countries because of high-cost instrumentation, regular maintenance, need for additional training, changes in traditional workflow, and integration with present software.

II. Liquid Biopsy in Oral Cancer detection:³

- Majority of cases of oral squamous cell carcinomas (OSCC) are not diagnosed until advanced stages, a point at which therapy is less effective and the prognosis is worse
- Field of liquid biopsy is a new, revolutionary area of oncology in tumor molecular profiling, monitoring therapeutic response and in the development of tumor-precision medicine.

- It is a noninvasive or minimally invasive diagnostic tool which helps in gaining broader understanding of the disease.
- It is based on the detection of circulating tumour cells (CTCs), circulating tumour DNA (ctDNA) circulating tumour RNA (ctRNA), proteins, and exosomes
- Body fluids such as blood, saliva, urine, seminal plasma, pleural effusions, cerebrospinal fluid, sputum, and stool samples can be used

- Application
 1. Molecular profiling of primary and metastatic tumor
 2. Aids in early cancer detection
 3. To detect early evidence of recurrence or response to therapy
 4. Helps clinician in therapeutic decision making

- Advantages of Liquid biopsy over tumor biopsy
 1. Samples can be collected easily and quick diagnosis
 2. Less dependent on original tumor site since tumor from both primary and metastatic sites release DNA into the bloodstream
 3. New tool that can be applied for evaluation of response to therapy and for detection of residual disease
 4. Allows for serial evaluation in absence of detectable primary tumor or metastasis
 5. Greater patient compliance as it is minimally invasive.

III. Oral and Maxillofacial Pathology App⁴

- New app has been developed by the Department of Oral Pathology and Oral Biology in collaboration with the Department for Education Innovation at the *University of Pretoria*
- The app provides an essential adjunct to the head and neck pathology curricula for both undergraduate and postgraduate medical and dental students.

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‘Happenings’: A Publication from KUHS on Recent Advances

1. Stream	DENTAL
2. Speciality	PROSTHODONTICS
3. Date	26/09/2019
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T- Scan –Computerized Occlusal Analyser –

Dr LYLAJAMS , PROFESSOR DEPT OF PROSTHODONTICS GOVT DENTAL COLLEGE THRISSUR

T- scan is an objective assessment tool used to evaluate the occlusion of a patient

T- Scan is a bite analysis system that measures the efficiency of how teeth come together and separate to protect natural teeth, implants ,restored teeth and muscles.

T-Scan can identify the important parameters for measuring occlusion namely force and timing of tooth contact.

The latest version of T-Scan is T-Scan III (version 7.0).

It quantifies the amount of relative occlusal forces and enables us to identify traumatic occlusal contacts , also helps to find the order of occlusal contact simultaneously measuring the force percentage of the same contact to maximum intercuspation . Shows the abnormal forces leading to trauma.

Components of T - Scan

- Sensor and support -
Sensor –two size -Large and Small
- Handle assembly
- Computer Soft ware
- Printer

Mechanism

Two mode – time analysis

- Force analysis

Provides information of the location and timing of occlusal contact on the screen ,with different colours for the 1stcontact , 2nd, 3rd or more contacts . Five different colours for relative forces

T- Scan analysis the order of occlusal contacts and simultaneously measure the changes in force percentage s of the same contact to maximum intercuspation

Premature contacts and interferences can be identified

Centre of occlusal force falling on an area can be identified and measured.

Disclusion time and occlusion time

Clinical application

Implant Dentistry

Implants are not supported by periodontal ligaments .

Helps to identify and protect implants from damaging occlusal forces.

Restorative dentistry

Improperly restored tooth can cause several problems like head ache TMD related problems ,or tooth fracture . T-scan helps to identify the problem and helps in finishing and polishing and reduce recall visit .

Orthodontics – T- Scan use age before and after treatment for each patient helps to obtain the goal of malocclusion correction

Oral and maxillofacial surgery – T-Scan is can be used before and after surgery to check and visualise the result of occlusal correction

Prosthodontics – used as a diagnostic screening method for obtaining occlusal stability . also to minimize destructive forces in full mouth rehabilitation of the patient .

T-Scan can be used in occlusal analysis and it helps correction of occlusal discrepancies to enhance patient comfort .

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3. Dr J H kim DDS computerised occlusion using T-Scan III DTL T-Scan e-book 2016 /12
4 articles

'Happenings': A Publication from KUHS on Recent Advances

1. Stream	Dentistry
2. Speciality	Oral and maxillofacial surgery
3. Date	23/09/2019
4. Title	Artificial Intelligence in orthognathic surgery
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Artificial Intelligence in orthognathic surgery

Artificial Intelligence (AI) is commonly defined as “a system’s ability to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation”. In the past decade, numerous very promising applications of AI have emerged in Medicine. Convolutional Neural Networks trained with massive labelled datasets proved to be very efficient in image recognition. The main reason explaining the actual superiority of AI over human doctors in select sub-specialties of medicine is that machines can be educated with hundreds of thousands of clinical cases. This exceeds by far the clinical experience of even the best specialists in any field. AI must be considered a useful tool in evaluating facial alterations after orthognathic surgery

AI intervenes at different levels to optimize the acquisition and processing of data, as well as pre-analysis of maxillofacial imagery. AI in intra-oral scanner software allows for a quicker and more efficient acquisition. Moreover, the use of AI in tridimensional radiology optimizes the signal to noise ratio and yields higher quality images using lower doses of radiation. They allow for superimposing of various diagnostic tools (i.e. CBCT, digital photography, and intra-oral scanners). Various software exist that incorporate artificial intelligence and machine learning technologies to automate cephalometric analyses. 3D digital treatment planning software will replace the long and fastidious task of setting up plaster stone models and lateral cephalograms.

The dynamic virtual set up is a wonderful dialogue tool between the maxillofacial surgeon and the orthodontist. It allows the practitioners to visualize diagrams of each therapeutic objective and the role of each intervention on the overall result. Virtual set up software are also great tools to discuss and explain the procedures to the patient in order to improve their understanding and implication in the orthognathic-surgical protocol. Visualizing and quantifying the impact of a given treatment on different anatomical structures help the practitioner to validate the chosen optimal treatment plan and evaluate the pros and cons of alternative treatment options. Additionally, it offers the opportunity for patients to visualize the effects of the treatment hence optimizing informed consent. In addition, it enhances the work of the orthodontist and maxillofacial surgeon by objectively presenting the impact of the different phases of the treatment through a non-biased filter. Moreover, the use of AI would allow the practitioner to be better equipped to tackle future clinical challenges with similar presentations.

AI based solutions offer the ability to combine digital photography and 3 D models called “3D Matching” to yield a 3D image of the dental arch models using the actual teeth photographs. This model is dynamically adjusted based on the evolution of the treatment over time. It is possible to automate the use of geometric morphometric tools such as Procrustes methods without a burdensome and labor intensive intervention from a practitioner. It very difficult to predict the path that AI intrusion in the medical field will follow in the future.

Elaborating a treatment plan in orthognathic surgery is based on three main components. The first component is a basic knowledge in the fields of craniofacial anatomy,

orofacial functions, dysmorphisms and their etiologies, as well as surgical techniques. Machines have by far exceeded human capacities in storing and organizing data.

The second component is linked to the artistic sense of each physician. Facial aesthetics is a major feature of orthognathic surgery, and elaborating a treatment plan requires a certain artistic sensitivity. This component is mainly acquired through personal experience gained from contact with patients and an artistic sense. It is developed while contemplating arts, discovering museums, observing nature and overall increasing one's general culture about mankind and its societies. It can be hypothesized that in a near future deep learning algorithms educated with hundreds of thousands of expert-labelled clinical cases will be at least equivalent to the best maxillofacial surgeons at establishing the diagnosis of a dento-facial dysmorphism.

The third component is the patient's demand for a treatment. The orthodontist-surgeon team must carefully assess the actual reasons that make the patient seek an orthodontic-surgical protocol. Patients' demands are often ambiguous in the field of craniofacial dysmorphisms and it needs all the experience of a well-trained physician to detect patient's real motivations and elaborate a personalized treatment plan. Beyond the natural empathy that should be part of the doctor-patient relationship surgeon should really try to "comprehend" the patient's symptoms and demands. And, likewise the agreed upon treatment plan should be "comprehensible" by the patient so that he can really be involved in it. Third component is definitely the one that demands the more human skills, as machines are not at ease when dealing with ambiguous data.

Overdependence to the enhanced capacities that AI offers in every step of the process of an orthodontic surgery protocol carries an obvious inherent risk, loss of intrinsic specialist skills. By allowing the practitioner to rely too heavily on computerized algorithms and simply execute established treatment plans, practitioners could lose their clinical and technical sense of reasoning in the long-term. The lack of use of specific skills learned and acquired by clinical experience could suffer if critical thinking is not used in conjunction with these new methods.

AI has yet to demonstrate its value and capacities in the field of simulation of outcomes of orthognathic surgery. Indeed, the question of the virtual simulation of the postoperative aesthetic result remains unanswered to date. The soft-tissue response to the underlying skeletal displacements can be quite different according to the quality of the soft-tissues linked to various factors such as (age, sex, ethnics, body mass index, etc.) and vary from one patient to the other.

It is the responsibility of the entire medical profession to successfully manage the use of artificial intelligence in the diagnosis and treatment of patients and to achieve a positive symbiosis between clinical sense and AI. In order to achieve this, artificial intelligence needs to be viewed as a tool to be used with the utmost care and training, and not as a threat.

TITLE : Artificial Intelligence in orthognathic surgery

Source : Bouletreau P, et al. Artificial Intelligence: Applications in orthognathic surgery. J Stomatol Oral Maxillofac Surg (2019)

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THIRUVANANTHAPURAM

Relevance

1. The passage from 2D to 3D imagery along with added benefits of increased diagnostic precision
2. The possibility to visualize the treatment plan and engage patients and practitioners in a constructive dialogue. This limits confusion and brings a unique treatment plan for each patient using the CAD/CAM technology
3. The assistance and collaboration of software capable of assisting practitioners in all steps from treatment planning to treatment follow-up. Such software would have the ability to learn from every real-life case it is exposed to improve its performance on the following cases.

Body of the article

- Dramatic increase in computer power linked to the big data invasion pushed AI applications towards medical field
- AI must be considered a useful tool in evaluating facial alterations after orthognathic surgery.
- AI improved acquisition and processing of data, as well as pre-analysis of maxillofacial imagery
- AI allow for superimposing of various diagnostic tools (i.e. CBCT, digital photography, and intra-oral scanners) to identify and calculate the dimensions.
- 3D digital treatment planning software can be revolutionary
- Visualizing and quantifying the impact of a given treatment on different anatomical structures allows the practitioner to validate the chosen optimal treatment plan
- AI based solutions offer the ability to combine digital photography and 3 D models called “3D Matching”
- AI have superiority in basic knowledge of clinical data
- AI is improving its skills inartistic sense using expert labelled clinical cases

- AI needs assistance in assessing patient's real treatment motivation.
- Overdependence to AI may lead to loss of intrinsic specialist skills.
- Artificial intelligence needs to be viewed as a tool not as a threat

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'Happenings': A Publication from KUHS on Recent Advances

1. Stream	Dentistry
2. Speciality	Conservative Dentistry and Endodontics
3. Date	04-10-2019
4. Title	Regenerative Endodontics by Cell Homing: Current trends and Future perspectives
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Regenerative Endodontics by Cell Homing: Current trends and Future perspectives

Source: Original Article

Contributors Name: Dr Satheesh SL

Why it is Relevant: The most common endodontic management for irreversibly inflamed or necrotic pulp in mature tooth is root canal treatment. Root canal treatment involves removal of infected pulp, preparation and disinfection of canals and finally obturation with gutta-percha. Advantage of cell homing over conventional root canal treatment is that patients own stem cells are recruited into prepared root canals and induce proliferation and differentiation to regenerate pulp like tissue.

Success rate of conventional endodontic treatment is high. Failure of endodontically treated tooth occurs due to fractures, reinfection by coronal or apical micro leakage^{1,2}.

Regenerative endodontic procedures aim to restore vitality, function and structure of irreversibly inflamed or necrotic pulp and dentin. Revitalization procedures were primarily used in immature pulpless teeth to promote apical closure and root formation.

Regenerative endodontics should include revitalization of both immature and mature permanent tooth. The three essential components of regenerative endodontic procedures are growth factors and other signalling molecules, an appropriate scaffold and stem cells.

Two approaches for regenerative procedures are cell homing and cell transplantation. Recently cell homing approach which recruits endogenous stem cells are gaining popularity as it circumvents many disadvantages of cell transplantation such as, high cost and complex procedures.

Cell homing does not rely on transplantation of stem or progenitor cells into the root canals. In cell homing the host endogenous stem cells are recruited into the root canals from root apex and other niches by growth factors or biological signalling molecules impregnated in bioactive scaffolds.

In pulpotomy procedures, the remnant tissue serves as a source for dental pulp stem cells. These cells when activated migrate and differentiate into functional odontoblasts at the site of tissue injury resulting in formation of mineralised tissue.

In cases of complete removal of pulp tissue, stem cells of apical papilla, bone marrow stem cells and periodontal ligament stem cells can migrate into the root canal when combined with bioactive scaffolds containing growth factors.

Endogenous sources of growth factors include platelet rich plasma, platelet rich fibrin and blood clot. Exogenous sources of growth factors include functionalized scaffolds which can control and sustain the release of growth factors.

Growth factors and bioactive signalling molecules impregnated into scaffolds recruit endogenous stem cells by chemotactic effects and regulate proliferation and differentiation. Several signalling molecules have been identified: stromal cell-derived factor (SDF-1a), basic

fibroblast growth factor (bFGF), vascular endothelial growth factor (VEGF), platelet-derived growth factor (PDGF), stem cell factor (SCF), cytokines such as interleukin (IL)-8 and chemokines including stromal cell-derived factor-1 (SDF-1)¹.

Bioactive molecules in dentin remain in a fossilised state. During injury or disease, matrix dissolution occurs leading to the release of these bioactive molecules. Endogenous growth factors sequestered in dentin can be released by demineralization, which enhance chemotaxis, differentiation, and mineralization of human dental pulp cells. Chemotactic molecules released from dentin allow spatial localization of stem cells along the dentinal walls³.

These bioactive proteins include, transforming growth factor β 1 (TGF- β 1), fibroblast growth factor 2 (FGF-2), insulin-like growth factors 1 and 2 (IGF-1 and IGF-2), epidermal growth factor (EGF), bone morphogenetic protein 2 (BMP-2), vascular endothelial growth factor (VEGF) and platelet-derived growth factor (PDGF)^{4,5}.

Recent study demonstrated that conditioning with ethylenediaminetetraacetic acid (EDTA) exposes bioactive matrix proteins, followed by saline with ultrasonic activation provides a physiological solution rich in dentin derived growth factors. This solution rich in growth factors can be incorporated into injectable scaffolds and reinserted into the canals⁶.

Bioactive scaffolds laden with growth factors are essential for tissue regeneration. It should be biocompatible, biodegradable and enhance migration, attachment, proliferation, differentiation and mineralization of cells.

Spatial and temporal controlled bioactive molecule release systems enhance stability of bioactive molecules and release appropriate concentration of growth factors in a predetermined manner. Temporal controlled delivery of transforming growth factor β 1 (TGF- β 1) and dexamethasone releasing nano-carrier, enhanced stem cell adherence, viability and differentiation⁷.

Further clinical trials are necessary to identify indications and contraindications of cell homing based regenerative endodontic procedures.

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FACING SHEET OF ARTICLE

1. Stream	Dentistry
2. Speciality	Prosthodontics
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4. Title	Digital Impressions in Dentistry
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Digital Impressions in Dentistry

Title : Digital Impressions in Dentistry

Source : Compilation from various articles and websites.

Contributors Name : Dr Mehul R Mahesh

Relavance : Impression making is an inevitable part of Dental treatment especially in Prosthodontics which is an art and science that deals with the replacement of missing teeth and Oro-facial tissues. Large amounts of various impression materials are used to make models and working casts for planning and treatment. Making impressions is also a skill that varies from person to person. The onset of digital impressions has been very promising and not only is it less technique sensitive but also lessens the strain on the environment.

- Digital Impressions (also known as 3-D intraoral scanning) are the latest technology in capturing a replica of the mouth.
- By using a wand-like tool connected to a computer and advanced software, a dentist can create a virtual model of the hard and soft tissues in the mouth
- Advantages of Digital impressions include, clean impressions, less time consuming, not dependant on properties of the impression materials, no remakes needed, consistent accuracy, no disinfection and cross contamination, better lab compliance and enhanced patient comfort.
- It comprises of intraoral scanners (wand like tool) and necessary CAD/CAM software and milling machines.
- Video scanning types uses Blue LED optical scanners that depend upon a reflective surface and require a contrasting medium or powder to acquire a representation of the tooth morphology.
- Other systems use laser scanning technology to scan and measure distances from the tooth surface to acquire the image. They do not require powder and are more accurate.
- Digital impressions are virtual impressions and the information can be downloaded directly to their milling units through suitable software to

produce CAD/CAM restorations, such as e.max crowns that require no models.

- These systems eliminate stone model (Gypsum products) work so there are no distortion issues and no bubbles.
- A solid model is milled and all dies can be captured in one model/cast. Dies are precision-fit in the cast with no movement and physical preparation of separable die systems is eliminated.
- The operatory time and lab time is substantially reduced, thereby enhancing the quality and quantity of output by the dentist and lab for the same amount of effort.
- The systems are presently costly but with increased turnover and demand, the prices are bound to come down or remain stagnant in the long run.
- A basic knowledge of computer aided designing is necessitated and involves a learning curve.
- It can be difficult to detect deep margin lines in prepared teeth and/or in case of bleeding.
- In addition to crown and bridge, digital impressions can be integrated in implant dentistry for guided surgery and in orthodontics for fabricating aligners and custom-made devices.
- There are 4 major companies which market these systems.
- The Cadent and 3M ESPE machines produce models that are sent to the lab to produce the restoration of choice.
- Sirona and D4D include milling units for immediate fabrication of the final restoration. These systems can be used in the clinic for chair side fabrication of milled prosthesis.

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‘Happenings’: A Publication from KUHS on Recent Advances

1. Stream	ORAL & MAXILLOFACIAL SURGERY
2. Speciality	CLEFT & CRANIOFACIAL RECONSTRUCTIVE SURGERY
3. Date	18/9/2019
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TRANSFORMING FACES.. TRANSFORMING LIVES!

The human face is a corridor of emotions, a gateway to verbal and nonverbal communication, and a criterion for social acceptance and mate selection.¹

It is a key, which generate a note and leaves a very long lasting impression in the minds of concerned parties. It automatically becomes a reference point for description and identification of individuals. The pleasant facial appearance awakens positive feelings and reactions in the family and other people, but altered facial appearance and speech are also immediately observable by others.² The aesthetics of facial structures are used by humans to determine, not only a person's beauty but his or her personality, intelligence, social class, trustworthiness, social skill, popularity and overall goodness.³

I joined Charles pinto Center for cleft lip palate and Craniofacial anomalies at Jubilee Mission Medical college Thrissur, Kerala, India in year 2016. It has been a wonderful journey to see the transformation of these cleft babies as well as to see the smile and relief of their parents .I consider myself truly blessed to be part of this divine mission to transform their lives.

While sitting in outpatient clinic last day an adolescent girl came for review; after the initial introduction she confided in me her only prayer now to God is she wants her nose to be corrected. She was born with complete cleft lip and palate; we had corrected her lip and palate deformity and now it's time for correction of her cleft nose deformity. Many children born with cleft deformities their parents and children have these silent prayers; they are often side lined from the mainstream society and as clinicians it's our collective responsibility to lead them back to normal life⁴.

Treatment for cleft lip and palate is multidisciplinary by nature and takes place mainly during the first 20 years of life. Ideal treatment objectives are improved aesthetics, good speech, good function and positive self-image⁵.

The most promising happening in cleft care in the last decade include:-

- **Antenatal diagnosis & Neonatal counselling**

More accurate diagnosis and effective counselling is now possible with the advent of 3D and 4D scanning, this also helps in reducing the anxiety of parents.

- **Presurgical orthopaedics**

Infant orthopaedics like nasoalveolar moulding is usually performed in the first few weeks of life to realign the cleft segments.

- **Primary surgery & modern anaesthesia care**

With the latest advances in anaesthesia care, quality of surgical care has improved in leaps and bounds. The aim of cleft lip surgery is to create an aesthetic and functional result with minimal scarring. The muscles of the lip and floor of the nose are reconstructed during the operation and In palate repair the surgeon aims to both close the cleft, and more importantly anatomically reconstruct the muscular 'sling' of the soft palate so that velopharyngeal closure can be achieved. This is required for the development of speech. The timing of surgery in cleft deformity remains controversial, but every case represents a compromise between function, development and appearance versus scarring, and its effect on growth.

- **Speech and language therapy**
Even after cleft palate repair, speech is still vulnerable to disorders of resonance and articulation which can affect intelligibility. This requires a coordinated approach between specialist and speech pathologist trained in this field.
- **Hearing**
There is a well-recognized association between cleft palate and middle ear disease that is related to failure of the ventilatory function of the eustachian tube. ENT surgeons have an active role in tackling this issue
- **Psychology**
The psychological care of the cleft patient and their parents begins at the time of diagnosis. The importance of psychologists involvement in the cleft team is becoming increasingly apparent.
- **Dental health**
The aim of the paediatric dentists is to try to prevent decay, minimize restorative necessity, prevent infection and prevent tooth loss with its associated alveolar bone loss, as this could complicate future cleft surgery.
- **Alveolar bone grafting & Cone beam CT**
Clefts of the alveolus lead to significant displacement of adjacent teeth and hinder their orthodontic alignment. The increasing availability of cone beam CT is allowing detailed assessment of the cleft site pre-bone grafting. This allows accurate positioning of any supernumerary teeth as well as any permanent teeth adjacent to the cleft site. It is also enables production of three-dimensional stereolithographic models.
- **Orthodontics**
The orthodontist monitors tooth eruption and growth throughout childhood as well as aligning the dentition and preparing the cleft site for alveolar bone grafting. They also have an active role in correction of dental and skeletal deformities.
- **Orthognathic surgery & Distraction Ontogenesis**
Cleft children with the need for multiple surgeries at various stages in life are bound to have dental and skeletal growth disturbances, both these treatment modalities are used in providing better functional and aesthetic appearance.
- **Electronic patient record & Digitisation**
A great advance for clinicians involved in cleft care is the use of digitisation and maintenance of electronic patient records. This spans traditional organization boundaries and allows access to all clinicians working with the patient. At birth each patient can be registered and their records including radiographs, photographs and correspondence stored electronically. Items such as protocols and audit sheets for different specialities can be included.
- **The future...**
 1. With the identification of various genetic and environmental factors involved in causing cleft deformities, let's hope for a day that we work of preventing these deformities!
 2. Techniques to reduce scar formation after surgery on a cellular level.

3. Speech after cleft palate surgery always and enigma, lets strive in giving them perfect intelligible speech.

Let's hope, pray and together work in providing these children a better life!!

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pg 48-50
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‘Happenings’: A Publication from KUHS on Recent Advances

1. Stream	DENTAL
2. Speciality	PROSTHODONTICS
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‘HAPPENINGS ‘: a publication from KUHS on recent advances

Laser in dentistry

Dr Lylajam S Pofessor &head of Prosthodontics Govt Dental College Thrissur

LASER - L- light ,A –amplification by S- stimulated E –emission R – radiation

Laser is produced from a device that emits light through a process of optical amplification based on the stimulated emission of electromagnetic radiation .

In dentistry it is used

Diagnosis

Detection of Pulp vitality

Detection of caries , bacteria and dystrophic changes in the detection of cancer

Hard tissue application

Caries removal and cavity preparation

Recontouring of bone –crown lengthening

Endodontic treatment –root canal preparation, sterilization and apicectomy

Soft tissue application

Soft tissue curettage

Gingivectomy and gingivoplasty

Gingival retraction for impression

Implant exposure

Biopsy incision and excision

Treatment of aphthous ulcer and oral lesion

Coagulation /homeostasis

Flap surgery

Removal of granulation tissue

Pulp capping pulpotomy and pulpectomy

Vestibuloplasty

Incision and drainage of abscesses

Laser activation – bleaching of teeth

Others –

Gutta-percha removal

Removal of fractured instrument

Drying of root canal

Types of Laser in dentistry

Soft tissue – CO₂ laser , YAG laser

Hard tissue-ER YAG laser, Eximer

Advantages

Less pain

Minimize bleeding

Reduce infection

Preserve healthy tissue

Disadvantage

Expensive .

Final shaping is not possible needs drill.

Cannot be used in teeth with filling.

Precautions

Safety goggles for patient and operator.

Procedure should be done in locked room.

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'Happenings': A Publication from KUHS on Recent Advances

1. Stream	Medicine
2. Speciality	Palliative Medicine
3. Date	19.9.19
4. Title	e-palliative homecare service
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Title: e-palliative home care service.

Source:Original article

Contributor's Name:Dr. M.S.Biji

Relevance: Palliative care is a growing field of medicine which aims to improve the quality of life of patients with life limiting illnesses as well their family. With progression of the disease and difficulty in transporting them to the hospital ,palliative homecare service is the preferred choice of patients and their family.With limited resources and financial constraints,**e-Palliative homecare** is a feasible option for providing excellent palliative care in developing countries like ours.

- Palliative care aims to relieve the sufferings of patients with life limiting illnesses by identifying, assessing and treating pain and other physical, psychosocial and spiritual problems.
- When the curative options have exhausted or are no longer beneficial, patients continue with palliative care treatments alone to have a good quality of life for their remaining days of life.
- Studies have shown that cost effective palliative care services can be provided by home based services. Over 50% of people prefer to be cared for and to die at home¹
- A homecare team consists mainly of a doctor,nurse,volunteers all trained in palliative care and other allied members like social worker, physiotherapist, nutritionist depending on the availability.
- The homecare service of Malabar Cancer centre was Started in **2009** as Physician led homecare. But gradually as our OP attendance started increasing from 1024 in 2009 to the present figure of 8196 per annum ,the physician could not be spared for homecare. As a result , since June 2011 our homecare service has been **Nurse Led and Physician Assisted** one ,where-in our home care nurse interacts with the physician over phone for any doubts regarding the management of the patients. But most of the time lack of a palliative physician in the team produces dissatisfaction among patients and care takers. This often led to hospital visits by such patients.
- In order to overcome this dissatisfaction among patients due to lack of physician in the visiting team, MCC introduced an innovative **e palliative homecare service in 2013** ,a kind of telehealth.

- WHO defines telehealth as “The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies, for the exchange of valid information for diagnosis, treatment, and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, in all the interests of advancing the health of individuals and their communities²³”
- The e-Palliative, an open source web application was developed by the Health IT Division of MCC in research collaboration with Centre for Development of Imaging Technology (C-DIT), Thiruvananthapuram.
- e-palliative care is a form of telemedicine that uses technology to provide real-time visual and audio patient assessment.
- The concept of e-palliative care is to bring the doctor to the bedside of a home care patient. The homecare team led by a palliative care trained nurse visits the patients carrying a laptop with an internet facility and a high resolution camera in it. The laptop is placed at the bedside of the patient and the nurse connects the patient to the palliative care physician sitting in the hospital through the e palliative web application ,so that the patient and caregivers could see and communicate with their palliative care physician .
- **More than 50 patients** are consulted every month through e-Palliative care at our centre.
- A study done to assess the satisfaction with this e palliative service revealed an over high score(Mean score 4.38 against a maximum score of5)Covering 5 aspects namely Patient’s general satisfaction, technical quality, communication aspects, financial aspects, time spent with doctor, accessibility and convenience on a likert scale of 1 to 5.
- The highlights of e-palliative care are
 - Feasible and easy to use.
 - Increases patient’s confidence level.
 - Increases the Homecare team’s confidence.
 - Expert palliative care doctor’s service can be made available in remote villages.
 - Reduces the travel burden, waiting time of patients in the hospital
 - Reduces hospital stay.
 - Reduce travelling cost
 - Patients can share their health details with doctor from their calm and quite home atmosphere.
 - Cost effective model

- The challenge we faced after implementing this service was difficulty in getting high speed internet connectivity in few locations. However we overcame this challenge by implementing wireless internet connectivity of two service providers.
- So now with e-palliative homecare service provided, our palliative homecare patients are able to spend their days remaining at home.
- This innovative method of **e-palliative Home care service** which facilitates a doctor's virtual presence and care at the patient's bedside in his home using appropriate technological expertise, is definitely a gigantic leap in the Health care delivery system.

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'Happenings': A Publication from KUHS on Recent Advances

FACING SHEET OF ARTICLE

1. Stream	MEDICAL - MBBS
2. Speciality	ANATOMY
3. Date	30/09/2019
4. Title	GLYMPHATIC SYSTEM
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11. Suggested Structure of Article	<ol style="list-style-type: none">1. Facing Sheet of the Article2. Article on maximum TWO sides of an A4 Page3. Title of the Recent Advance4. Source:Original Article / Site / Book5. Contributor's Name (To be Published)6. A note on why it is relevant.7. Body of the article as 10 to 20 Bulleted Points8. References (2 to 3 nos.)

TITLE: GLYMPHATIC SYSTEM AND ITS CLINICAL RELEVANCE

ORIGINAL ARTICLE:

Louveau A et al. Structural and functional features of central nervous system lymphatic vessels. *Nature* 523, 337–341, doi:10.1038/nature14432 (2015). [PubMed: 26030524]

CONTRIBUTOR'S NAME:

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RELEVANCE:

Discoveries in the field of human anatomy is presumed to be rare, which is relatively verifiable. But recently, a number of publication has changed this avowal. The new update has assisted in creating a breakthrough in the pathogenesis and treatment of neurodegenerative diseases in humans.

GLYMPHATIC SYSTEM:

- The term “immune privilege” was coined by Peter Medawar to describe a tissue or organ in which the introduction of foreign antigen does not elicit an immune response. CNS was believed, not to have existing lymphatics and hence enjoyed absolute immune privilege.
- Paolo Mascagni, an Italian anatomist described about lymphatic vessels in 1816. Later some studies suggested that the central nervous system undergoes constant immune surveillance that takes place within the meningeal compartment.
- Jonathan Kipnis in 2014 discovered the meningeal lymphatic vessels, a network of lymphatics located parallel to the dural sinuses and meningeal arteries of the mammalian central nervous system. The landmark discovery by Jonathan Kipnis and his postdoctoral fellow Antoine Louveau was published in 2015.
- Aspelund et al showed that dural lymphatic vessels absorb CSF from the adjacent subarachnoid space and brain interstitial fluid via the glymphatic system. Dural lymphatic vessels transported CSF-ISF mix to deep cervical lymph nodes via foramina at the base of the skull. The dural lymphatic vessels display typical immunohistochemical markers that identify lymphatic vessels elsewhere in the body. They provide an alternate route for drainage of immune cells and cerebrospinal fluid from the brain, different from the previous learning.
- Antoine Louveau et.al in another study proved that meningeal lymphatic vessels sample macromolecules and immune cells from the CSF serve as an important conduit for CNS drainage. They described structural features of spinal cord meningeal lymphatics elaborated on the immune-cell trafficking via the meningeal lymphatic vessels to the

draining lymph nodes, which is primarily dependent on CCR7. Using a pharmacological method they adopted to specifically ablate meningeal (or nasal) lymphatic vessels and demonstrated that the nasal route drains directly into the superficial cervical lymph nodes, while the meningeal lymphatic route drains into both the deep and superficial cervical lymph nodes. These findings demonstrate that brain antigens can drain into cervical lymph nodes and generate an immune response there.

- A potential lymphatic connection between the CNS and periphery has been discovered and some works indicate a possible presence of lymphatic vessels in the meninges and even in the CNS parenchyma
- Neuroinflammatory diseases, such as multiple sclerosis, are characterized by invasion of the brain with autoreactive T cells. The findings of the above study demonstrated that meningeal lymphatics govern inflammatory processes and immune surveillance of the CNS and pose a valuable target for therapeutic intervention.
- Based on knowledge from tumor immunology, meningeal lymphatic vessels may provide a plausible mechanistic explanation for how CNS tolerance is established. Understanding how meningeal lymphatic vessels contribute to a unique immune status toward CNS-derived antigens demands intensive further investigation.
- The glymphatic system has been demonstrated to be responsible for movement of the CSF through the brain parenchyma. CSF moves into brain specifically within periaxonal spaces and interchanges with interstitial fluid owing to the presence of AQP4 water channels in perivascular astrocyte end-foot processes.
- This glymphatic system is now said to be the primary route of the removal of the metabolic waste of CNS including beta amyloid, and a disruption of this system has been implicated in the etiology of the Alzheimer's disease . Glymphatic system mediated CNS metabolic waste clearance is said to be more active during sleep.
- The perivascular spaces have also been reported around the vessels supplying the retina and optic nerve, in post-mortem human studies where it is assumed to be a possible role in the diseases related to altered intraocular/intracranial pressure removal of metabolic waste including glaucoma.
- Proper functioning of the nervous system requires effective cleaning of metabolic by-products. Ineffective elimination of toxic substances is one of the causes of neurodegenerative diseases. Recent studies have demonstrated that toxic proteins are present in interstitial and cerebrospinal fluids. Decreased activity of the glymphatic system seems to be an essential risk factor of this neurodegenerative disease. Susceptibility to neurodegenerative diseases is also associated with sleep disorders.
- Investigations of the function of the glymphatic system in young and old mice demonstrated a decrease by 80-90% in aged individuals. The aging brain is characterized by the dislocation of AQP4 channels.
- Knowledge of the inevitable impairment of the function of the glymphatic system in old age is important for geriatric care and investigations of the function of the glymphatic system is important for the daily clinical practice

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Facing Sheet

Stream	: Medicine
Speciality	: Pharmacology
Date	: 27/09/2019
Title	: Is Ranitidine Carcinogenic?
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Consent for publication	: I hereby declare to abide by the KUHS Rules regarding publication and agree that the article contributed by me may be published in KUHS publication on Recent Advances.

Title of the Recent Advance : Is Ranitidine carcinogenic?

Source : Original Article

Contributor's Name : Dr.Regina Roy

A note on why it is relevant: Ranitidine is known to cross the placenta; however, it is still commonly used when pregnant patients require acid-suppressing therapy. Ranitidine is excreted into breastmilk too. Hence, I wanted to search out the veracity of the report that ranitidine is carcinogenic so as to save the lives of human beings.

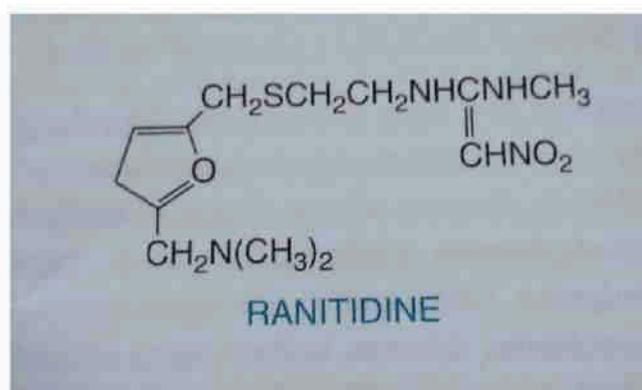
Background

- Indian authorities are closely monitoring the sale of the drug Ranitidine after the US drug regulator said it had found a cancer-causing impurity called N-nitrosodimethylaniline (NDMA) in some products containing Ranitidine.
- The US Food and Drug Administration (FDA) recently announced it is investigating Zantac (ranitidine hydrochloride), a heartburn and acid reflux treatment, after amounts of N-nitrosodimethylamine (NDMA) were found in the brand-name drug and in generic versions too.¹

Ranitidine hydrochloride

- The H₂-receptor antagonist, ranitidine, is among the most widely used pharmaceuticals to treat gastroesophageal reflux disease and peptic ulcers. Ranitidine is a competitive and reversible inhibitor of the action of histamine, released by enterochromaffin-like (ECL) cells, at the histamine H₂-receptors on parietal cells in the stomach, thereby inhibiting the normal and meal-stimulated secretion of stomach acid. In addition, other substances that promote acid secretion have a reduced effect on parietal cells when the H₂ receptors are blocked.²

- Chemical structure: $\text{N-(2-(((5-((dimethylamino)methyl)-2-furanyl) methyl) thio) ethyl)-N'-methyl-2-nitro-1,1-ethenediamine, hydrochloride}$



- The reversible inhibition of H₂-receptors in gastric parietal cells results in a reduction in both gastric acid volume and concentration. Ranitidine's acid-lowering effect is more pronounced for basal and nocturnal acid secretion than it is for food-stimulated acid

secretion. Additional indirect effects of ranitidine are decreased pepsin secretion and increased nitrate-reducing bacterial flora.

Pharmacokinetics and Pharmacodynamics

- When dosed orally, ranitidine has a bioavailability of 50%, which is relatively unaffected by food. The peak levels occur 2 to 3 hours post-administration for oral administration and occur 15 minutes after intramuscular administration. *However, when ranitidine is ingested, it metabolises into NDMA.* While previous studies have demonstrated that amines can form N-nitrosamines when exposed to nitrite at stomach-relevant pH, N-nitrosamine formation from ranitidine, an amine-based pharmaceutical, has not been demonstrated under these conditions

Carcinogenic potential of NDMA

- NDMA is a known environmental contaminant and found in water and foods, including meats, dairy products, and vegetables. NDMA is a cancer-causing chemical. Zantac tablets have been found to contain 26,000 times the FDA-approved amount of NDMA that can be safely consumed daily.

Modulation of nitrosamine carcinogenesis:

- It is important to examine the role of the liver in determining the extent to which extrahepatic tissues are exposed to nitrosamines, since the liver plays the major role in the process of activation or detoxification of most of these carcinogens. In fact, after oral administration of very low doses of NDMA, very little or none of this nitrosamine reaches extrahepatic tissues because of the efficient metabolism of the liver. Thus, interactions of the nitrosamine are strongly determined by the dose of nitrosamine, the rate of absorption from the intestine and by various factors that could modify the metabolic competence of the liver. Experimental studies have shown that a number of factors can drastically change the organotropism of the carcinogenic effect of nitrosamine.
- Although NDMA is acutely toxic and induces hepatic damage in several species at dose levels of approximately 1 mg/kg body weight per day in short-term experiments, the main concern is its carcinogenicity: NDMA has been consistently shown to be a potent carcinogen in all experimental species studied.

Quantity of NDMA produced from one ranitidine 150mg tablet

- Urine samples collected from five female and five male, healthy adult volunteers over 24-h periods before and after consumption of 150mg ranitidine were analyzed for residual ranitidine, ranitidine metabolites, NDMA, total N-nitrosamines and dimethylamine.³ Following ranitidine intake, the urinary NDMA excreted over 24h increased 400-folds from 110 to 47 600ng, while total N-nitrosamines increased 5-folds. NDMA excretion rates after ranitidine intake equaled or exceeded those observed previously in patients with schistosomiasis, a disease wherein N-nitrosamines are implicated as the etiological agents for bladder cancer. Hence it is mandatory to evaluate the risks attributable to NDMA associated with chronic consumption of ranitidine, and to identify alternative treatments that minimize exposure to N-nitrosamines.

What next

- The FDA is urging patients to trust that their medicines are as safe as they can be and that the benefits of taking them outweigh any risk to their health. Although NDMA may cause harm in large amounts, the levels of ranitidine found by the FDA barely exceed amounts found in common foods. The FDA is not calling for individuals to stop taking ranitidine at this time; however, patients taking prescription ranitidine who wish to discontinue use should talk to their health care professional about other treatment options. People taking OTC ranitidine could consider using other OTC medicines approved for their condition.

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'Happenings': A Publication from KUHS on Recent Advances

1. Stream	MODERN MEDICINE
2. Speciality	ANAESTHESIOLOGY
3. Date	2.10.2019
4. Title	ULTRASOUND IN ANAESTHESIA
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Title

Ultrasound in anaesthesia.

Source

Original article.

Contributor's name

Dr. Subha. R.

The rapidly emerging technology of ultrasound with its wide variety of applications has benefitted the Anaesthesiologists and hence the patients. Amongst anaesthesiologists, critical care and pain physicians, it is becoming a core competency.

Uses of ultrasound

- Delineating nerve plexuses for chronic pain management.
- Nerve blocks for regional anaesthesia.
- To aid vascular access.
- Guidance for difficult venous access.
- Epidural space identification in cases of difficult anatomy.
- Transesophageal echocardiography for cardiac imaging.
- Alternative to X-ray to check for position of the guide wire or catheter in the vessel.
- Can demonstrate the presence of a thrombus-help in the diagnosis of deep vein thrombosis and pulmonary embolism.
- Aid in arterial cannula insertion for blood pressure monitoring and blood gas sampling.
- Ultrasound appearances of the lung with pulmonary edema, pneumonia, and pneumothorax in post op ICU.
- Biopsy and drainage of diseased lung.
- Neural blocks in children due to variability in anatomy according to age and constitution of the patient.
- Doppler sonography used in patients with blunt and penetrating trauma with evaluation of peripheral arterial trauma.
- To evaluate changes in intraocular pressure (IOP) and intracerebral pressure (ICP) reflected by the optic nerve sheath diameter (ONSD).

Conclusion

Ultrasound imaging is a simple noninvasive technique, which allows anaesthesiologist to evaluate complex and varied anatomy prior to needle insertion. Modern ultrasound machines are more compact and portable, with better resolution and enhanced tissue

penetration. Its widespread use in Anaesthesiology depends on its efficacy and cost effectiveness.

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1. Stream	Medicine
2. Speciality	Microbiology
3. Date	03-10-2019
4. Title	Evolution and applications of CRISPR - CAS
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Title of the Recent Advance	CRISPR Cas
Source: Site	https://www.broadinstitute.org/research-highlights-crispr
Contributor's Name (To be Published)	Sabitha Baby
A note on why it is relevant.	The ability to precisely edit the genome of a living cell holds enormous potential to accelerate life science research, improve biotechnology, and even treat human disease

EVOLUTION AND APPLICATIONS OF CRISPR -CAS

- CRISPR is an acronym for “Clustered Regularly Interspaced Short Palindromic Repeats.” CRISPR genome engineering technology enables scientists to easily and precisely edit the DNA of any genome. CRISPR-based technologies have revolutionized genome editing in the past decade.
- CRISPR-Cas is a heritable adaptive immune system of bacteria and archaea. About 10 years ago, scientists discovered that bacteria and archaea, generally regarded as primitive organisms, have a sophisticated adaptive(re-programmable) immune system, known as CRISPR-Cas (Clustered Regularly Interspaced Short Palindromic Repeats) Cas(- CRISPR associated)
- For a long time it was presumed that adaptive immunity was restricted to higher organisms. Adaptive immunity in prokaryotes has been one of the most bewildering discoveries in microbiology.
- CRISPR-Cas has been turned into a versatile genome editing method that has the potential to treat human genetic diseases
- The beauty of CRISPR lies in its simplicity. The enzyme cuts DNA and the system can then insert a new genetic sequence designed by scientists to alter the DNA.
- CRISPR relies on just two components: the molecular scissors, a CRISPR-associated (Cas) nuclease, and the GPS guiding it to the appropriate site, the guide RNA (gRNA).
- the gRNA consists of two distinct segments of RNA: CRISPR RNA (crRNA) and transactivating CRISPR RNA (tracrRNA). Synthetically, they can be engineered as one seamless fusion sequence known as single guide RNA (sgRNA).
- In nature, the CRISPR palindromic repeats play an important role in microbial immunity. Scientists learned how to reprogram the enzyme CRISPR-associated nuclease (Cas9) produced by the CRISPR system to enable the editing of genes, not only in bacteria but also in animals, plants and people.

How do CRISPR-Cas systems work?

- When a virus infects a microbial cell, the microbe employs CRISPR-associated nuclease (Cas9) to chop off a piece of the viral DNA. The cas9 is directed to its target sequence by a guide RNA (gRNA), which is complementary to the target segment of the viral genome.
- CRISPR-Cas systems capture pieces of DNA from virus, integrate this into the CRISPR locus to retain a genetic memory, and use this information to destroy the virus when it infects again.
- CRISPR-Cas systems are composed of CRISPR arrays and *cas* operons.
- A very important aspect of CRISPR-based immunity is the ability to distinguish host DNA from the foreign one.

Applications of CRISPR

- Many CRISPR tools can be used to manipulate food microbiomes from farm to fork.
- Various pathogenic bacteria and spoilage organisms can be targeted and removed using CRISPR-based antimicrobials.

- Beneficial bacteria such as starter cultures and probiotics can be enhanced using CRISPR-based genome editing.
- CRISPR tools have been implemented in Biotechnology sector for the production of uridine, adipic acid, β -carotene, and isopropanol.
- Synthetic CRISPR systems can be delivered to a target bacterium using so-called phagemids, which are replication-deficient bacteriophage particles
- CRISPR-Cas systems can be applied for development of new antimicrobials based on the self-targeting.
- The researchers at the University of Exeter are able to cut out the genes for resistance by using CRISPR-Cas, a novel way to tackle the growing issue of antimicrobial resistance (AMR)
- Researchers have engineered a plasmid to specifically target the resistance gene for Gentamicin. When the plasmid identifies the gene for Gentamicin, it cuts out the DNA, removing the resistance and making the bacteria susceptible to the drug.
- Development of a CRISPR-Cas9 cassette that is able to target particular resistance genes would be a powerful tool to tackle healthcare-associated infections.
- CRISPR-Cas9 mayb be implemented to target AMR genes in clinical isolates of vancomycin-resistant *Enterococcus faecium*, and extended-spectrum β -lactamase (CTX-M) or carbapenemase (Oxa-48)-producing *Klebsiella pneumoniae* and *Escherichia coli*
- Preliminary work using *E. coli* MG1655 as plasmid donor have shown that all strains can receive the plasmid, and there is significant variation in conjugation frequency between *E. coli* recipients.
- The CRISPR-Cas9/Cas12a technologies have revolutionized the research on bacteria. Clinical trials have started where this gene editing tool itself is used as a therapy for diseases ranging from cancer to blindness and AIDS.
- CRISPR offers endless possibilities beyond its applications in human health. As application areas of CRISPR are exceeding beyond research and biomedical therapies, new and existing ethical concerns abound throughout the global community about the appropriate scope of the systems' use.

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3. <https://doi.org/10.1186/s12941-019-0317-x>
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'Happenings': A Publication from KUHS on Recent Advances

1. Stream	Modern Medicine
2. Speciality	General Medicine
3. Date	02/10/2019
4. Title	Artificial Intelligence in Health Care- Changing Role of Physicians
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10. Consent for Publication	I hereby declare to abide by the KUHS Rules regarding publication and agree that the article contributed by me may be published in the KUHS publication on Recent Advances.
11. Suggested Structure of Article	<ol style="list-style-type: none">1. Facing Sheet of the Article2. Article on maximum TWO sides of an A4 Page3. Title of the Recent Advance4. Source: Original Article / Site / Book5. Contributor's Name (To be Published)6. A note on why it is relevant.7. Body of the article as 10 to 20 Bulleted Points8. References (2 to 3 nos.)

Artificial Intelligence in Health Care – Changing Role of Physicians

Dr.P.V.Ajithkumar

Artificial Intelligence (AI) aims to mimic human cognitive functions. Powered by increasing availability of health care data and rapid progress of analytic techniques, AI may bring a paradigm shift to healthcare.

- Advances in computational power paired with massive amount of high quality data generated in health care system make many clinical problems ripe for AI applications.
- India can revolutionize its unique needs, challenges and aspirations in health care in a democratic and fundamental way driven by technology and improve life of millions of its underserved citizen.
- AI can enable an increasing precision approach to medicine by tailoring treatments and targeting resources with maximum effectiveness in a timely, consistent and dynamic manner.
- AI can address shortage of qualified health care professionals, their non-uniform accessibility, and reduce errors in execution due to human fatigue.
- Doctor's primary role may shift from data collector and analyzer to interpreter and counsellors for patients and act as a remedy to changing doctor –patient relationship.
- AI can help in creation of a need based smart health care system by reducing health care costs and improving health care outcome.
- The biggest impact of AI are in fast, accurate and early prediction of pandemics, imaging diagnostics, early detection of diabetic retinopathy and CV disease, reducing the cost and time to market in drug discovery, reducing risk of antibiotic resistance, medication adherence, increasing motor function of stroke patients, detection of abnormal cell growth in CXR, fast and accurate pathology slide review in metastatic breast cancer, AI assisted robotic surgery, wearable devices to track physical activity and cardiac health, environmental sensors to check exposure to air pollution etc.
- As an intelligent partner, AI will help in providing contextual relevance to data in health care system analysis to better handle OP load, easy access to health records and avoiding unnecessary hospitalizations.
- First systematic review and meta-analysis on AI suggest that AI may be as effective as health professionals at diagnosing diseases.
- AI infused technology with deep machine learning for actionable insight has the potential to provide high performance data –driven clinical decision support to physicians to solve real world health care problems.
- AI will help to prioritize administrative tasks, and free up clinicians of their time to take a more comprehensive approach to disease management.
- AI may replace human judgment in certain functional areas of health care like radiology.
- AI can unlock clinically relevant information hidden in massive amount of data, which can assist clinical decision making. AI will provide an individualized, evidence –based list of therapeutic options for clinicians and patients to discuss.

- Outstanding concerns are potential for coder bias, moral, ethical, legal & privacy issues, lack of uniform formal regulations, absence of enabling data ecosystem and collaborative approach and finally trust and approval of patients. Lack of data infrastructure which is essential to optimally train algorithms that fit local population or local practice patterns will affect sustainable and consistent performance of AI.
- Fear of AI worsening inequality, discrimination and issues in medical insurance regarding prediction on future development of diabetes, cognitive decline, opioid abuse and suicidal tendency are the other reservations.
- With digital consultations and virtual nurses machines become smarter. By optimizing work flows and maximizing hospital efficiency, physicians become more human with empathy and compassion which AI cannot offer now.
- India needs large scale concerted and collaborative holistic effort on generating valid data for ensuring greater good on social development and inclusive growth in health care by using AI driven medical tools.
- The use of AI technologies promises to reduce the cognitive workload for physicians, thus improving care, diagnostic accuracy, clinical and operational efficiency, and the overall patient experience. AI offer more possibilities than capabilities in patient care.

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'Happenings': A Publication from KUHS on Recent Advances

1. Stream	Nursing
2. Speciality	Pediatric Nursing
3. Date	01/10/2019
4. Title	Challenges faced by nurses in Conducting Randomized Control Trails
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Challenges faced by nurses in Conducting Randomized Control Trails

There are two major issues discussed among nurses in the academia who are actively involved in research. Whether nurses should concentrate on Nursing research or research in nursing. Professionals from sociology and psychology are much interested in doing research in nursing. They have done many studies both qualitative and quantitative to high light the sociological issues, image issues, attitudinal issues, gender issues, etc among nurses. Nursing professional at the same time has done many studies on patient care, and their impact on delivery of care to patients adding knowledge base to nursing science and its practice. Next issue discussed is why nurses go for soft research? If somebody looks into the researches done by the postgraduate of nursing faculty can witness that abundance of descriptive and quasi experimental studies though they meet all methodological regulations religiously. Why is it so?

Why nurses are reluctant on doing hard research? Whether they are scared or not prepared properly for RCTs? Focus group discussion initiated among members of some groups of nursing academia in India had identified the following points.

1. Nurses are under estimated by many in the health care arena on their capability to do research though they study research methodology from their basic education
2. Nurses have inadequate number of mentors to guide them to do RCTs
3. Many nurses after finishing their undergraduate and postgraduate studies are not motivated to conduct studies and many of them never turn to do research
4. The research they conduct as a part of their academic requirement will be a decoration to the library cupboard as space occupying lesions
5. RCTs are methodologically rigorous. Nurses conducting studies are not having a enough practice on such studies. The methodological rigor of RCTs keep this design that maximizes sound (true effect) and minimize the noise (bias) through allocation concealment. This remains as a threat for many nurse researchers
6. Randomization or random assignment of participants is also remains a real threat as getting adequate participants to help generalize findings
7. The statistical analysis and the question of p value also remains as a road block for conducting RCT
8. Development of proper protocols is seems to be difficult due to lack of administrative support, restrictive privacy law, lack of transparency, complex regulatory requirements and lack of infrastructure
9. Randomization, random assignment, blinding, matching, blocking all these terms, and its protocols remain as threats to novice nurse researchers
10. RCTs requires funding and funding opportunities for nurses are scanty
11. People are skeptical on the capability of nurses conducting RCTs.

12 The Achilles' heel of RCTs- the internal and external validity, legal and ethical issues- is one of the major concerns for nurses while conducting RCTs. The preliminary round of the discussion concluded with following resolutions:

1. The senior and experienced nurse researchers should spare time to guide younger nurses interested to conduct RCTs, motivate and provide mentoring to younger nurses
2. More and more postgraduate students and doctoral candidates may be promoted to conduct RCTs
3. In research classes importance of RCTs for knowledge development should be emphasized and RCTs may be promoted for academic requirement projects/ dissertations
4. Encourage publication of RCTs done in indexed journals
5. Try to support RCTs with available grants and instituting small grants for RCTs and help researchers to obtain grants from available agencies.

Along with these action plan, professionals should conduct seminars and workshops on RCTs and research methodology and scientific writing. When we promote RCTs, we should not forget that a single RCT may not produce best evidence and is not sufficient to change or inform practice. We need to have systematic reviews of RCTs to get cumulative best evidence. We also should not underestimate observational and descriptive studies as they bring much knowledge on certain aspects of thought and behavior. After human beings are social animals who possess emotions.

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Happenings': A Publication from KUHS on Recent Advances

1. Stream : Nursing
2. Speciality : O&G
3. Date : 25/09/2019
4. Title : Simulation is gaining common ground in Health
Science Education as it meets the Need of the Hour
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SIMULATION IS GAINING COMMON GROUND IN HEALTH SCIENCE EDUCATION AS IT MEETS THE NEED OF THE HOUR

Introduction

The first step to provide a better quality of care begins on how health care professionals are trained. One of the most important steps in curriculum development is the introduction of simulation-based medical teaching and learning. It can be adapted to accommodate the need of various medical specialities such as anaesthesia, medicine, obstetrics and gynaecology, paediatrics, other professionals such as nurses, paramedics, and respiratory therapists.

Need Of Simulation Based Education

Medical education has undergone significant changes all over the world. One of the reasons for the changes is concern for the patient's safety. "To Err Is Human", a landmark report released by the Institute of Medicine (IOM) in 1999 estimated that medical errors cause injury to approximately 3% of hospital patients and results in a minimum of 44,000 and perhaps as many as 98,000 deaths per year in the United States. Another important finding came from the Harvard Medical Practice Study, in which the authors reviewed over 30,000 randomly selected hospital records at New York State in 1984 as part of an interdisciplinary study of medical injury and malpractice litigation. They found that injuries from adverse events occurred in 3.7% of hospital admissions, 27.6% of which were due to negligence and in which 13.6% led to death. [2] Medical errors also contribute to the cost of medical care throughout the world. (1)

Evidence

An evaluation of the perceptions and opinions of nursing students on the effect of high-fidelity simulation model on the development of obstetric skills was examined in a study conducted on the third year nursing students in the United States of America at The Ohio State University in 2014 descriptive design. The Results showed all students found the simulation model significant for gaining obstetric skills, and their communication skills with the patients and team improved. Furthermore, 85.7% of the students were satisfied with performing application with the simulation model and 95.2% suggested this model for developing obstetric skills. Finally the students reported that this model was quite effective on self-efficacy, professional skills, self-confidence, problem solving, communication, and teamwork. Use and generalization of the simulation application as an education method in nursing education is suggested since it contributes to students. (2)

World Health Organization Urges Simulation

At the end of the last century, WHO reported on persistent gaps in healthcare quality and safety across the world. The Institute of Medicine documented high rates of preventable medical errors and demanded a fundamental change in the healthcare delivery system. One of the 13 recommendations in their report was the need to re-structure medical education to be consistent with the principles of the 21 century health system. It is also an effective method for inter professional education, to use simulation effectively for education, particularly inter professional team training. Future development in simulation depends on overcoming issues related to technology, research, and cost and faculty development. In conclusion, the promise of simulation-based medical training offers useful opportunities to reduce risks to patients and learners, improve learners' competence and confidence, increase patient safety, and reduce health care costs in the long run (3).

Definition

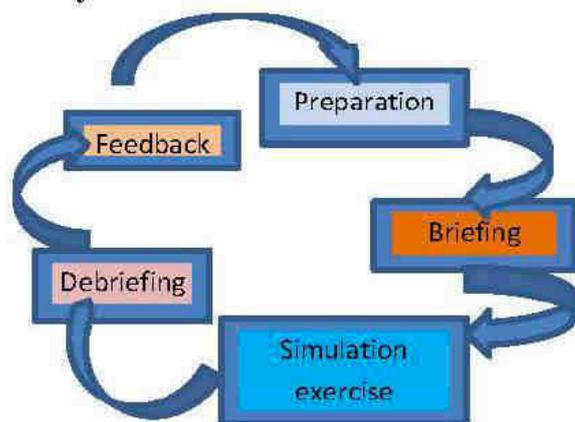
Simulation I defined as a technique to replace or amplify the real life experience with guided experience often immersive in nature that evoke or replicate the aspects of real world in a fully interactive fashion (4).

Phases

The simulation scenario includes mainly five phases

Preparation, Briefing, Simulation exercise, Debriefing, Feedback (4)

Cycle of simulation scenario



Types of simulator

Models and specimens, Specific task trainers, Standardised patients and Hybrid Simulations etc.

Advantages

Practicing hands-on and invasive procedures

- Repeated practice with no risk to patients and learner.
- The opportunity for same scenario to be accessed by multiple students providing similar Learning opportunities and use of real medical equipment
- Planning clinical cases based on student need, rather than patients' availability
- Immediate feedback during debriefing sessions
- Transfer of training from classroom to real situation is enhanced

Conclusion

Simulation can uncover the basic causes of medical errors and introduce preventive and corrective way to ensure patient safety. Once we recognise the importance of this fruitful innovation, it can be employed on a routine basis. This reliable technology can enlighten and strengthen the pre-clinical learning of practical skills in all health care disciplines.

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A Note on why it is relevant

In my article I have already mentioned why simulation is relevant today.

For example:

- The Need of the Hour- scarcity of patients, Patient safety
- To provide a better training to the Students.
- To reduce medical errors
- To improve professional skills, self-confidence, problem solving, communication, and teamwork.

I take this opportunity to express my sincere thanks to KUHS, the eminent personalities all those who were committed to conduct Certificate programme in Clinical Skills Simulation (CCSS) with reading material. As we the participants have grown, because of you, surely we will influence our students and through them the society. This is a recent Advance in my department.



Happenings: A publication from KUHS on Recent Advances

1. Stream	Nursing
2. Speciality	Community health Nursing
3. Date	23.10.2019
4. Title	Promising Happenings in Community Health Nursing in Last Decade
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Promising Happenings in Community Health Nursing in Last Decade (2010-2019)

Adoption of villages / Panchayats/ wards in early years of this decade

- From 2010- 2013 there was a difficulty for self finance nursing colleges to use government facility for community health nursing postings
- During those periods many self financing nursing colleges adopted some villages or panchayats for their clinical learning. This helped to implement a lot of health promotion activities in these areas as well as helped to generate a lot of statistic from survey.

Ph.D in Community Health Nursing by Indian Nursing Council

- Till 2015, Indian Nursing Council through National Consortium for Ph.D in Nursing was offering Ph.D in Nursing by selecting candidates irrespective of their speciality
- From 2015 Indian Nursing Council has decided to select candidates based on their speciality, and declared allotted seat, base on the availability of guides in that particular speciality.¹
- This leads to the selection of more health promotional and domiciliary centred research topics which helped to enrich the scope of community health nursing

Middle level health provider programme (MLHP)

- Indian Nursing Council proposed the horizontal integration of middle health provider in Basic B.Sc (N) and Post Basic B.Sc (N).² This horizontal integration will help to expand the scope of a nurse who graduated beyond traditional nurse and midwives.
- To discuss the challenges on integrating MLHP programme to Under Graduate Curriculum a one day conference for Nurse Educators in Community health nursing was organised by KUHS on 29 July 2019. The conference formulated a core committee to facilitate the implementation of MLHP in the current academic year.

Nurse Practitioner in Midwifery Training

- Ministry of Health and Family Welfare along with Indian Nursing Council Published guidelines for midwifery services in India which recommend midwifery training and certification (2018).³

- Based on this Nurse Practitioner in Midwifery programme is started which envisages gradual integration of midwives in Public Health System. It also aims the posting of Nurse Midwives in rural and urban community health institutions for 24 X 7.

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‘Happenings’: A Publication from KUHS on Recent Advances

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2. Speciality	COMMUNITY HEALTH NURSING
3. Date	02/10/19
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NOVELTY IN NURSING PRACTICE AND EDUCATION

A dynamic profession gives rise to various trends. Nursing is a dynamic profession by its own way and in a spectacular way it is continuously progressing. These trends can be both negative and positive. Nurses were trying hard to find new and better methods to help the client, their family and community which in turn lead to the trends in Nursing. Nurse's knowledge and clinical experience always result in their quality of their clinical practice. The current trends in nursing and care are multidimensional. Nursing services are mainly affected by the increase in the aging population, a transition to informatics, a nursing shortage, and an overarching emphasis on specific frameworks for the guiding of nursing practice, including integration of evidence based practice etc. Nurses too affected by these changing face of the populations, a rapidly change in technological environment, nurse/faculty shortages, or an emphasis on evidence based research in nursing practices. Educated and trained with sound empirical knowledge is the only base to face these challenges.

The noticeable happenings in nursing services at global levels are

- Continues rise in nursing jobs.
- Rise in Nursing shortage
- Growth in Hiring bonuses
- Preferences for graduate and nationalized nurses.
- Strict license for Nurses to practice and periodical license renewal.
- Retirement of nurses at later ages.
- Continuation of advancement in Technology
- Continuation on Evidence Based Practice
- Emerging Interest in Translational Research
- Expanded Discrimination of Research Findings
- Increased Visibility of Nursing Research
- Shared Decision Making
- Increased Emphasis on Systemic Review. On the other hand the trends in nursing education have to occupy a greater role for the dynamism of the nursing. Major trends in nursing education area are Curriculum Innovations, Technology & Nursing, Student Population, Clinical Teaching Learning Process, Evaluation System, Quality Assurance, Knowledge expansion & Modes of Education.

Suggestions:-

- Innovated curriculum with Periodic Revision of Curriculum & Curriculum Change through competency based Nursing curricula with focuses on outcome and emphasizes student participation & responsibility for learning.

- Train the Competent nurses to provide quality nursing care. Even though we have quality management system and accrediting agencies, a periodic system of monitoring can improve the quality of education rather only annual affiliation inspections.
- Nurse's informatics with High Tech High Touch Approaches to preserve the human component of nursing care is latest trend in nursing care. The training institution should be equipped with simulations laboratory to update the students with latest types of equipments and machines apart from the olden and orthodox types teaching strategies and kinds of nursing care. Technology assisted nursing education is an area in need of updating with teaching strategies.
- Demographic changes in nursing students and the respect of student's rights are the major area of concern to be addressed with care by the nurse administrators.
- Evaluation system in the teaching institute should be monitored in a formative rather than summative and give special consideration on 'Objective Structured Clinical Evaluation' and Faculty Self-evaluation of Teaching through rubrics. A rubric is typically an evaluation tool or set of guidelines used to promote the consistent application of learning expectations, learning objectives, or learning standards in the classroom, or to measure their attainment against a consistent set of criteria.

Conclusion: The technological changes, changes in demographics and health patterns have contributed to various trends in nursing education. The dynamic nature of nursing education strives to enhance the quality of care, the core of nursing.

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FACING SHEET OF ARTICLE

1. Stream	M. Sc. Nursing
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The HUG:

Comprehensive Pediatric care for well children is particularly complex in an age not only the diseases suffering by children also the stresses faced by parents make the term 'well child care'. In fact, the multiple wide-ranging needs of today's growing families has caused, that primary healthcare providers and nurses be trained to enhance child mental health care where they were least bothered. . It's always found that there is a gap between what the pediatric world promises and what it delivers and between what parents want from their providers and what they actually get. This dilemma even reflects in care receiving by each child. The HUG is intended to distill aspects of the literature into accessible, memorable, and practical strategies that pediatric nurses at all levels and in varied settings can use. The HUG (Help, Understanding, and Guidance for Young Families) is an innovative approach to Pediatric nursing care to support parents in optimizing the health and well-being of their children. Nurses' use 'The HUG' at helping nurses to enhance their relationships with parents, helping parents feel heard and attended to, encouraging parents to share what worries them most, which obviously increases the nurses' job satisfaction.

The HUG consists of three strategies; Start Here, Not There; See, Then Share; and Gaze, Then Engage.

1. Start Here, Not There:

Conversations between nurses and parents are strikingly dominated by the nurse and that parents introduce less problems about their child. Nurses who use the HUG would Start Here (where the family is), rather than There (where the nurse thinks the encounter should be going). Sitting down with the parents, establishing eye contact, and paying attention to what the parents and infants are doing to identify their problems.

2. See, Then Share:

This second HUG strategy is aimed at teaching parents about child development by encouraging the nurse to See what the child is doing Then, Share the observed behavior with the parents.

3. Gaze, Then Engage:

It encourages the nurse to gaze at the parent and engage with the parent on two fronts: What meaning does the parent attribute to the child's behavior? How does the parent feel about that behavior? Obviously the parents have complex emotions about their child's behavior. At one

minute a parent feels successful in understanding and responding to their child, but the next minute, that same parent may feel confused and frustrated. Nurses' education, ability to establish professional boundaries with patients, and access to mental health referral resources support the implementation of this HUG strategy.

CONCLUSION:

Using HUG strategies may help to optimize the health of children and enhance parental confidence and skills. Parents who connect with a nurse over the challenges of parenting they feel could be more likely to seek a relationship with their nurse. Those relationship can enhance continuity of care and increase compliance with healthcare recommendations. When parents are given new insight into their child's development and their own parenting issues, they can become more confident and competent in their parenting.

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'Happenings': A Publication from KUHS on Recent Advances

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2. Speciality	Pharmaceutical Analysis
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Note	The pharmaceutical industry discovers, develops, produces and markets drugs for use as medication to be administered to patients with the aim to cure them or vaccinate them. Pharmaceutical companies deal in generic or brand medications or medical devices; they are subjected to a variety of laws and regulations that govern the patenting, testing, safety, efficiency and marketing of drugs.

ERA OF TRANSITION IN PHARMACY

We can look back on last decade as a year of transition. From new clinical opportunities to encourage progress on reforming pharmacy education, the pharmacy landscape continues to shift. The importance of pharmacist responsibilities in handling patient data has been brought into sharp focus, lately facing severe repercussions on selling patient information to marketing companies without their consent.

Around the globe, a great focus was made into innovative treatments for especially on affordability for diseases like cancer, the therapies is deemed too expensive and studies and research is paving a means of providing desperate patients with access to newly developed therapies. Patients access to drugs is usually restricted, provisions to legally challenge is now developed.

Pharmacy education and training is also at a crossroads. A focus on improving the quality and decrease a variability in making quality is seen. A new focus on professionalism, team working and communication skills is a welcome change that is observed in recent years. Introduction of pharmacy practice is one such change.

Medicine safely has been a matter of utter most concern especially the last decade the cardiovascular risks of painkillers have dominated the medicines safety agenda in recent years. As a result, oral diclofenac tablets were withdrawn from pharmacy shelves, those were used for short time pain relief.

One of the most promising trends that have been observed is deficiency in drug development. A flurry of innovation has risen in the past few years. Use of nanotechnology in Cancer therapy is one such case of innovative drug development.

Medication therapy management has succeeded in becoming an important point of focus on the world of pharmacy. In recent times pharmacists are encouraged to provide these services and it aims to improve outcomes by helping people to better understand their health conditions and medications they are using in order to manage them. Diverse disease management programs that incorporate effective medication management have been developed for conditions like DM, COPD, asthma.....

A focus on services rendered than product by pharmacists will be good for patients and the pharmacy profession. Although an ideal situation, a focus is consciously made towards this in recent years. Clinical pharmacy was developed focusing on this shift.

Recent years have witnessed an expansion of pharmacogenomics. Personalized healthcare using genetic testing offering is becoming available within retail pharmacy settings. Further development's holds the opportunity for patients to work with pharmacist to choose the best drug

based on their DNA profile, especially in case of genetic disorders, cancers and chronic diseases like DM, asthma etc....

Pharmacists nowadays make an effort to target compliance and adherence using data as effective tools to boost adherence. Real time interaction with shared patient's data has been found to be effective; this is especially true in case of chronic diseases (hypertension, DM) where usually a decline in patient compliance is noticed.

Self care market is developing to be more than a trend, thanks to patient education and health promotion activities. Consumers are much more conscious to make efforts to reduce risky life styles resulting in medical conditions. This trend has had a positive impact, thus reducing incidence of lifestyle diseases like obesity, heart diseases etc.

Slowly but surely in a world where technology is the driving force, a way is being paved for the growth of "e-patient". Research predicts that the number of consumers using home health technologies will further increase in future. Advanced level clinical training is given to practicing pharmacist; Greater focus on training programs to yield qualified graduates is of greater focus nowadays. The Focus has shifted from product oriented to direct engagement with patients.

We see pharmacy faculty members plays a important role in improving the uses of people by conducting research in the discovery of drugs and therapeutic agents for diagnosis, prevention and treatment of disease, research is being given more attention calling forth innovative ideas.

Greater focus and study is put into post marketing surveillance resulting in uncovering adverse reaction. Studies indicate that commonly prescribed antibiotics (fluroquinones) may be linked to heart problems. These new findings join other possible adverse events associated with antibiotic like drop in blood glucose, mental health effects, tendon ruptures, aortic ruptures and tears etc. Development in drug designing has come a long way in the recent years. One such example is the quest for oral insulin. The pharmaceutical industry has been trying to develop oral formulations of insulin since 1920 without success but over the past few years. Several new oral delivery systems have shown promise in clinical trials. In recent years, pharmacies focus have shifted from product oriented role to direct engagement with patients, that is to a patient oriented one. This is a promising new trend that leads to lower your medication errors.

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‘Happenings’: A Publication from KUHS on Recent Advances

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A REVIEW ON TRANSFERSOME

Dr. ARUN RAJ R

Transfersomes are ultra-flexible lipid bilayer vesicles that have the ability to penetrate the skin intactly. Each transfersomes consists of at least one inner aqueous compartment, which is surrounded by a lipid bilayer with specially tailored properties resulting from the incorporation of “edge activators” into the vesicular membrane. Transfersomes can deform and pass through narrow constriction (from 5 to 10 times less than their own diameter) without measurable loss. Materials which are widely used in the formulation of transfersomes are various phospholipids, surfactants, alcohol, dye, buffering agent etc.

Transfersome is a term registered as a trademark by the German company IDEA AG, and is used to refer its proprietary drug delivery technology. The term transfersome means ‘carrying body’, and is derived from the Latin word ‘transferre’, meaning, ‘to carry across’, and the Greek word ‘soma’, meaning ‘a body’. A transfersome carrier is an artificial vesicle designed to be like a cell vesicle or a cell engaged in exocytosis, and thus suitable for controlled and, potentially targeted, drug delivery¹. In the broadest sense, a transfersome is a highly adaptable and stress-responsive, complex aggregate. Its preferred form is an ultra-deformable vesicle possessing an aqueous core surrounded by the complex lipid bilayer. Interdependency of local composition and shape of the bilayer makes the vesicle both self-regulating and self-optimising. This enables the transfersome to cross various transport barriers efficiently, and then act as a drug carrier for non-invasive targeted drug delivery and sustained release of therapeutic agents¹.

Mechanism of penetration of transfersomes^{4,5}

The mechanism of penetration of transfersome can be described by three mechanisms^{4,5}.

- Interaction between hydrophilic lipid residues and proximal water makes the polar lipids attract the water molecules. This induces hydration and the lipid vesicles move towards the site of higher water concentration. The difference in water content across skin stratum and epidermis develops transdermal osmotic gradient that leads to penetration of transfersomes across skin.
- Transfersomes by enforcing its own route induce hydration that widens the hydrophilic pores of the skin. Gradual release of drug occurs across the skin through the widened pores. The osmotic gradient developed helps in binding to targeted organ.
- Transfersomes act as penetration enhancers that disrupt the intercellular lipids from stratum which ultimately widens the pores of skin and facilitate the molecular interaction and penetration of system across the skin.

Transfersomes vs other carrier systems

At first glance, transfersomes appear to be remotely related to lipid bilayers vesicle liposomes. However in functional terms, transfersomes differ widely from commonly used

liposomes in that they are much more flexible and adaptable. The extremely high flexibility of their membrane permits transfersomes to squeeze themselves even through pores much smaller than their own diameter. This is due to high flexibility of the transfersomes membrane and is achieved by judiciously combining at least two lipophilic/amphiphilic components (phospholipids plus bio surfactant) with sufficiently different packing characteristics into a single bilayer^{3,6}.

The high resulting aggregate deformability permits transfersomes to penetrate to the skin spontaneously. This tendency is supported by the high transfersomes surface hydrophilicity that enforces the search for surrounding of high water activity. It is almost certain that the high penetration potential of the transfersomes is not primarily a consequence of stratum corneum fluidisation by the surfactant because micellar suspension contains much more surfactant than transfersomes. Thus, if the penetration enhancement via the solubilisation of the skin lipids was the reason for the superior penetration capability of transfersomes, one would expect an even better penetration performance of the micelles.

Composition of transfersome^{3,7}

The transfersome is composed of two main aggregates:

- An amphipathic ingredient (phosphatidylcholine), in which the aqueous solvents self assemble into lipid bilayer that closes into a simple lipid vesicle.
- A bilayer softening component (such as a biocompatible surfactant or amphiphile drug) that increases lipid bilayer flexibility and permeability.

Conclusion

The developed transfersomal formulation may prove to be a promising carrier for drugs, especially due to their simple production and ease of scale-up. Transfersomes can deform and pass through narrow constriction without any measurable loss, this high deformability gives better penetration of intact vesicles. Easy to scale up, as procedure is simple, do not involve lengthy procedure and unnecessary use of pharmaceutically unacceptable additives.

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PROMISING DEVELOPMENTS IN PHARMA

- Pharmacist will be recognized and remunerated from their professional roles. They will have close links with other health professionals who will regard them as equal colleague's .e.g.; students holding Pharm.D degree get wide opportunities such as research development and quality assurance....
- Pharmacist will be the key to meet government target in public health, management of long term conditions and helping patients to get the best from the medicines. e.g.; pharmacist's role in prevention of communicable diseases. pharmacist provide good health and medicine usage habits in to their communities by delivering public health campaigns and offering pharmaceutical consultations for patients in need.
- Pharmacist will not be stuck in dispensary, they will be talking to patients in consultation area in community pharmacy or on the ward of the hospitals, and they will be responsible for managing patient medicine. Counseling can help with all sort of issues in help like choosing direction in life, starting a family, abortion, abuse, addiction, cancer....
- The pharmaceutical industry has been trying to develop oral formulations of insulin since the 1920's without success, but over the past few years several new delivery system have shown promise in clinical trials.
- Access to affordable HIV treatment from India is one of the greatest success stories in medicine. The major reason in the countries success is the sustained commitment of the Indian government through its national AIDS program, which has been particularly effective at targeting high risk group such as sex workers and people who inject drugs.
- India prevents 'ever greening' and makes affordable generic possible. India adopted a strict medicines patent law that, while allowing patent protection for new pharmaceutical compounds, make it tough to get a patent on new forms of existing medicine. This public health approach to setting strict patent standards is in line with international trade rule and encourages timely entry of affordable generic into the market, driving prices down.
- Indian pharmaceutical companies are key players in space of generic market of global pharmaceutical sector and India is one of the important players of pharma market. Due to sky high prices of patented drugs in the US vs low cost Indian generics, the prices of medicines in the united states are one of the highest in the world because US laws and

policies blindly favor pharmaceutical companies over generic competition, allowing multiple and extended monopolies on the same medicine, leading to exorbitant rises for lengthy period of time on the other hand India's policy and law makers have identified generic competition as the strongest and most effective force to reduce the drug prices.

- Supporting state sponsored health coverage programs and focus on chronic healthcare could enable universal drug access .Universal Health Care is that all individual and communities receive the health service they need without suffering financial hardship. It includes the full spectrum of essential quality health services, from health promotion by prevention, treatment, rehabilitation and palliative care.
- Pursuing opportunity in newer product classes like gene therapy and specialty drugs. e.g.; Biosimilaris, which is approved and used in India which is mainly consist of vaccines, insulin, monoclonal antibodies, and recombinant proteins.
- In coming years Indian pharmaceutical companies could increase exports to large and traditionally under penetrated market such as Japan, china, Africa, Indonesia.

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Happenings : A Publication From KUHS on Recent Advances

Facing sheet of article

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VITEX NEGUNDO PHONOPHORESIS

- Natural products are rich in several potent bioactive compounds, targeting complex network of proteins involved in various diseases. Vitex negundo (VN), commonly known as "chaste tree", is an ethnobotanically important plant with enormous medicinal properties.
- Several bioactive compounds have been extracted from leaves, seeds, roots in form of volatile oils, flavonoids, lignans, iridoids, terpenes, and steroids. These bioactive compounds exhibit anti-inflammatory, antioxidant, antidiabetic, anticancer, antimicrobial.
- VN is typically known for its role in the modulation of cellular events like apoptosis, cell cycle, motility of sperms, polycystic ovary disease, and menstrual cycle. Several bioactive compounds obtained from VN have been commercialized and others are under investigation.⁽¹⁾
- Osteoarthritis is the most common form of arthritis in the knee. It is a degenerative, "wear-and-tear" type of arthritis that occurs most often in people 50 years of age and older, but may occur in younger people too.
- Phonophoresis is a technique that employs the use of ultrasound waves to enhance percutaneous absorption of drug delivery similar to iontophoresis. It was first used to treat polyarthritis of the hand by delivery of hydrocortisone ointment into inflamed areas in 1954.
- Various invasive and noninvasive treatments are available for OA knee management.
- Physiotherapy along with pharmacological management can prove better outcomes in Knee pain cases.
- A study done to find out effectiveness of diclofenac sodium phonophoresis and Vitex negundo phonophoresis along with knee exercises in osteoarthritis.

- In this randomized control trial, 32 diagnosed cases of grade 2 knee osteoarthritis without any other knee pathology were divided in two groups using computer generated random numbers.
- First group was treated with diclofenac sodium phonophoresis along with quadriceps strengthening and active knee exercises and second group was treated with Vitex negundo oil phonophoresis along with quadriceps strengthening and active knee exercises for 2 weeks.
- Outcome measures such as pain (VAS score) and WOMAC score was assessed at baseline and at the end of 2 weeks.
- Result was analyzed using unpaired t test showed significant difference in two groups ($p < 0.005$). Pain intensity and knee disability using MODQ score showed more improvement in group two. (i.e. Vitex negundo group).
- This study concluded that Vitex negundo oil phonophoresis along with physiotherapy is more beneficial than diclofenac sodium phonophoresis in knee osteoarthritis cases.⁽²⁾
- From various studies and investigations, it is suggested that vitex negundo can add as a drug during phonophoresis for the therapeutic effects of various conditions.
- The present review is relevant because it aims to compile medicinal values of Vitex negundo generated through the research activity using modern scientific approaches and innovative scientific tools.

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“Happenings”: Publication from KUHS on Recent Advances

Facing Sheet of Article

1	Stream	Allied Health Sciences
2	Speciality	Physiotherapy
3	Date	04/10/2019
4	Title	Robotic therapy in Neuro Rehabilitation
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Title: Robotic therapy in Neuro Rehabilitation

Functional rehabilitation of patients with neurological disorders like stroke demands more time, cost and physical efforts from therapists' part. Robotic therapy is one of the novel and promising technology that enhance recovery and facilitate restoration of function in an efficient manner in terms of cost, time and effort. Robotic devices are able to provide consistent training in motor learning and functional abilities and are a reliable tool to assess patients' performance and prognosis¹.

Robotic therapeutic devices can be broadly categorised as Over-ground Exoskeletons, Body Weight Supported Treadmill Trainer (BWSTT) Exoskeleton devices and End- Effector devices. Over-ground Exoskeleton devices train patients to ambulate on ground and require patients to have some upper extremity strength. BWSTT Exoskeletons involve a harness that supports some percentage of patient's body weight, while orthoses control joint movement patterns during gait. End Effector device functions on foot plates that mimic the trajectory of gait².

Robotic devices provide assistive or resistive forces and passive mode for functional activity training among patients³. Some of the devices are,

- MIT-MANUS shoulder and elbow module, which helps in reaching movements and hand function
- MIME (Mirror Image Movement Enabler) helps to move affected limb in mirror pattern of non affected limb
- ARM – Guide (Assisted Rehabilitation and Measurement Guide) helps for horizontal reaching activities
- T – WREX (Therapy Wilmington Robotic Exoskeleton) allows patients to exercise in functional way
- NeReBot (Neuro Rehabilitation Robot) is a three degree of freedom robot³

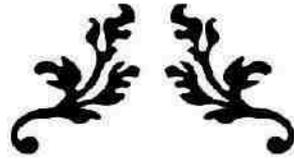
Robotic therapy offers better repetitive therapeutic tasks with minimal supervision of therapists. It helps in monitoring and controlling speed, joint coordination patterns, controlled perturbations, provide weight support with minimal exertion and acts as reliable and standardized evaluation tool⁴.

One of the major implications of Robotic device is on gait training where the patient is strapped to the device and helps in avoiding improper gait patterns. Advanced robotic devices

help in evaluation of joint angles, velocities and amplitudes which is crucial to assess progress of patient during treatment⁴. As an emerging therapy in rehabilitation field, intensive researches are required for standardized measures for therapy protocol and assessment and for clinical evidence for patient improvement.

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