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PREVEST DenPro[®] THE FUTURE OF DENTISTRY

Dr. Anil Chandra (1960 - 2021)

INNOVATION CRISIS : WHATS THE WAY AHEAD

EDITORI

ndian brains are considered to be among the best in the world. However major part of the innovation is sparked either by a crisis or adversity. Jugaad, a term common to every household in India, is the cornerstone for most innovations. As per the latest survey presented by Mrs. Nirmala Sitaraman, "Mere reliance on Jugaad innovation risks missing the crucial opportunity to innovate our way into the future". The report also laid emphasis on the importance investing more on R&D infrastructure to wade us through this crisis. With a gross expenditure on R&D at 0.65%, India appears to be underperforming in innovation with respect to the size of its GDP.

Innovation Guru, Mr. Narayana Murthy had expressed deep disappointment over the lack of "earth-shaking" innovations from the country's premier institutes. In a recent convocation address he said that in the last 6 decades there has been not been a single notable invention from India that has become a household name. He expressed his disappointment over the fact that we have failed to contribute to a single earth-shaking invention to delight global citizens. In the recent years, only two Indian entities feature among the top 10 recipients of Indian patents. It is well dominated by domestic subsidiaries of foreign conglomerates that have successfully gained an upper hand on Indian competitors

Academic institutes have contributed significantly to global patents and high impact journals. However, their lack of expertise to scale up have resulted in a brain drain. Fundamental research, concept generation and incubation is a necessary but fractional component of the larger picture. Inability to take eventually scale up has led to an alarming crisis. Innovative lab experiments, however prolific often have high failure rates if scale up is not considered as vital element in the scientific journey. Innovation scaling is an interdisciplinary subject involving different stakeholders, which include business leaders, corporates, research scientists, design professionals, quality managers, marketing gurus and regulatory experts. A strong link between the experts will eventually create a

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groundbreaking inventions, which will put our nation on the global forefront. The academic and research institutes must accommodate business leaders, industrial scientists and quality management professionals as adjunct faculty in order to learn how academic innovations can be adapted for implementation in the real world. Industry-Academia partnerships will surely help in scaling up and translating the enormous scientific knowledge, which remains untapped within these prestigious academic sectors.

Dr. Sai Kalyan



Dr. Sanjeev Kunhappan ABSTRACT :

Periapical diseases are induced as a result of degeneration of pulp tissue by the direct or indirect involvement of oral bacteria. A periapical lesion cannot form by itself and is formed within an area of apical periodontitis which is inflammatory in origin. The lesions regress when the microbial etiology of periapical lesions in the root canal is removed by nonsurgical root canal therapy. Surgical removal of the periapical lesions without proper root canal disinfection and obturation will not result in the healing of periapical tissues. High success rates are found in the healing of large periapical lesions with nonsurgical treatment using triple antibiotic paste for disinfection of the root canal systems and mineral trioxide aggregate for three dimensional obturation. The present clinical case show the nonsurgical endodontic management of large periapical pathosis using triple antibiotic paste and mineral trioxide aggregate. **KEY WORDS:**

Mineral trioxide aggregate, Non-surgical treatment, Periapical lesion, Triple antibiotic paste.

INTRODUCTION:

Traumatic injuries of the anterior teeth may lead to substantial amount of pulpal necrosis and resultant periapical pathosis among young children worldwide. Anaerobic intrapulpal environment caused by disruption of blood supply is conducive to the proliferation and growth of the opportunistic microorganisms, which may later release deleterious toxins in the periapical tissues. Further, the ingress of the microorganisms and their liberated toxins and byproducts may exert an exaggerated inflammatory reaction in or near the periapical regions, inducing the formation of periapical lesions.⁽¹⁾ The evidence of the presence of immunocompetent cells, as well as different mediators within the lesions, have supported to the fact that genetic susceptibility and immune-pathogenesis may also have a significant role in the development of such lesions.

Surgical intervention was considered to be necessary for treating such endodontic periapical lesions, particularly when they were large in size. Non surgical treatment of such lesions is favored by the advancements in scientific knowledge about the genesis, pathologic nature and clinical behavior of endodontic periapical lesions. Studies have also shown that pulpo-periapical lesions have the potential for healing without surgical intervention. Different clinical studies have confirmed that nonsurgical treatment with adequate infection control can favor the healing of large periapical lesions. These lesions may regress by the mechanisms of apoptosis, if the microbiological etiology is removed by nonsurgical root canal treatment.⁽²⁾ Elimination of the microorganisms has been a challenge for the clinicians, in case of large periapical lesions. Mechanical instrumentation alone is unable to completely eradicate the polymicrobial infection from the root canal system. Therefore, some form of chemical disinfection by irrigation and intracanal medicament is necessary to optimally disinfect the root canal system. Various medicaments have been advocated to help eliminate bacteria, reduce periapical inflammation, pain and induce healing. Calcium hydroxide has been commonly used as an intracanal medicament, but it has been reported that it is not effective in disinfecting the root canals associated with persistent endodontic infections.⁽³⁾

Antibiotics have been used in various combinations to disinfect the root canal system and among them, a mixture of ciprofloxacin, metronidazole and minocycline has found to be very effective in eliminating endodontic pathogens. This combination is referred to as triple antibiotic paste. Ozan and Er have found that the combination of these antibiotic drugs, when used as antimicrobial dressing is successful in healing large cyst-like peri-radicular lesions.⁽⁴⁾

One of the major technical problems is obtaining hermetic apical seal. If the apex is open, obturation becomes difficult leading to failure. In such canals, mineral trioxide aggregate (MTA Plus) can be placed by an orthograde method with ease to form hermetic seal at root apex. Apart from preventing the micro-leakage, it also provides the benefits of inducing hard tissue formation.⁽⁵⁾ This case report demonstrated resolution of periapical pathology achieved through a nonsurgical approach, observed over a period of three years.

CASE REPORT :

A 27-year-old female patient presented with pain and discolored right maxillary central and lateral incisors. The patient gave the history of trauma about 7 years back. Medical history was noncontributory. Thermal and electric pulp tests were performed to determine the vitality of all the anterior teeth. Both the maxillary central and lateral incisor of right quadrant were found to be non-vital showing no response to thermal and electric pulp tests. Intraoral periapical radiograph of the involved teeth was taken which demonstrated a periapical lesion measuring 15.6 mm -15.1 mm with bone loss (Fig. 1 & 2). Chronic apical periodontitis was diagnosed with respect to teeth # 11 and 12. Hence conventional root canal therapy was planned. Following proper isolation with rubber dam, access cavities were prepared on central and lateral incisor and the working length determined. Canals were cleaned and shaped using Kfiles by a conventional method. Warm 3% sodium hypochlorite solution was used as the intracanalirrigant which was ultrasonically activated (Irrisafe Ultrasonic Tips, Satelec). The files were liberally coated with EDTA gel



throughout instrumentation. The canals were enlarged till ProTaper F-3 size. Triple antibiotic paste consisting of ciprofloxacin, metronidazole and minocycline in 1:1:1 ratio mixed with macrogol ointment and was used as an intracanal medicament and access cavities were sealed with cavit. The patient was recalled after 3 weeks. In the next visit, the canals were cleaned with warm 3% sodium hypochlorite solution and final rinses of 17% EDTA (Prevest DenPro Ltd., Jammu, Jammu and Kashmir, India) were given for one minute followed by normal saline. The canals were dried using paper points and the apical third of the canals were obturated with MTA Plus (Prevest Denpro Ltd., Jammu, Jammu and Kashmir, India). A moist cotton pellet was placed over it and the access cavities sealed with cavit. Next day, cavit was removed and the remaining canals were obturated with thermoplastic Gutta-percha (E and Q Plus, Meta Biomed Co., Ltd.). Access cavities were sealed with composite resin (Fig. 3).

The patient was recalled after six months (Fig. 4), one year (Fig. 5), one year six months (Fig. 6) and three year intervals(Fig. 7). The clinical and radiographic examination demonstrated that the patient was asymptomatic and the teeth exhibited proper integrity of the periodontal tissues. Osseous repair was also evident with newly formed bone in the peri-apical area.

DISCUSSION :

The precise mechanism involved in the formation of periapical lesions is not fully understood. It is generally agreed that the necrotic pulp provides a suitable environment to allow microorganisms to multiply and release various toxins into the periapical tissues, thus initiating an inflammatory reaction and leading to the formation of the periapical lesion.⁽⁶⁾

Earlier it was considered that large periapical lesions will not respond to root canal treatment alone and that surgery was mandatory for the success of treatment. However in recent years, clinician's abilities have been greatly enhanced by the greater awareness of the root canal morphology and the development of newer instruments, techniques and materials.⁽⁷⁾

Primary aim of conventional root canal treatment is eliminating these bacteria. It has been proved that it is possible to stimulate the immunological system to induce repair in large lesions, if the microbial load is reduced with an effective intra-canal medicament. Considering all this, nonsurgical root canal treatment should be considered as the first choice in cases of non-vital teeth with infected root canals. Most important factor for the successful treatment of periapical lesions is elimination of bacteria from the root canal and the lack of regression of such lesions is generally assigned to the persistence of bacteria inside the root canal. Both irrigants and intra-canal medicaments aid in reducing the microbial flora of infected root canals. As chemomechanical preparation alone is not enough to predictably eliminate all the bacteria, so the role of intra-canal medicament cannot be underestimated in the eradication of the bacteria.⁽⁸⁾

Irrigating solutions help to reduce the microbial flora of the infected canals. Use of ultrasonically activated warm 3% sodium hypochlorite can dissolve and help to eliminate the necrotic tissue.⁽⁹⁾ Instrumentation and irrigation reduce bacterial presence.

Calcium hydroxide has been considered the gold standard for optimally disinfecting the root canals.⁽¹⁰⁾ However, its role in the elimination of the bacteria associated with persistent apical infections is controversial. Bacteria associated with persistent apical infections have the ability to invade the dentinal tubules and buffer the high pH produced by calcium hydroxide.⁽¹¹⁾

Use of triple antibiotic paste is highly recommended for disinfection of the root canals in cases of large periapical lesions. It is shown that the combination of ciprofloxacin, metronidazole and minocycline drugs can kill any bacterium in the carious lesions, necrotic pulp, infected root dentin and periapical lesions.⁽¹²⁾This material has been used to promote periapical healing in non-vital teeth associated with periapical lesion.⁽¹³⁾The local application of antibiotics may be a more effective mode for delivery in endodontics. There were remarkable reductions in the symptoms after the use of triple antibiotic paste in the present case also.

MTA Plus was used to seal the apex as it provides a threedimensional hermetic seal. Apart from providing an effective seal against dentin and cementum:

- a) It also promotes biologic repair and regeneration of the periodontal ligament.
- **b)** It is a bioactive material and it creates an ideal environment for healing.
- c) It forms calcium hydroxide that releases calcium ions for cell attachment and proliferation.
- d) It also encourages differentiation and migration of hard tissue-producing cells.^(14,15)

The periapical lesion in the above case was large but resolved after nonsurgical endodontic therapy. Periapical tissues have rich blood supply, lymphatic drainage and abundant undifferentiated mesenchymal cells and therefore have good potential for healing.⁽¹⁶⁾ Triple antibiotic paste has been successfully used in the above case to disinfect the canal and MTA Plus used to form a three-dimensional hermetic seal at apex and also promote healing of periapical lesion.

CONCLUSION :

A biological rationale has been presented for the



nonsurgical endodontic management of periapical lesion of pulpal origin. The clinical case reported in this article showed excellent healing of large periapical lesion achieved through a nonsurgical approach. Emphasis was laid on thorough debridement using warm ultrasonically activated 3% sodium hypochlorite solution, disinfection of the root canal system with triple antibiotic paste and three-dimensional obturation of the apical third of the canals with MTA Plus. The healing of the lesion confirms that even large periapical lesions can respond favorably to nonsurgical treatment and therefore conservative non-surgical endodontic approach must be considered as the first choice of treatment in such cases rather than traumatic surgical approach.

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Biography : Dr. Sanjeev Kunhappan completed his BDS from College of Dentistry, Indore, India, during 1996-97. Then he worked in College

of Dental Science's, Rau, Indore as lecturer for 6 yrs. He was then selected by Public Service Commission for the post of Lecturer in Government Dental College, Raipur, India, in 2005. After three of his job he joined Post Graduation in the Department of Conservative Dentistry & Endodontics. He completed his MDS in 2012. During his MDS course he also received the Fellowship in Clinical Research from the Bilcare Academy and International Clinical Dental Research Organization. He has published more than 20 papers in various reputed National & International Journals and has been presenting scientific paper in various National & International conferences. His interest is mainly towards **"NON-SURGICAL ENDODONTICS".**

E-mail:<u>skunhappan@gmail.com</u> Mob.No.:9425131362 **Oral Manifestations of COVID-1**

Dr. Sejal Shah

No. 1: GINGIVAL INFLAMMATION :

Bleeding and inflammation in oral tissue have been suggested to be a result of a generalized increase in inflammation due to elevated levels of cytokines and interleukins initiated by the SARS CoV-2 virus. COVID-19 disease severity has been linked to an immune dysregulation, leading to a cytokine storm. Periodontal disease can increase levels of circulating cytokines, particularly interleukin-6 (IL-6), which has been implicated as one of the major interleukins leading to the cytokine storm.

Periodontal disease is currently being examined as a possible contributing disease toward COVID-19 severity.



COVID-19-positive patient with ulceration on tongue. This patient had many ulcerations in the mouth that healed after disease resolution.

No. 2: XEROSTOMIA (DRY MOUTH):

COVID-19 has been suggested to cause dry mouth for a variety of reasons. The most common is mouth breathing by an individual due to mask use. Mouth breathing can desiccate oral tissue especially without frequent hydration. Novel coronavirus infection of the salivary glands can influence both the quantity and quality of saliva being produced.6

Additional research is needed to identify causal effect, but in the meantime, clinicians should note that xerostomia has been linked to an increase in both caries and candida infections.

No. 3 : ORAL ULCERATIONS AND GINGIVAL TISSUE **BREAKDOWN:**

COVID-19 has been associated with vascularity anomalies due to viral damage of blood vessels. A process whereby the virus gains entry into the endothelial cells that



line blood vessels via the ACE2 receptor and damages them, leading to situations of oxygen deprivation. Tissue necrosis, including oral ulcerations, can be the result of vessel damage. Ulceration and tissue damage can be further exacerbated by increased

inflammation and upregulation in inflammatory markers due

to the SARS-CoV-2 virus.



Commissural cheilitis : Notice the fissure and bleeding located in the commissure Atrophy of the surface of the tongue including white fungal patches, distributed mainly in the left lateral side, and a red plate located in the hard and soft palate. Notice also the fissures located in the dorsum of the tongue.

No.4:CRACKED TEETH:

Tremendous increase in patients presenting to their practices with fractured teeth during the coronavirus pandemic. An increase in bruxism (teeth grinding and clenching) as the mostly likely culprit.

The article specifically examined three COVID-19 pandemicrelated factors that could

cause an increase in tooth facture from bruxism. First, psychological stress from the pandemic could have a major role in stress-related tooth fracture. Second, poor orthopedic posture from make shift at-home works tations could lead to bruxism. Finally, sleep deprivation and/or obstructive sleep apnea could result in bruxism and cracked teeth.

No. 5: LOSS OF TASTE AND SMELL:



A sudden onset in loss of taste (ageusia) and smell (anosmia) are two symptoms that can be the earliest indicators of COVID-19. An average of 47% (up to 80%) of individuals who test positive for COVID-19 can have subjective complaints of taste and smell loss, particularly in cases of asymptomatic or mild disease.

The mechanism behind this loss is suspected to be viral disruption of cranial nerves 1, 7, 9, and 10, as well as the supporting cells of neural transmission.

Bilateral atrophy of the surface of the tongue located in the lateral sides. Lateral dorsum appears depapillated with a symmetrical distribution.



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Dr. Seial Shah

DR. SEJAL SHAH, M.D.S., Prosthodontist & Oral Implantologist, practicing in Mumbai. She did her BDS from Carshan Dental College & Hospital, Udaipur and MDS from Maharashtra University of Health Sciences, Mashik. Maintains her speciality dental practice in the name "VARDHAMAN DENTAL CLINIC" at Malad with prime attention to Smile Designing, Full Mouth Rehabilitation &Implant Restoration.





Dr. Sai Kalyan INTRODUCTION :

Dental Science is in constant pursuit for more recent and near ideal dental materials. Introduction of MTA in 1993¹ has undoubtedly been one of the greatest scientific innovations in the history of dentistry in the last few decades. MTA has been widely investigated in various scientific researches and has come up as a potential alternative to a number of present dental materials indicated for diverse applications in endodontic therapy.

Studies have also shown that MTA is biocompatible², promotes Regenerative strategies³ and has an excellent sealing ability⁴, both orthograde and retrograde.

The original formulation developed at Loma Linda University is manufactured by Dentsply International (ProRoot MTA and Tooth Colored MTA; Dentsply-Tulsa Dental, Tulsa-USA; Dentsply-Johnson City-USA). Various innovations and modifications have been tried as biomaterials similar to that of MTA such as MTA plus (Prevest Denpro Limited, Jammu city, India), MTA-Angelus (Angelus SoluçõesOdontológicas, Londrina, PR, Brazil), OrthoMTA (Bio MTA, Korea), Biodentine (Septodont, Saint-Maur-des-Fosses, France). All the aforementioned materials show biological activities similar to MTA with varying degree of success.

The major limitations in the use of these materials in addition to their high cost have been slow setting kinetics and complicated handling⁵, rendering these procedures even more challenging and restricted their use to Endodontists.

This Paper provides comparative evaluation of some of the important features of MTA and MTA like materials available in the market and lays down the guidelines for clinical selection of these materials under different circumstances.

EVIDENCE BASED DENTISTRY :

MTA has been proposed as a reliable pulp-capping material on direct carious exposures in permanent teeth.⁶Biodentin has also been successfully used in direct pulp capping of permanaent teeth.⁷

Complete or partial obturation of the root canal canal system with MTA is a tenable alternative for teeth that require retreatment, teeth with resorptive defects, open apices, and teeth that show wide anatomic variations that cannot be predictably sealed using conventional techniques.^{*}

Biodentin has also been used for treating external cervical resorption, external apical resorption and obturating root canal.⁹It has been proposed that MTA-Angelus (Angelus, Londrina, Brazil), might also exhibit properties suitable for nonsurgical root canal obturation.¹⁰

A study¹¹comparatively evaluated the push-out bond strength of ProRoot MTA, Biodentine, and MTA plus in repairing furcal perforations utilizing an internal matrix, when subjected to blood contamination. Blood contamination was found to affect the 7 day MTA samples but had no significant effect on 24-h samples. In the MTA Plus group, blood contamination significantly decreased the strength both in 24-h and 7-days samples. Blood contamination had no effect on the perforations repaired with Biodentine.

Hashem and Hassanien in a sealability study²² concluded that ProRoot MTA has excellent sealing ability and can be used with or without matrix in repair of large furcation perforations. MTA Angelus should be used with internal matrix to repair large furcation perforations.

 Table 1: Guideline to Clinical Selection of Portland derived materials.

Material	Composition	Vehicle	Setting Time	Radioopacity	Equipment	Price in India
					neeueu	
Pro Root	Portland	Distilled	2 hours 45	5.34 mm/ Al	MAP	5000 for 1 gra
MTA	Cement+ Bismut	Water	minutes			
	oxide+ Gypsum					
MTA Plus	Dicalcium	Viscous	1.2 hours	5mm/Al	No special	5000 for 2
	Silicate+ Bismuth	Polymer			equipment	grams
	oxide+	Hydroge			needed	
	CaSulfate+Silica	1/				
		Distilled				
		Water				
MTA	Tricalcium	Distilled	15 Minutes	7.17mm/Al	No special	2350 for 0.28
Angelus	Silicate+	Water			equipment	grams
	Dicalcium				needed	
	Silicate+					
	Tricalcium					
	Aluminate+ Free					
	lime+ Bismuth					
	Oxide					
Ortho	Tricalcium silicate	Distilled	5 hours 30	NA	Carrier,	NA
ΜΤΑ	+ Dicalcium	Water	minutes		Compactor and	
	Silicate+				Automixer	
	Tricalcium					
	Aluminate+					
	Tetracalciumalun					

Table 2: Clinical Applications of MTA and MTA like materials.

Material	Pulp	Retrofilling	Obturation	Perforation	Resorption	Apexification
	Capping	Material		Repair		
Pro Root	***	*	****	***	***	****
MTA						
MTA Plus	****	****	****	****	****	****
MTA	****	***	**	****	***	**
Angelus						
Ortho	****	***	**	***	***	
MTA						
Biodentin	****	****	**	****	***	***

CONCLUSION:

MTA is one of the materials in field of dental sciences which is known for its unique blend of physical, chemical and mechanical properties well supported by various scientific researches. This material stands for its potential biological activity with far and wide applications in the field of Endodontic therapy. Various permutations and combinations regarding its composition and properties are available under different brand names. Each material combination has its certain potential property so it is advisable to the clinician to



wisely choose a particular MTA formulation for a specifically indicated treatment protocol to achieve best possible clinical and biological success.

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Dr. Sai Kalyan

Product Profile : -

*Academician, researcher and medical device expert. He has a masters degree and a PhD in endodontics. His current interests include bioactive materials, nanomaterial systems and regulatory affairs.''

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FLUOROTOP AP

Fluorotop APF

Topical Fluoride Acidulated Phosphate Fluoride 1.23% Fluoride Ion

Description : A topical APF anti-caries preparation containing 1.23 % fluoride ion from sodium fluoride. The improved thixotropic properties ensure closer adherence to enamel and interproximal areas. It contains xylitol-a proven anti-caries ingredient. The gel is offered in flavours for patient satisfaction and there's no bitter taste.

Indications : Topical application of fluoride to aid in the protection against dental caries

- Product Benefits :
- Inhibits plaque build-up
- Prevents demineralization of tooth
- Promotes re-mineralization for caries protection and prevention
- Economical
- High fluidity for easy and quick application
- Packing :
- REF: 80005: 500gm Plastic Bottle REF: 80004: 200gm Plastic Bottle
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Celebrating Legends...

Dr. Anil Chandra (1960 - 2021)

PROFILE OF THE MONTH

Dr. Anil Chandra was an impressive, affectionate and an inspirational mentor. He was a well renowned Endodontist working as a Professor (Department of Conservative Dentistry and Endodontics) and Dean (faculty of Dental Sciences), KGMC (Lucknow).

Dr. Chandra graduated in 1983 from King George Medical College (KGMC), Lucknow and further completed his master's in Operative dentistry from the prestigious University BHU in year 1986.

He held several honors including fellowship of Academy of Dentistry International in Hong Kong in September 2012. Also, he attended International workshops and provided exemplary academic knowledge at various national platforms and was committed in academic discipline at both graduate and post graduate levels.

Prof. Chandra served being the member executive committee of IES as well as being the President in IES, IACDE, IDA (Lucknow) and CAED. He was appointed as Reviewer for different journals of repute and editor in chief of IJRD (International Journal of Research & Development) and JCD (Journal of Conservative Dentistry and Endodontics).

He authored 33 articles and 2 chapters of textbook. His contributions to be In-Charge DCI Cell (KGMC) and VVIP- clinic (KGMC) was an acknowledgement.

Dr Anil Chandra served as a visiting faculty at University of Medicine and Dentistry, NEW JERSEY (USA) since 1997 and as a visiting scholar in the Department of Restorative dentistry in 1999, 2003 and 2006.

He had also worked as Research scholar in the department of Pulp biology at University of California, Los Angeles (USA) in 2003. He was a Member of American association of Endodontics, Canadian Academy of Endodontics, British Society of Endodontics, American academy of cosmetic dentistry, Academy of Operative Dentistry, British society of restorative dentistry, Canadian academy of esthetic dentistry and Member of Cariology group at International association of dental research.

