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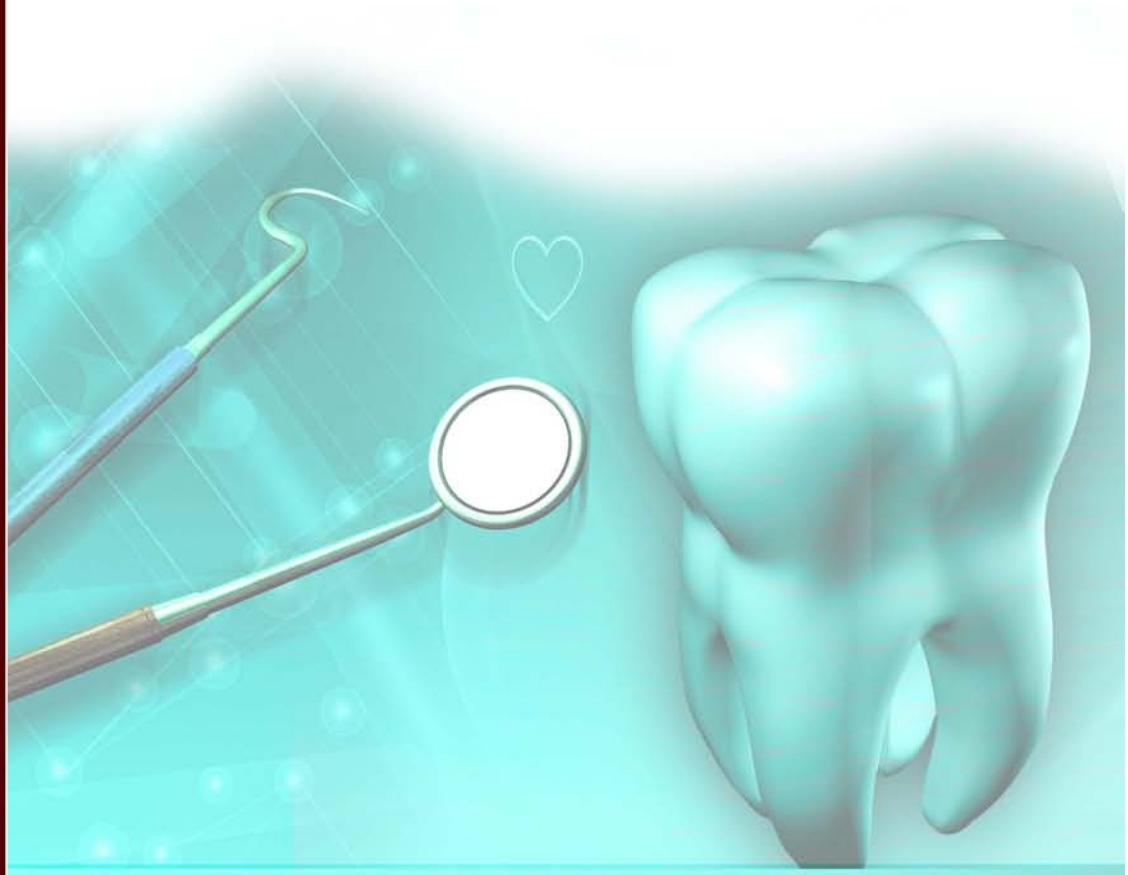

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Journal of Interdisciplinary Dental Sciences

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Editorial

I am extremely proud to bring forth the second volume of the journal and very glad to say that we are getting innovative papers from different colleges. I request all the authors to submit more of the original researches and reviews as we have got number of case reports. We do understand that case reports are equally important but unfortunately they do not provide strong causal evidence. Knowledge is of no use if it is not passed on to the fellow colleagues. Hence, I request all the authors to submit their original researches and reviews for the upcoming issues of the journal. In previous issues, we have covered history of different branches of dentistry except few; here by I invite all of you to submit invited review on subject of national importance, women & child health, epidemiological studies, and survey on oral health status in different parts of rural India. The journal is following open access policy, so that the knowledge can acquired through a single mouse click. I thank all the reviewers, contributors and editorial board for completing one year and stepping in to New Year with second volume.

Dr. Vivekanand S. Kattimani
Editor in Chief JIDS
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Executive Editorial

I am, What I am….Yes, it is a matter of immense pleasure and pride for me to take this Chair of Executive Editor and for this, first of all, I would love to express my gratitude to the Almighty who was, is and will always be my side on my path towards an attempt of serving the patients and the intellects in the field. Next, I want to thank Honorable Chairman of the Institute, Dr.PrafullaPatil followed by Honorary Secretary, Dr.Mrs.VidyaPatil for giving me this opportunity and keeping faith in me. I also want to pay heartfelt thanks to my fellow colleagues and especially, Dr.Vivekanand Kattimani, the Editor-in-Chief of the journal, who has shown the light for the bringingforth of this journal and who is working very hard to make this humble attempt a success.

Needless to say, I express my thanks to my parents, my pa, whom I have troubled tremendously from the beginning with my reasonable and unreasonable demands and my ma, who has remained a staunch support for me day-in and day-out and has stood besides me in all of my pains and struggle till here. Life was never easy for me anyways. What more if I don't express my gratitude to those known and the people for whom I could not pay much attention during my journey, might be whom I could not give time in my life because of my hunger for professional growth, might be I was wrong many a times, I accept this but can't help especially when I have lost most of them by now. I feel for them and will always feel and accept I need to be more humble and approachable in my life.

Yes, in the end, I want to wish the journal a huge success. I believe, together we can and together we will. We will surely leave no stone unturned to make this journal a huge success and food for thought for all its readers giving an insight into how different the reality might be from the words and will try to push those papers which will be authentic in their approach towards profession and will be enlightening.

With best regards,

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Biodentine: A Revolution in Conservative Dentistry & Endodontics

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Abstract:
Several new calcium silicate-based materials have recently been developed that aim to overcome the drawbacks of mineral trioxide aggregate (MTA), such as its difficult handling properties, potential discoloration, and long setting time. Biodentine, a silicate-based material that is used as a dentin restorative material, also has endodontic indications similar to those of MTA. Unlike Portland cements, Biodentine, with its improved physical properties and shorter setting time (12-min), can be used as a dentin substitute in several clinical indications. Biodentine has emerged as a reliable bioactive material with various applications in endodontics that include obturation combined with root-end resection, apexification, root perforations, and in cases of internal resorption and dens in dente.

Key words: Calcium silicate, mineral trioxide aggregate, biodentine, apexification

Introduction:

Biodentine can be defined as a special micronized concrete derived from the main component of Portland cement, tricalcium silicate. BioDentine cement is part of a new approach seeking to simplify clinical procedures.[1,2]

Biodentine is a modified powder composition with the addition of setting accelerators and softener, available which is available in a new predosed capsule formulation for use in a mixing device which is largely improved the physical properties of this material making it much more user-friendly. Its uniqueness not only lies in its bioactive property& pulp protective chemistry, but also in its universal application both in the crown and in the root.[4,5]

Initially MTA was proposed for retrograde obturation of root canals during endodontic surgery, calcium silicate cements has gradually become the material of choice for the repair of all types of dentinal defects. (Bogen and Kuttler 2009, Parirokh and Torabinejad 2010).[1] Biodentine was first introduced by Wang et al. 2008, Wonkornchoawalit & Lertchirakarn 2011[1]

CLINICAL IMPLICATIONS:

Clinically biodentine is used for:

1) Repair of a perforation of the pulp floor iatrogenically induced during retreatment
2) Retrograde root canal obturation
3) Direct & indirect pulp capping
4) Apexificaton & apexogenesis
5) External & Internal root resorption
6) Pulpotomy
7) Endodontic surgery after failure of orthograde endodontic retreatment[3,4,5]

CLINICAL REPORTS

CASE 1)

Repair of a perforation of the pulp floor iatrogenically induced during retreatment[2]

A 30year female patient presented to the Department of Conservative Dentistry & Endodontics in Saraswati-Dhanwantari Dental College & Hospital, Parbhani with the chief complaint of complications that had occurred during retreatment in private clinic. Clinical examination revealed that the left upper first molar exhibited periodontal symptoms, and radiography showed periapical lesions at the mesio-buccal and palatal roots resulting due to previous insufficient management, as well as radiolucency at the furcation without attachment loss. Since the tooth exhibited considerable coronal decay, the temporary filling was removed to assess the viability of the remaining tooth structure. Iatrogenic pulpal-floor perforation was diagnosed, and with the patient's consent an attempt was made to preserve the tooth by sealing the endo-periodontal communication. Retreatment was performed in two sessions, with intracanal medication between sessions. After removal of the filling and

instrumentation of the root canal, the perforation lesion was debrided with ultrasonic instruments and a calcium hydroxide intracanal dressing was placed to control periodontal inflammation**. (Shown in fig A: a-e)**After 7 days, the tooth was without symptoms. The session started with repair of the perforation to avoid any risk of contamination with endodontic cement when obturating the canals. The canal orifices were isolated with cotton pellets; and the dentin defect was filled with 2 layers of BioDentine using an amalgam carrier. The material was then adapted to the cavity with a cotton pellet without pressure. Once the material had set any excess material was stripped off with a curette before removing the cotton pellets and filling the root canal in the same session. At the end of the session, the hardened material was shaped with a bur to reproduce the pulp floor convexity for the future restoration of the tooth. The copper band was removed and replaced by a temporary metal cap luted with glass ionomer cement. Follow-up at three months showed no clinical signs, and the X-ray confirmed complete healing of the apical and furcation lesions.[6,8,9]

CASE 2

Endodontic surgery after failure of endodontic retreatment[2]

A 40year male patient presented to the Department of Conservative Dentistry & Endodontics in Saraswati-Dhanwantari Dental College & Hospital, Parbhani with the chief complaint of pain in upper right front region of the jaw since 1 month. Patient gave history of undergoing root canal therapy & the right upper lateral incisor was restored with a post and core buildup along with temporary crown. Radiographs before retreatment and 3months later, showed a persistent periapical lesion and inflammatory root-end resorption. Since obturation of the canal system seemed radiographically adequate, surgical retreatment was opted for. After raising a full-thickness flap using an incision in the attached gingiva, access to the defect was obtained using a tungsten-carbide bur in a turbine handpiece with water spray. The lesion was curetted before resection of the apical 3 mm of the root. After verifying the absence of any root fractures, the gutta percha and cement filling was removed from the root canal up to the level of the root post. The canal was instrumented to 6 mm using ultrasonic tips (EndoSuccess Apical Surgery Kit, Actéon-Satélec, and Mérignac, France).After decontamination and drying of the root cavity, retrograde obturation was completed placing 3layers of BioDentine with the use of a syringe-mounted carrier system (MAP-system, PDSA,Vevey, Switzerland). The successive portions of material were deposited in the root end cavity and adapted to the wall with root canal pluggers. After hardening of the material, a red(fine) diamond bur was used to surface the root cross-section and eliminate any excess material. Bleeding into the bone cavity was ensured before repositioning and closure of the flap with interrupted synthetic sutures (polypropylene 5/0 and 7/0, B Braun, Germany).The patient was seen after 48 hours for suture removal and to make sure there were no post-operative complications. Upon clinical and radiographic examination 3 months later, the tooth presented no symptoms and showed radiographic signs of an on-going healing process**(Shown in fig B: a-e)**[9,10,11]

CASE 3

Apexification of an immature tooth

A young 27year male patient presented to the Department of Conservative Dentistry & Endodontics in Saraswati-Dhanwantari Dental College & Hospital, Parbhani with the chief complaint of dental trauma resulting in coronal fracture of the right upper central incisor. Initial examination revealed that the pulp had been capped in emergency treatment at the hospital. Radiographically an insufficient root filling was detected in the left upper central, which also showed incomplete root growth with apically diverging walls. It was therefore decided that apexification was indicated. Both teeth were to be treated in the same session, while the restoration of the tooth was to be left to the referring dentist. Following removal of the root-canal filling from the left upper central incisor, the endodontic treatment

plan was to fill the apical part of the canal after cleaning and decontamination with a sodium hypochlorite solution. Shaping was limited to the coronal third of the canal (Gates glidden drills) to facilitate direct instrument access upto the apical foramen. A first increment of BioDentine was inserted into the canal using a curved needle of the largest diameter fitting into the canal (MAP-system, PDSA, and Vevey, Switzerland). The material was then delicately pushed towards the apex with a root-canal plugger. Several increments were required to form a plug of adequate thickness (> 4mm).The material was adapted to the walls by applying indirect ultrasonic vibration through an ultrasonic tip placed on the plugger touching the material. After verifying that the material was hard-set, the patient was sent back to his dentist for further treatment and conventional restoration.**(Shown in Fig C: a-b)**[7,8]

DISCUSSION

Biodentine is a new bioactive material which can be used as a dentin substitute. It is mainly composed of tricalcium silicate and a radiopacifier phase of zirconium oxide. Calcium silicate based cements are known to release during setting and for a long period of time thereafter significant amounts of calcium hydroxide ions, responsible for triggering pulp reparative processes. Histological studies have shown the formation of a homogeneous dentin bridge at the pulp exposure site after direct or indirect capping with Biodentine.[10,11]

Mineralized tissue formation was found to express markers of odontoblasts. The ability of Biodentine to trigger reparative dentin formation together with its antibacterial properties is two critical factors ensuring long-term preservation of pulp vitality. While the antibacterial activity may be due to the alkaline pH, the induction of reparative dentin seems to be due to a release of TGF-ß1 growth factor from pulp cells. This factor attracts pulp stem cells to Biodentine application site where it induces their differentiation into odontoblast cells secreting reparative dentin.[12,13,14]

The resulting pulp vitality preservation is highly required in restorative dentistry, especially when the restored teeth will be used as abutments of long-span prosthetic restorations. Compared to conventionally used pulp capping materials, such as calcium hydroxide, Biodentine presents significantly higher mechanical properties which are very similar to those of dentin (elastic modulus of 22 GPa, compressive strength of 220 MPa and microhardness of60 VHN).[15,16]

This allows the preservation of the material as a base underneath resin fillings or even its use as a core-build up material in vital abutment teeth. Moreover, the ability of the material to create a firm bond with the underlying dentin substrate is highly required for core buildup materials, to ensure the preservation of the abutment integrity and therefore to lower the risk for crown or bridges detachment. According to Shayegan et al. in 2010 (partial pulpotomy and dentin bridge formation and pulp tissue reaction, white portland cement vs. formocresol vs. Biodentine) and About et al. in 2010 (partial pulpotomy: preserving pulpal vitality), biodentine induces dentin bridge formation, in the same manner as MTA. Thus one may observe the apposition of tertiary dentin in direct contact with the capping material (protective role to prevent dentin reinfection and pulpal inflammation)[3,5,7].

However, Biodentine has some features which are superior to mineral trioxide aggregate. Biodentine consistency is better suited to the clinical use than MTA. Biodentine presentation ensures better handling and safety than. As mineral trioxide aggregate the setting is faster, there is a lower risk of bacterial contamination than with mineral trioxide aggregate. Therefore, it is advantageous for the clinician as well as and the patient.[4,5]

CONCLUSION

Biodentine seems to be a very promising material which can be used as a dentine substitute for the preservation of pulp vitality in cases of deep caries, apexification, root perforation, internal & external root resorption. It has a unique set of properties which are highly desirable in restorative dentistry and prosthodontics, hence it's recommended to be used in vivo.

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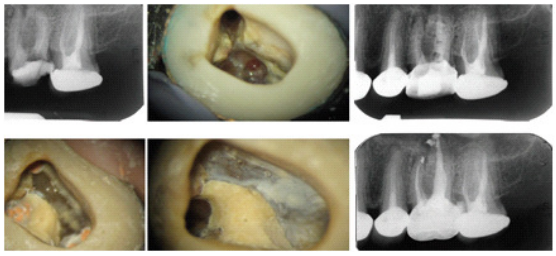
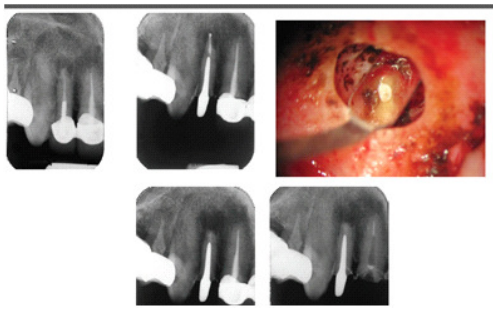
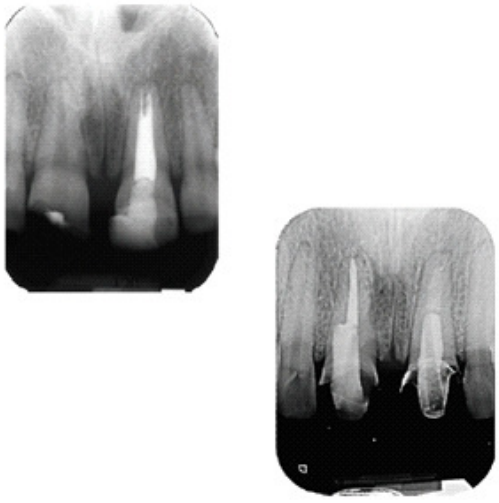


Case 1: (Fig A: a-e)



Case 2: (Fig B: a-e)



Case 3: (Fig C: a-b)

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Comprehensive Dental Treatment of Early Childhood Caries in a Patient with Sickle Cell Anemia-A Case Report

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Abstract:

Sickle cell anemia is a genetic disease caused by replacement of glutamic acid by valine in position 6 at the amino terminus of the beta-chain of globin, thus resulting in haemoglobin S. A review of the literature suggests oral manifestations of sickle cell disease include increased incidence of dental caries, periodontal disease and tooth loss as a result of untreated pulpal necrosis.

This brief paper reports a case of a 6-year-old female patient with sickle cell disease diagnosed to have Early Childhood Caries and describes dental considerations inmanaging severely mutilated deciduous teeth (ECC) in an emotionally immature patient resulting in an improvement in not only her oral and general health but also in helping her gaining self-confidence.

Keywords: Sickle cell anemia, Early Childhood Caries, Omega wire post and core.

Introduction

Sickle cell anemia is a genetic disease caused by replacement of glutamic acid by valine in position 6 at the amino terminus of the beta-chain of globin, thus resulting in hemoglobin S[1]. Under conditions of hypoxia, erythrocytes that predominantly contain hemoglobin S take on a shape resembling a sickle[2]. This sickling is reversible through increased oxygen levels, although constant changes in shape result in cell membrane lesions that make the cells rigid, preventing them from returning to their normal state[3]. The term sickle cell disease is most accurately reserved for the homozygous state SS that causes sickle cell anemia[4].

Oral manifestations and complications of sickle cell disease are mucosal pallor, yellow tissue coloration, radiographic abnormalities, delayed tooth eruption, disorders of enamel and dentine mineralization, changes to the superficial cells of the tongue, malocclusion, periodontitis and their high susceptibility to dental caries[5,6].

CASE REPORT

A 6-year-old child patient accompanied with her guardian reported to the Department of Pedodontics and Preventive dentistry with a chief complaint of all decayed teeth. Medical History revealed that she was a known patient of sickle cell anemia and she received multiple blood transfusions and last transfusion was done 6 months back. She was prescribed iron with folic acid suspension and multivitamin syrup on regular basis.

On Extra oral examination the patient had the Conjunctival pallor and Koilonychia suggestive of iron deficiency anemia. Evaluation of the oral soft tissues showed signs including mucosal pallor, smooth tongue, generalized gingivitis with results of the bleeding index (47%) and the plaque index (Score-2) suggestive of gingivitis enhanced by her underlying systemic problem.

Evaluation of Hard tissue examination showed presence of caries in all the primary teeth present with deep carious teeth involving 55, 65,75,74,84 and 85. Teeth missing were 54 & 52 which were extracted few months back and also decreased vertical height was observed due to carious destruction of crown structure of molars. The investigations included complete blood picture with hemoglobin of 6.3 gm. /dl, peripheral smear showing sickle shaped RBC's and Hb electrophoresis revealed Hemoglobin S. Cardiovascular system and CNS were within normal limits.

The radiographic examination was limited to the full mouth RVG in order to achieve patient cooperation and to decrease the radiation exposure as the patient showed Frankels negative behaviour. The interpretation included bony rarefaction and

loss of height of alveolar bone with bone crests rounded. All these findings are suggestive of the diagnosis of Early Childhood Caries in a Sickle cell anemia patient.

With a known history of sickle cell anemia, a dental treatment plan was developed to address the systemic problem before any oral therapy was implemented. An antibiotic prophylaxis of 50 mg/kg amoxicillin one hour prior to the dental procedure was prescribed, and consultation with her regular physician was undertaken to make sure that there were no other impediments to the dental treatment and with the constant monitoring of the physician the patient was called for further dental appointments.

Since the patient condition was stable, the treatment was started on with a dental prophylaxis, followed by excavation and review of all the caries, fluoride application and parent counselling in initial therapy. Pulp therapies were doneirt 55, 51,61,62,65,75,74,84 & 85 and extraction of 64 was done as that tooth was not restorable, all the procedures were carried out under aseptic techniques and under antibiotic coverage. Necessary precautions were taken during treatment procedure in order to avoid the initiation of sickle cell crisis.

For rehabilitation purpose specially designed Omega wire custom made post and core followed by composite (strip crown) restoration was fabricated & given irt 51, 61 & 62. Missing 52 was rehabilitated by a modified fixed custom made prosthesis where an acrylic tooth is incorporated in a wire component and this prosthesis is engaged to 51 omega loop post and core on one side and to lingual slot of 53 on another side. Space Maintainer is given irt 54 & 64 Stainless-steel crowns given with relation to 74, 75, 84 & 85. Patient was advised about future oral health care and dietary plan to promote a non-cariogenic meal plan, also instructed regarding tooth-brushing technique and tongue cleaning. Recall visits at 3-4 weekly intervals for fluoride applications and oral hygiene checks were arranged.

DISCUSSION

Sickle cell anemia presents with variable clinical manifestations with different degrees of severity that depends on the stage at which this disease is diagnosed, the patient's age, number of hospitalizations, need for blood transfusions and need for continuous drug use[7]. It is important that all clinicians are aware of the pathophysiology andoral manifestations of sickle cell anemia. Dental surgeons should carefully obtain the patient's clinical history and information about particular features so that they can plan any dental treatment such that it is appropriate to the patient's limitations and needs[4].

Sickle cell anemia may be diagnosed in the sixteenth week of gestation, but manifestations normally do not appear until the sixth month after birth. Newer techniques for hemoglobin electrophoresis can be used to diagnose the abnormal hemoglobin at birth[8]. The patient presented in this report with investigations including Complete blood picture with hemoglobin of 6.3 gm./dl, peripheral smear showing sickled RBC's and Hb electrophoresis revealed Hemoglobin S.

The dental implications of SCA must be understood fully to successfully treat SCA patients. Mucosal pallor, delayed eruption and radiographic changes are common oral findings associated with the disease (Cox and Soni 1984)[9, 10]. In the present case mucosal pallor, bony rarefaction and loss of height of alveolar bone with bone crests rounded is suggestive of SCA. Patients with sickle cell anemia are more likely to have higher DMFS scores, increased incidence of periodontal disease, or tooth loss as a result of untreated pulpal necrosis[5, 10, 11]. The child patient in this case report was diagnosed to have Early Childhood Caries which required a comprehensive dental treatment.

A particularly virulent form of dental caries is early childhood caries (ECC) which is observed in children. It is characterized by an overwhelming infectious challenge and is associated with unusual dietary practices. ECC initially presents with smooth-surface carious lesions affecting the primary maxillary incisors (PMIs). As the disease progresses, decay appears on the occlussal surfaces of the primary maxillary first molars, with subsequent

spread to other primary teeth, resulting in the eventual destruction of the primary dentition.[12,13] Such children sometimes have problems with self-esteem. Children are most afraid of losing face and being thought of as unattractive especially by their peers. The esthetic rehabilitation of deciduous anterior teeth has an important psychological impact on recovery of such patient's self-esteem.[14,15] The present case report describes the task of treating an SCA patient, having ECC with anesthetic comprehensive dental treatment.

A local anaesthetic is the preferred method for treating these patients because it does not lower the oxygenation of blood which prevents the sickle cell crisis.[16, 17] Most dental procedures produce some form of bacteraemia therefore, the SCA patient's physician should be contacted before the procedure to determine the recommended antibiotic regimen for that patient (Smith et al. 1987)[16, 17]. In the present case patient was given antibiotic prophylaxis(Amoxicillin-50 mg/kg) one hour prior to the dental procedure as prescribed by her regular physician to make sure there were no other impediments to the dental treatment.[18]

Psychosocial aspects of SCA should be part of the evaluation of the patient. Whitten and Fischhoff (1974) reported that these children are unable to keep up physically with their peers due to their inability to control the onset, frequency, or duration of crises that may be initiated by childhood games. The authors also believe that SCA patients develop a low self-esteem[11]. So taking this in to consideration, for building up her self-confidence in esthetic demands, masticatory efficiency, speech and preventing abnormal tongue habits leading to subsequent malocclusion, we opted an unique technique i.e. Omega wire custom made post and core followed by composite (strip crown) restoration irt 51, 61 & 62. Missing 52 was rehabilitated by a modified fixed custom made prosthesis where an acrylic tooth is incorporated in a wire component and this prosthesis is engaged to 51 omega loop post and core on one side and to lingual slot of 53 on another side.

Preventive dental therapy is the ideal approach for treatment of the SCA patient.[19]. Incorporate fluoride therapy and routinedental recall visits into the preventive dental treatment regimen (Rouse and Hays 1979)[11]. In the present case we advised about future oral health care and dietary plan to promote a non-cariogenic meal plan Patient was also instructed regarding tooth-brushing technique and tongue cleaning. Recall visits were planned at 3-4 weekly intervals for fluoride applications and oral hygiene checks.

CONCLUSION:

The dentist's goal should be to treat the SCA patient with a thorough understanding and knowledge of the disease, ramifications of the disease must be considered carefully before dental treatment is initiated. One of the dentist's main goals should be to achieve comprehensive dental care by instilling a positive attitude in the patient and parents toward maintaining good dental health. The dentist must be sure that SCA patients are receiving the latest preventive dental measures (e.g. sealants, fluorides, antimicrobial rinses, etc.) and should monitor preventive dental care at routine follow-up visits. Finally, team approach including the physician, dentist, and patient is vital to the successful dental management of the patient with sickle cell anemia.

This case report documents the restoration of severely mutilated deciduous teeth(ECC) in an emotionally immature sickle cell anemia patient resulting in improvement of her oral and general health by helping her gain more self-confidence.

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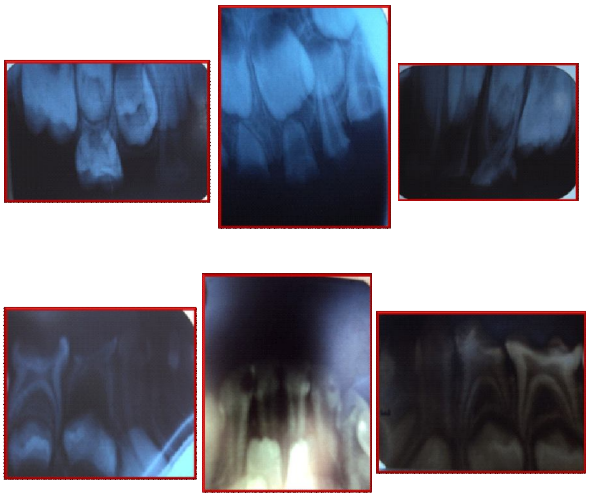
PRE-OPERATIVE RADIOGRAPHS



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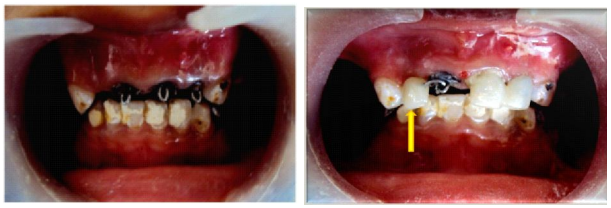

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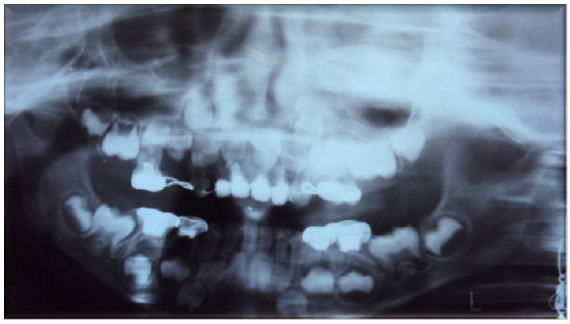

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Centuries of Periodontics

Dr. Surekha Rathod MDS, Dr. Farooque Khan Post Graduate Student**, Dr. Aruna G. MDS****

Abstract:

Periodontal diseases have afflicted humans since the dawn of history. Oral hygeine is practised since ancient times. Sushruta Samhita contains numerous descriptions of severe periodontal disease with loose teeth and purulent discharge from gingiva. The Chinese were amongst the earliest people to use the "chewstick" as a tooth pick and toothbrush .The use of Miswak is a pre-lslamic custom, which was adhered to by the ancient Arabs to get their teeth white and shiny. This custom was adopted by Prophet Muhammad (PBUH) around 543 AD. Leonard Koecker (1785-1850) described inflammatory changes in the gingiva and the presence of calculus on teeth, leading to the looseness and exfoliation of teeth. Leuwenhoek first described oral bacterial flora. Ambroise Pare (1509-1590) developed many oral surgical procedures including gingivectomy for hyperplastic gingival tissues. Years ago periodontists were divided into two camps: the Localists & the Generalists. The Localists claimed that periodontal diseases were a result of local irritational and occlusal circumstances.

The generalists said that systemic conditions were the immediate cause of periodontal disturbances. The past inabilities of generalists to pinpoint systemic causes are being overcome with the application of modern epidemiologic and clinical research approaches. Such work may lead to the identification of novel approaches for the prevention, care, and possible cure of periodontal patients. With better understanding of etiopathogenesis of periodontal diseases & advancements in the field of diagnosis & treatment of periodontal diseases, we are in a position to prevent and treat various periodontal diseases in a better way. The article reveals the history of periodontology since beginning of era till day.

Key words: Periodontology, History of periodontics, Dentistry

Introduction:

Gingival and periodontal diseases, in their various forms, have afflicted humans since the dawn of history, and studies in paleopathology have indicated that destructive periodontal disease as evidenced by bone loss affected early humans in such diverse cultures as ancient Egypt and early pre-Columbian America. The earliest historical records dealing with medicaltopics reveals an awareness of periodontal disease and the need for treatment.

Years ago periodontists were divided into twocamps: the Localists and the Generalists. The Localists claimed that periodontal diseases were a resultof local irritational and occlusal circumstances. The generalists said that systemic conditions were theimmediate cause of periodontal disturbances.Our understanding of the causes of periodontal diseases have changed greatly over time. The past inabilities of generalists to pinpoint systemic causes are overcome with the application of modern epidemiologic and clinical research approaches. Such work may lead to theidentification of novel approaches for the prevention,care, and possible cure for periodontal patients[1].

Oral hygeine in ancient times-

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Centuries of Oral & Maxillofacial Pathology

Dr. Bhagyashree Bhagwat Post Graduate Student, Dr. Prakash Gadodiya MDS***

Abstract:

Oral Pathology appears to have had its origin during the first Golden Age of Dentistry, from 1835. This era saw the establishment of organized, education-based dentistry and was integrally associated with an obvious fascination for pathologic processes and an inherent wish to share scientific and clinical knowledge with others in the dental profession. The article reveals the historical background and importance as whole.

Key words: Pathology, History of pathology, maxillofacial pathology, dentistry.

Introduction:

Oral Pathology appears to have had its origin during the first Golden Age of Dentistry, from 1835. This era saw the establishment of organized, education-based dentistry and was integrally associated with an obvious fascination for pathologic processes and an inherent wish to share scientific and clinical knowledge with others in the dental profession. It encompassed the creation of the first professorship of "Dental Pathology".

Oral Pathology as a specialty of dentistry is traditionally presumed to have its origin in the 1930s and 1940s, perhaps commencing with Bunting's Textbook of Oral Pathology, Thoma's Oral Pathology, or the first issues of the Archives of Clinical Oral Pathology, and Oral Surgery, Oral Medicine, Oral Pathology. The American Academy of Oral Pathology and the American Board of Oral Pathology were formed during this time period, preceded slightly by the first organizations devoted exclusively to Oral Pathology, the New York Institute of Clinical Oral Pathology and the American Dental Association's Registry of Dental and Oral Pathology. An even earlier landmark was Bloodgood's 1915 "everything-you-need-to-know" review of oral lesions in the second volume of the Journal of the American Dental Association.

The first professorship of "Dental Pathology", however, originated much earlier, with the 1840 establishment of the Baltimore School of Dental Medicine. The first text dedicated to Oral Pathology as we know it today was published shortly thereafter by Bond and, of course, Fouchard, Jordain, Hunter, Bell and others had reported even earlier on a variety of tooth anomalies. In reality, it appears that the mid-nineteenth century was the time of the true birth of both Oral Pathology started. This first "Golden Age" of dentistry, 1835-1860, began with dentistry "not a whit more respectable than the barber-surgeons of old times" and concluded with its establishment as an organized, science-based health profession with techniques and therapeutic successes not unlike those of the twentieth century. The face of dentistry was absolutely changed to something unrecognizable from that which came before.

Koecker, although a less influential dental surgeon, was the first professional to actually be designated a "dental pathologist" in print. He published a general text on dentistry, Principles of Dental Surgery, as early as 1822. Interest in pathology continued to grow as dentistry became a strong and independent health profession, and by 1860 many of today's well-established oral lesions had been reported in the various dental journals then publishing.

Oral pathology papers frequently begin with historical reviews of the lesion or disease under discussion, usually mentioning the first cases identified. It seemed appropriate, therefore, to document the first actual dental journal reports of such entities. The attempt to do so is considerably facilitated by the fact that American dentistry, through its free exchange of innovative technology and scientific inquiry, its journals, national organizations, and its schools of dentistry, dominated

the profession throughout the nineteenth century. Now the face of oral and maxillofacial pathology taken its turn in to modern era with its speciality in India with giving its significance in many more ways for the dentists and the society for the upliftment of disease, disorder, and treatment.

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Self Adjusting Files-Paradigm Shift in Endodontics

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Abstract:

To introduce a new concept of the self-adjusting file (SAF), discuss its unique features compared with current rotary nickel-titanium file systems. The SAF file is hollow file in form of thin cylindrical lattice that adapts perfectly to the root canal. Single file is used throughout the procedure which inserted into a path initially prepared by a # 20 K-file. Operating with a transline vibration, the file's abrasive surface gradually removes a thin uniform layer of dentin from the entire root canal surface, resulting in a canal with a similar cross-section but of larger dimensions. This holds good for canals with an oval or flat cross-section. The hollow SAF file is operated with a constant flow of irrigant activated by the vibrations and is replaced continuously throughout the procedure. It has high mechanical endurance and failure is confined to small breach in the lattice pattern.The SAF represents a step forward in endodontics that may overcome many of the shortcomings of current rotary nickel-titanium file systems.

Key Words: Canal preparation, curved root canals, endodontic files, flat root canals, micro–computed tomography scan, nickel-titanium, scanning electron microscopy, self-adjusting file.

Introduction:

The cleaning and shaping of the root canal is the key step in root canal treatment. Its aim is to remove maximum of the smear layer. For many years, it has been a common practice to enlarge the root canal to at least three ISO sizes larger than the first file to bind at the apical part of the canal. It was assumed that such preparation will remove the inner layers of the dentin while allowing the irrigant to reach the entire length of the root canal for a thorough cleaning and disinfection of the root canal space. But transportation and ledging are the major problems facedwhile achieving this goal, especially with the conventional stainless steel hand files. Rotary nickel-titanium files do this more efficiently and apparently require less operator expertise. The resulting root canal filling viewed radiographically is impressive, though the three dimensional structure of the canal is often ignored[1-,6].

The goal of cleaning and shaping may be easily and achieved with rotary files as far as root canals with a round cross-section are concerned.The same is difficult in case of oval or flat canals which are commonly found in the distal roots of lower molars, upper and lower bicuspids, and lower incisors and canines. Asymmetrical, flat, tear-shaped cross-sections are another challenge. Such canals are common in most roots that contain two root canals in the same root and a potential isthmus. This includes anterior roots of lower molars, mesiobuccal roots of upper molars, first upper bicuspids, and some lower incisors.The flat or asymmetry is in the buccolingual dimension, often missed in the radiograph(fig 1).

The results of cleaning and shaping with rotary instruments are no better with curved root canals. When the three-dimensional shape of root canals was studied using micro–computed tomography (CT) scans, rotary nickel-titanium files failed to adequately prepare all the inner surfaces of curved canals, such as those of maxillary molars(fig 2). Peters et al found that when upper molars were prepared with rotary files 43% ± 29% and 33% ± 19% of the wall of the mesiobuccal and distobuccal canals remained unchanged, respectively. The results were no better even in the larger palatal canal, which is commonly thought to be easier to clean and shape. Rotary nickel-titanium files left 49% ± 29% of the canal surface unchanged. Furthermore, the extremely high standard deviation indicates the high variability of the results; some may have been better, but some were much worse [(10).].

Another inherent problem with rotary-nickel titanium files is apical canal transportation in curved

root canals. Most file systems will adequately maintain the apical part of a curved root canal in place as far as the thin instruments are concerned. However, the larger-diameter instruments are relatively stiffer and have a tendency to remove more dentin on the outer side of the curvature of the apical area, leading to apical canal transportation. Rotary file manufacturers made many improvements, such as noncutting tips and more flexible alloys and designs, but the problem still exists. Therefore, the instructions for use usually indicate that the thicker instruments should not be applied in the apical part of a curved canal more than the absolute minimum time required for them to reach the working length; otherwise, apical canal transportation may occur [5,10,11].

Another closely related problem is straightening of the root canal at the midroot section of curved root canals. Most file systems will straighten this part of the curvature to one extent or another by removing more dentin on the inner side of the curvature. This may reduce the thickness of the remaining dentin on the inner side of the curvature to such an extent that it increases the risk of vertical root fracture or even results in a strip perforation [14].

Unexpected separation of rotary nickel titanium files was and still is the major drawback. Improvements in metallurgy, design, surface treatment, quality control, and, above all, the introduction of hands-on training, have significantly reduced the extent of this problem, nevertheless it is still with us. As opposed to stainless steel files that may give a "warning" by some distortion that appears in an abused file, usually no such macroscopic sign will appear in a rotary nickel titanium file. Furthermore, even in the era of microscope-assisted root canal treatment, a separated nickel-titanium file screwed in at the apical part of an even slightly curved canal is much more difficult to remove than a similar segment of a stainless steel file.

Design Of SAF: The SAF is a hollow file designed as a compressible, thin-walled pointed cylinder either 1.5 or 2.0 mm in diameter composed of 120-ìm-thick nickel-titanium lattice (fig 3A). The 1.5-mm file may easily be compressed to the extent of being inserted into any canal previously prepared or negotiated with# 20 K-file (fig 3B). The 2.0-mm file will easily compress into a canal that was prepared with a #30 K-file. The file will then attempt to regain its original dimensions, thus applying a constant delicate pressure on the canal walls. When inserted into a root canal, it adapts itself to the canal's shape, both longitudinally and along the cross-section (fig 3C). In a round canal, it will attain a round cross-section, whereas in an oval or flat canal it will attain a flat or oval cross-section, providing a three-dimensional adaptation. The surface of the lattice threads is lightly abrasive (fig 3D), which allows it to remove dentin with a back-and-forth vibrating motion.

The SAF is operated with transline (in and out) vibrating handpieces with 3,000 to 5,000 vibrations per minute and amplitude of 0.4 mm. Such a hand piece may be the KaVoGENTLE power or equivalent combined with either a 3LDSY head (360° free rotation; Kavo, BiberachRiss Germany(fig 4)) or MK-Dent head (360° free rotation; MK-Dent, Bargteheide, Germany) or RDT3 head (80 rpm when free and stops rotating when engaging the canal walls, recently developed by ReDent-Nova, Ra'anana, Israel). The vibrating movement combined with intimate contact along the entire circumference and length of the canal removes a layer of dentin with a grinding motion.

The hollow design allows for continuous irrigation throughout the procedure, flow rates of 1 to 10 mL/min. The SAF is inserted into the canal while vibrating and is delicately pushed in until it reaches the predetermined working length. It is then operated with in-and-out manual motion and with continuous irrigation using two cycles of 2 minutes each for a total of 4 minutes per canal. This procedure will remove a uniform dentin layer 60- to 75-ìm thick from the canal circumference (Fig.5A & B). The SAF file is designed for single use [15].

Adapts Itself to the Three-Dimensional Anatomy of Root Canals: The SAF file is different from any current nickel-titanium rotary file. Most rotary file systems will find the widest part of the canal and gradually

machine it, using several files of increasing diameter, to a wider canal with a round cross section. If the canal happens to be relatively narrow, the whole original canal may be included in the preparation. However, if the canal is flat, oval, tear shaped, or simply large, this mode of preparation may leave untreated recesses, mainly buccally or lingually to the machined part of the canal.

Uniform Removal of Dentin and Remaining Wall Thickness: When operated in flat root canals, rotary nickel-titanium files may result in uneven thickness of the remaining dentin wall. In places in which the round bore has been created, the remaining dentin will be thinner in the mesial and distal aspects than in the untreated areas . When excessive apical preparations are used in an attempt to include as much of the irregular canal space in the preparation as possible, the uneven thickness may be even more pronounced. This uneven thickness of the remaining dentin wall may be a predisposing factor for vertical root fractures. On the other hand, the SAF removes a uniform layer of dentin from the canal walls, thus resulting in a relatively uniform remaining dentin wall thickness and avoiding the previously mentioned risk[16,17].

Prevention of Canal Transportation: The SAF file is extremely flexible and pliable. It does not impose its shape on the canal but rather complies with its original shape. This is true both circumferentially and longitudinally. The long axis of the apical part of curved canals is kept closer to its original place than reported for rotary files: a mean center-of-mass shift of 68.8 ± 7.7 ìm compared with the shift of 120 to 135 ìm previously reported by Peters et al with rotary files in similar canals. In curved canals, the thicker rotary nickel-titanium files have a tendency to transport the canal to the outer side of the curvature. When the SAF is used to enlarge the canal to similar dimensions, it tends to keep the apical part of curved canals closer to its original location [10].

High Durability: The SAF file is extremely durable and may go through rather severe abuse before a mechanical failure will occur. It does not have a core as do other nickel-titanium instruments. Any strain applied to it is distributed along many of its delicate parts, and the total endurance is a function of the accumulated endurance of each of these individual parts. Breakage is seen as a breach in the ni-ti lattice pattern and no separation of a fragment as seen in the conventional and rotary Ni-Ti files.[15](fig6).

Removal of the Smear Layer in the Apical Part of the Canal: The smear layer should be removed in order to allow intimate, unobstructed contact of antibacterial agents with bacteria at the orifices of dentinal tubules and also to optimize the sealer's adaptation to the canal walls and thus prevent the future formation of a gap between them. A final wash with a chelating agent such as EDTA or citric acid has recently become widely used to remove the smear layer before obturation. Nevertheless, scanning electron microscopic studies indicate that the removal of the smear layer and ultramicroscopic debris in the apical third of the canal using either a syringe and a needle or a chelator paste leaves much to be desired[25,26,27].

When 3% sodium hypochlorite and 17% EDTA were used as alternating irrigants with the SAF file, the root canal surface (including its apical third) was rendered clean of debris and the smear laye(fig 7). This may be attributed to both the effective continuous replacement of the chelator in the apical region and to the mechanical vibrating action of the SAF in this region. This combination results in a cleaner apical canal surface than most other reported methods can achieve [23,28,29,30,31]..

Removal of the smear layer: The SAF was operated for two cycles of 2 minutes with a continuous flow of 5% sodium hypochlorite during the first minute of each cycle and 17% EDTA during the second minute. This was followed by a 0.5-minute EDTA flush through a passive SAF and a final short flush with sodium hypochlorite to remove the EDTA.

Root Canal Obturation: Root canal obturation of SAF-prepared root canals may be done by any of the common methods (fig 8). Adaptation to the canal walls is possible even in flat canals because of the thorough cleaning of the otherwise difficult to clean recesses. Obturation using lateral compaction using

chloroform-dipped customized master cones is of particular interest because it allows the operator to actually visualize the shape of the SAF-treated root canal as reproduced on the customized master cone. It is evident that the apical part of the preparation is far from being round in the cross-section but rather represents the enlarged 3D shape of the canal. It is also clear that if a standardized master cone is used to gauge the prepared canal size, it may provide rather limited and misleading information [3, 32].

*Cases done using SAF.(Fig 9)

Discussion: Self Adjusting files are a paradigm shift in endodontics which promises better quality treatment using an unique operating system. It promotes the 'minimally invasive technique' where the operator can give provide complete treatment with minimum harm to the patient.It is a hollow, thin walled cylinder with asymmetrical tip.It is the first endodontic file with no solid core which adapts perfectly to the canal anatomy by taking the shape of the canal.Its sand paper like surface gives complete and efficient removal of the dentin.The file works with continuous flow of irrigants. Thus it's a complete cleaning-shaping-irrigating system.

In addition to its effective cleaning and shaping, the system also overcomes the drawbacks of conventional and rotary Ni-Ti files. This file because of its asymmetrical head passes smoothly in 'c' shaped canals hence preventing the ledge formation, canal transportation and perforations. Thus, Self Adjusting File System truly is a paradigm shift in endodontics.

Conclusion: The self adjusting file represents a new approach in endodontic file design and operation. Its main features include three-dimensional adaptation to the shape of the root canal, a hollow core, an asymmetrical tip and continuous irrigation .One file is used throughout the procedure, during which it changes from an initially compressed form to larger dimensions.Canal straightening and canal transportation of curved canals are largely avoided because of the lack of a rigid metal core. The file does not have "a will of its own."Its high mechanical durability overcomes the issue of instrument separation commonly encountered in nickel-titanium instruments.

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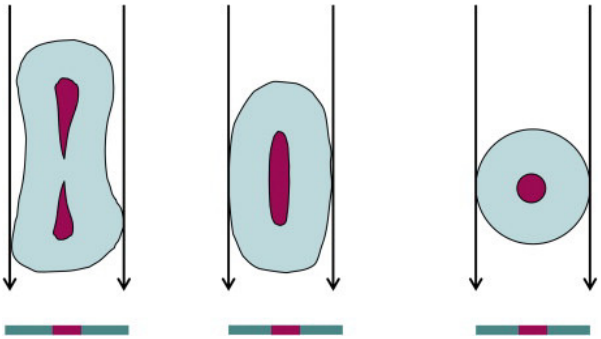

Fig. 1

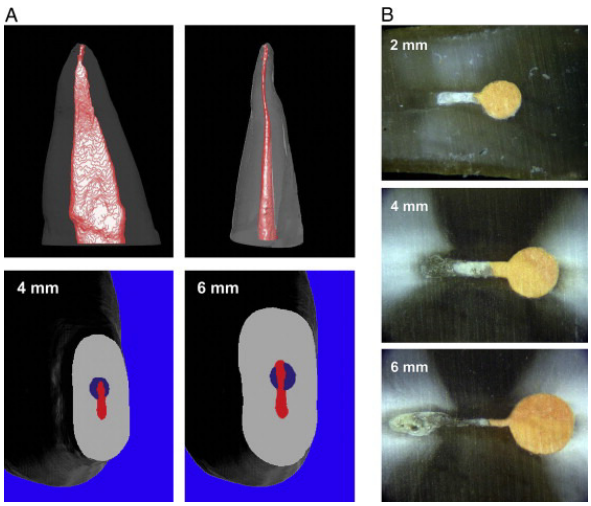

Fig. 2

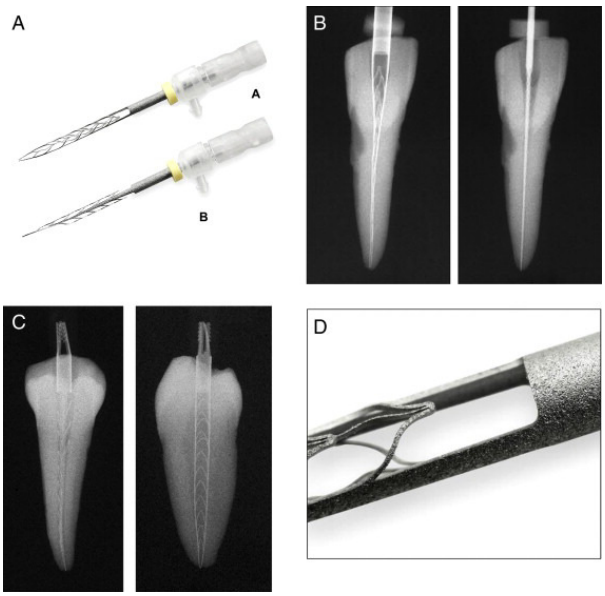

Fig. 3A, 3B, 3C, 3D

Fig. 4

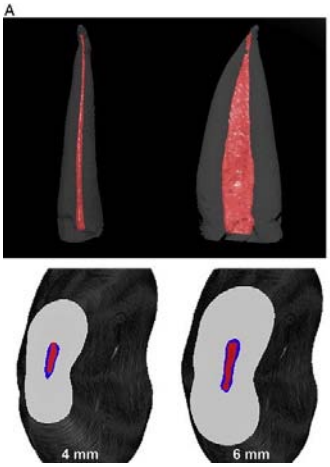

Fig. 5A, 5B

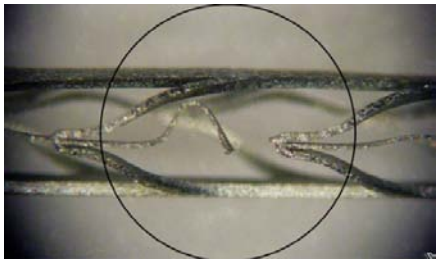

Fig. 6

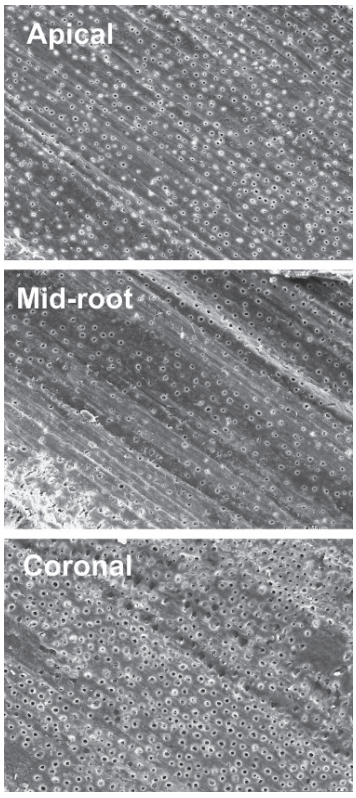

Fig. 7

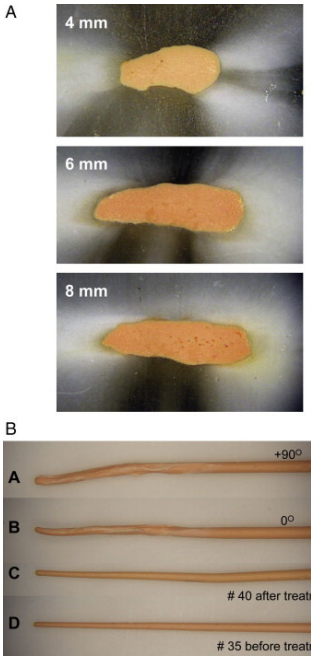

Fig. 8A, 8B

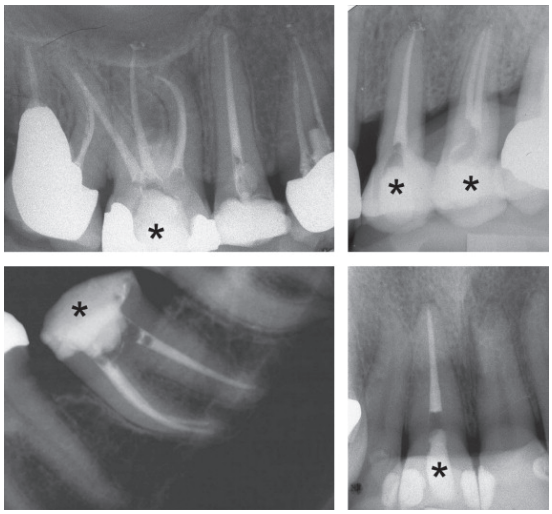

Fig. 9A, 9B, 9C, 9D

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