TAPER

Journal of Indian Dental Association Thiruvalla

Volume: 6 Issue:1 December 2022

www.idathiruvalla.org

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Editor's Message

Dear Friends & Colleagues,

All the world's a stage,
And all the men and women merely players;
They have their exits and their entrances,
And one man in his time plays many parts

Being the editor of TAPER, the Journal of the Indian Dental Association , Thiruvalla Branch for this year has been a part that I have donned with pride.

. The journal through the years has evolved to its current form and as the editor I ponder if in today's era of information overload a journal may still find relevance, hence this year Taper brings to you along with review articles and case reports, a new section of Practice oriented articles like Product Review, legal viewpoints and some snippets.

Special thanks and appreciation to **Master. Levin Lanu,** son of our members Dr Sherin & Dr Lanu for the image for the **cover page.**

A robust team headed by our dear president Dr Reji Thomas and secretary Dr Thomas Jacob has really made my work lighter. Gratitude to all the authors for their contributions and timely responses. Thank you dear friends once again to have reposed confidence in me and given me this opportunity.

I remain.

Dr Subbalekshmi
Editor, Taper

President's Message

My dearest friends and colleagues,

As always it is an honour to write a few words to you readers as you prepare to browse through this volume 'TAPER ', Journal of Indian Dental Association Thiruvalla .

This year Every program, every activity we had undertaken has been a roaring success thanks to our member's enthusiasm good spirit and cooperation. This year we were able to conduct 10 CDE in which two mega CDE of Dr Gopikrishna and Dr Shail jaggi and 13 CDH programs including Vikas school project. Dec 3rd we are inaugurating a free dental clinic at Gilgal Aswasabhavan Eraviperoor.

This year IDA thiruvalla had released two major public Awareness videos Our WDC hosted International Women's Day IDA Kerala State program on March 8th honouring three eminent women in our society which was attended by 100 members.

My special mention and appreciation to all sports activities this year and the participation of our members is highly commendable. We had conducted 6 offline executive and nine online executive meetings. I would like to express my special appreciation to our Hon. Secretary, Dr. Thomas jacob who ensured the smooth functioning of our association. My heartfelt thanks to all the participants of chilamboli , especially Dr Abhilash and Dr Emil . Congratulations to winners Dr Drisya, Dr Emil ,Dr Kuleena,Master Levin Lanu and all the participants.

Last but not the least, my commendation to the Editor, Dr. Subbalekshmi for releasing out this issue

Before I sign off, I once again express my sincere gratitude to all of you for your immeasurable help and support.

Thank you

Dr Reji Thomas

President

IDA Thiruvalla

SECRETARY'S MESSAGE

Dear colleagues

Warm regards from IDA Thiruvalla branch office

It's really an honour to be able to connect with all through our journal TAPER as the Hon:Secretary of this branch. During the last year we were slowly recovering from the damages caused by the pandemic to our professional,social and personal life.

As the secretary of this branch I foresee a lot of challenges ahead especially to continue with the activities on a regular basis and also to introduce newer ideas and ensure their implementation.

As the saying goes when the going gets tough the tough get going. I am sure we will overcome all these obstacles. We always have and should have difference of opinion amongst ourselves as a democratic organization but when we are able to overcome them in mutual agreement and in the right spirit it truly reflects our urge to work in unison for the betterment and excellence of our members and profession.

Our journal TAPER has been doing well since its inception. Thanks to all the past editors and editorial boards. This year also our editor Dr. Subbalekshmi and the editorial Board have been performing the herculean task of raising the bar of our journal. Congrats and keep up the good work.

To conclude let me remind our members that the branch office seeks your support, co-operation and guidance in our efforts to take the association to greater heights and help realise the aspirations of budding dentists.

Thank you

Dr. Thomas Jacob

Hon: Secretary

IDA HOPE (Help Offered to Professionals in Emergencies)

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Dr Saji Kurian
Hope representative
IDA Thiruvalla

Clinical Perspective

Beyond Failures

Dr Priya Rajendran
Private Practitioner

A success rate of 100% to any treatment is an ideal, one that we can only aspire for. Having said that, it becomes our ethical and moral responsibility to maintain our attempts towards perfection. It is only in the pursuit of perfection, that we can hope to achieve excellence.

In the context of Root canal treatment, an 85% probability of success has been cited in literature. The question to ourselves here is, are we there, beyond or short of it (*you may well ignore the pun*)!

It would be fool hardy to try and understand why every case that fails, does so. The focus of this article is therefore, quite practical, namely the most common and avoidable causes for failure of RCTs. Ironically, it is often because one "***over"does*** it:

"***Over"look***, "***Over"use***, "***Over"work***.

Overlooking the obvious (at times, not so obvious)

A tooth with deep carious/abrasive lesion that involves the pulp is indicated for RCT. Also a tooth that has sustained acute or chronic trauma. Therefore, when examining a patient we subconsciously look for only these. Of these, the most tricky by far are proximal lesions that don't show up occlusally, deep craze lines from chronic occlusal trauma, and caries beneath apparently healthy PFM crowns. Radiographs help, but only when you know what you're looking for. Like they say, the mind and the umbrella are similar- both work only when they are open. So instead of looking at the teeth with a set prejudice formed from the patient's described symptoms/history, examine systematically. Even when the obvious problem is on an anterior tooth, it won't hurt to palpate the TMJ. For all you know, you may catch that cuspal fracture forming from the misguided occlusion.

Apart from diagnosis, an open attitude is needed from an intra-operative point of view too. No one said the upper molar cannot have more than three roots. Or what you have found is the only canal in that mandibular incisor. As far as root canal anatomy is concerned, there are only probabilities and guidelines. No hard and fast rules, no norms. Here again, radiographs help, but interpreting them needs patience. Lots of it.

The message: take your time; confirm; double-check.

Overuse is almost abuse

Did you know that every one of those endodontic rotary instruments (and most of the

hand instruments) are intended for a single use? Well, as a race that reuses disposable cups and containers, disposing something as expensive as NiTi after one use would qualify as a sin!

Like we said at the start, let's be practical here. For every rotary file, set a maximum of 4-6 cases, depending on complexity of the anatomy. If it has negotiated a curvature in two planes, discard immediately. Make use of the 'petals' provided by the manufacturer, or simply make a mark with your diamond on the shank to designate number of uses. Also, do inspect your hand files and discard once the flutes are unwinding.

The message: balance economy versus efficiency

Overwork - extra isn't always good

Using a file (especially a rotary file) for too long within the canal doesn't do any good. An instrument need linger at the apex for no longer than a couple of seconds at a go. One might want to repeat after some irrigation, but the total time shouldn't exceed seconds in single digits. The longer you cut, the more you remove dentin, the more you distort the apical anatomy, the more impossible it is to get a seal afterward.

One should also fight against the natural tendency to exert apical pressure, particularly when the file has engaged and won't advance. Feather touch, brush stroke, pecking moves are all fine. Anything but forcing your way forward.

In an attempt to eliminate even that last bacterium, one might want to go right upto the apex as seen in the radiograph. Bad idea. A little short is excusable, beyond is disaster. Here I'm citing more from experience than literature.

The message: sometimes less is enough.

All this doesn't ensure that failures won't happen. They do. We ***learn***. We ***improve***. We ***evolve***.

Case Report

ENAMEL CONTOURING – A CASE PRESENTATION

Dr. K.N. THOMAS BDS, PG (Cert) Aesthetic Dentistry

Private Practitioner

Introduction

Enamel contouring is an important adjunct to composite bonding, composite veneering, crowning or any other treatment designed to make the teeth look better. In fact, the procedure is indicated to some degree in almost every patient who wants to achieve the best smile possible.

Indications

Alteration of tooth structure

The most frequent use of enamel contouring is in the reshaping of fractured, chipped, extruded or overlapped teeth to give them a more pleasing appearance. Reshaping and repolishing chipped incisal edges decreases the chance of additional fracturing.

Minor orthodontic problems

Enamel contouring is a recommended treatment in patients with slightly crowded anterior teeth. These teeth usually can be reshaped to create an illusion of straightness.

Bruxism

Makes the anterior teeth wear evenly across the front, producing sharp angular edges which may be considered masculine. In women the teeth can be reshaped by rounding the corners to make the lateral and central incisors look more feminine.

Contra Indications

Hyper sensitive teeth: - If a patient usually a child or adolescent, complaints that the tooth is sensitive, it is better to defer enamel contouring until the tooth becomes or can be made less sensitive. The patient should be encouraged to have orthodontic treatment.

Large pulp canals: - Young people with extremely large pulp chambers and pulp canals are poor candidates for enamel contouring, because of the possible

discomfort during the procedure and sensitivity afterward.

Thin enamel:- Enamel contouring should be avoided in patients with overlapping incisors where proximal reduction might create translucency or expose dentin .

Deeply pigmented stains that would require extensive reduction to eliminate or lighten should be treated with Restorative procedures.

Periodontal involvement: Enamel contouring is not the line of treatment.

Susceptibility to caries: As the enamel is made thinner a tooth could be more susceptible to caries.

Large Anterior Restoration:- Large composite or other anterior restorations may limit the amount of contouring that can be done.

Extensive anterior crowding or occlusal disharmony enamel contouring cannot be done.

CASE PRESENTATION

Chief complaint

Patient complains slight overlapping of left central incisor on right central incisor.

History

Patient gives history of orthodontic treatment before three years. She used Retention plate for a year. Patient noticed overlapping of central incisors, a few months back.

Diagnosis : This is a good case for creating special effects of illusion. On close observation, the mesiolabial and distolabial line angles on right central incisor are parallel, while on left central incisor line angles appear diverging. (Line angle is junction of two surfaces where light reflection is seen)

Treatment plan : Enamel contouring is the line of treatment. It can be done using enamel contouring kit.

Procedure

- Make an impression of maxillary arch.

- Diagnostic model is prepared.
- With Alcohol marking pen, mark the areas to be contoured on the model.
- After confirmation similar markings are made on patient's tooth.
- Selective grinding is done with red ringed diamond bur.
- Smoothening of marks created by diamond bur is done with green or white stone.
- Be cautions not to remove the entire enamel, a thin layer should be left covering dentin.

Post treatment care: Antisensitivity paste should be prescribed. Paste like enafix for enamel remineralisation is advisable.

Post operative picture

Conclusion

On observation, Mesial and Distal line angle of Right Central lncisor and Left Central lncisor are equal. This creates a visual illusion that Overlapping of Left Central over Right Central is corrected.

Reference :

Esthetics in Dentistry – Ronald Goldstein DDS

Product Review

ENDOACTIVATOR : A PRODUCT REVIEW

Dr Annie Beena Thomas

Private Practitioner

DESCRIPTION

The Endo activator from DENTSPLY MAILLEFER is a sonic device that uses cavitation and acoustic streaming to activate irrigation solution to assist in debridement and the disruption of the smear layer and Biofilm in the root canals during Endodontic therapy.

Product information

- Brand –Dentsply
- Manufacturer-Dentsply
- Powersource- Battery powered
- Colour – White Blue
- Item weight- 250 gms
- Length – 10 cms

Parts of an Endo activator

1. Hand piece
2. Non cutting polymer tips
3. Barrier sleeves

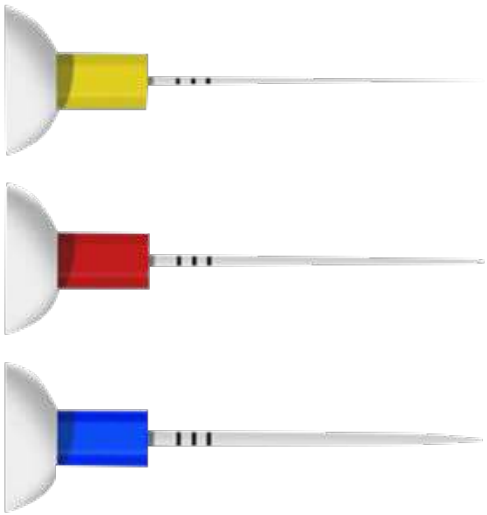
Hand Piece :-

- It is cordless and built for user comfort with a contra angled design for easy access to the posterior teeth.
- It is battery operated , Has an on/ off switch .
- It comes in white- blue colour.
- It is light weight.
- It has 3 – speed sonic motor provides options of 2000,6000 and 10000 cpm.

(Image Source : https://images.dentalkart.com/media/catalog/product/d/e/dentsply-endo-activator-system-kit_1.jpg)

Non cutting POLYMER TIPS :

- The tips are made of Flexible medical grade polymer.
- Length of polymer tips -22mm and have depth gauge rings at 18 mm,19,, and 20mm. Comes in three sizes and colour coded by size.
- 1 small – Yellow (15/02)
- 2 Medium –Red colour (25/04)
- 3 Large – Blue colour (35/04)
- These tips can be easily snapped on and off.



(Image Source: https://thedentalmaterialshop.com/wp content/uploads/2019/12/cq5dam.web_.1280.1280.png)

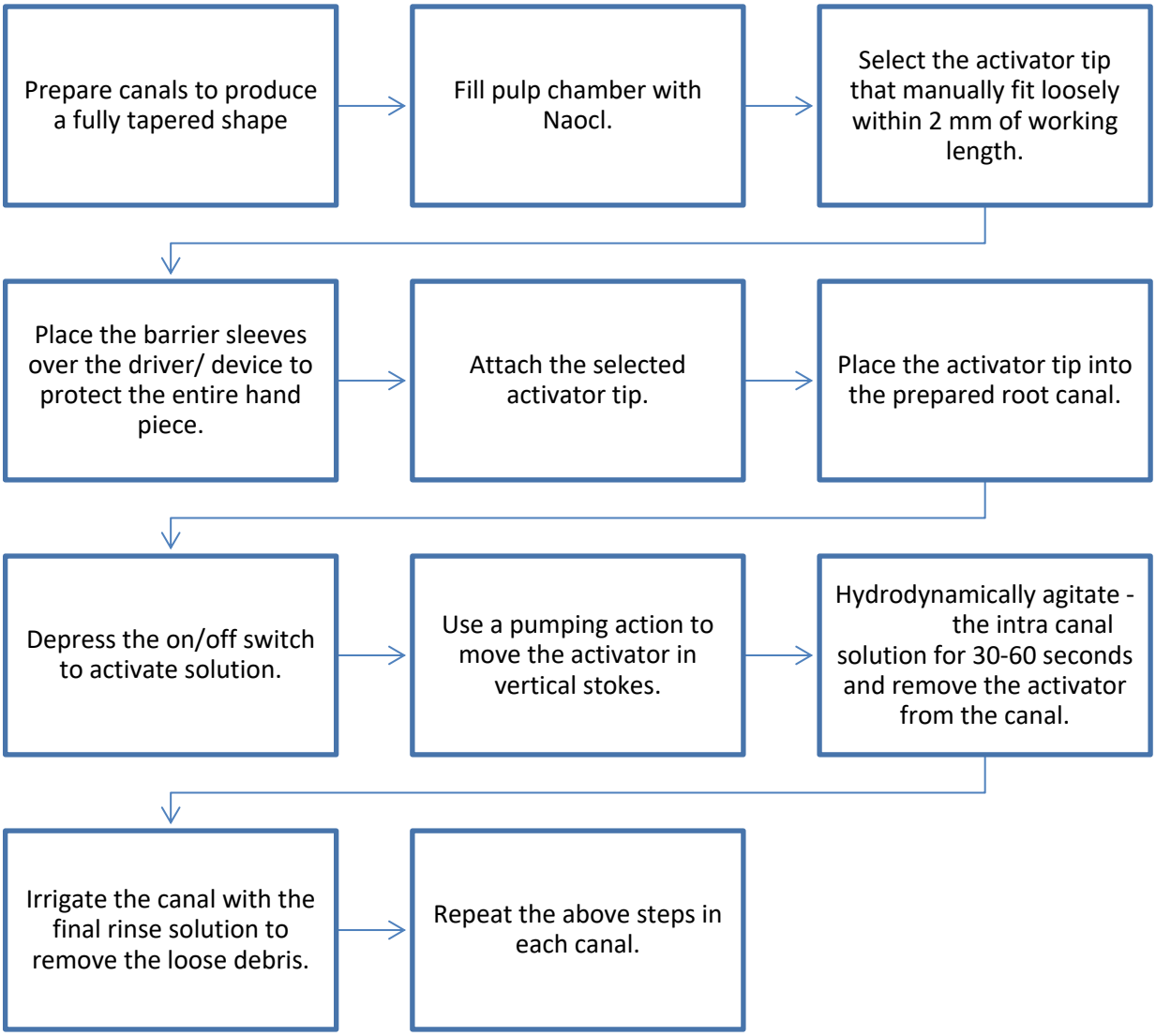
Use

The cordless , light weight, contra angled Endo Activator is easy to use.

Once the shaping and cleaning of root canals are over ,fill the canals with sodium hypochloride irrigating solution and activate the solution by inserting the Endoactivator into the root canals.

Debridement of root canals supported by sonically and ultrasonically activated irrigation is superior to passive needle application of irrigants. It debrides the canals and remove the smear layer and disrupts the biofilm especially from the apical region of a prepared root canal and cleans lateral canals, fins,webs and anastomoses in the root canal system.

Technique sequence



Conclusion

Overall the Endoactivator system is effective and easy to use and ergonomically well designed.

For Further Details on product Scan QR code

Review Article

Consumer Protection Act – A Boon Or Bane For Medical Practitioners

Dr. Zubin Cherian, B.D.S; L.L.B

ABSTRACT

The Consumer Protection Act is a milestone in the history of socio economic legislation to protect the interest of consumers in India. With the advent of Digital Age, a new era of commerce and digital branding came into existence. This led to the emergence of new challenges in the area of consumer protection. In order to address these challenges faced by consumers, the Parliament has enacted a new Consumer Protection Act, 2019. This article aims to create awareness among medical and dental practitioners regarding various aspects covered under the Consumer Protection Act, 2019.

Key Words : Consumer Protection Act (CPA), complainant, complaint, consumers, deficiency, service.

INTRODUCTION

The new Consumer Protection Act was passed by the Parliament in 2019. It came into force on July 2020 and replaced the Consumer Protection Act, 1986. The objective of the present legislation is to provide protection to the interest of consumers. The Act aims to align the existing consumer protection laws to new trade practices such as e-commerce. In order to make justice more accessible to the consumer, the Act as now enabled the consumer to file the complaints at the place of his or her location. The pecuniary jurisdiction of the Consumer Dispute Redressal Commissions have been increased. For speedy settlement of the consumer disputes, provision for a mediation cell has been included as part of the Consumer Dispute Redressal Commissions in the Act. The Act also provides for establishment a Central Consumer Protection Authority. The Act has also included provision for liability of product manufacturers and service providers.

SALIENT FEATURES OF T HE CONSUMER PROTECTION ACT, 2019.

The Act has widened the definition of 'consumer'. According to this Act, a consumer is any person who avails the services and buys any goods for his/her own use. However, if a person buys any

goods or avails any service for resale or commercial purposes, he/she is not considered a consumer. This definition covers all types of transactions ie. offline and online transactions through teleshopping, direct selling or multilevel marketing. The Act is applicable to all the products and services, until or unless any product or service is specifically debarred out of the scope of this Act by the Central Government.

Central Consumer Protection Authority (CCPA)

The Act provides for the establishment of the Central Consumer Protection Authority (CCPA) as a regulatory authority. The function of the CCPA is to protect, practices, misleading advertisements and violation of consumer rights. The CCPA have the powers to take suo-moto actions, recall products, order reimbursement of the price of goods/services, cancel licences, impose penalties and file class-action suits. The CCPA will also have an investigation wing to conduct independent inquiry or investigation into consumer law violations. The CCPA may impose a penalty on a manufacturer or an endorser, for a false or misleading advertisement. The CCPA also has the power to sentence them to imprisonment.

Consumer Disputes Redressal Commissions (CDRCs)

The Act also provides for the establishment of Consumer Disputes Redressal Commissions (CDRCs) at the national, state and district levels to entertain consumer complaints. The CDRCs will entertain complaints related to overcharging or deceptive charging, unfair or restrictive trade practices, sale of hazardous goods and services, which may be hazardous to life, sale of defective goods or services. According to the Consumer Disputes Redressal Rules, there will be no fee for filing cases up to Rs.5 lakhs. The Act also provides flexibility to the consumers to file complaints with the jurisdictional Consumer Disputes Redressal Commission located at the place of residence or work of the consumer. In the earlier Act, the consumer had to file a complaint at the place of purchase or where the seller has its registered office address.

Concept of Product Liability

The Act has introduced the concept of product liability. According to this concept, a manufacturer or product service provider or product seller will now be responsible to compensate for injury or damage caused by defective products or deficiency in services. The term, ‘product

seller' would also include e-commerce platforms.

Alternate Dispute Resolution Mechanism

The Act provides for mediation as an Alternate Dispute Resolution mechanism. A complaint may be referred by a Consumer Dispute Redressal Commission for mediation, wherever there is scope for early settlement exists and parties agree for it. There will be no appeal against settlement through mediation.

Unfair Trade Practices

The Act has empowered the authorities to take action against unfair trade practices as well. The Act has given a broad definition for unfair trade practices. Unfair trade practices now includes the sharing of personal information given by the consumer in confidence unless such disclosure is made in accordance with the provisions of any other law within its ambit.

Central Consumer Protection Council

The Consumer Protection Act empowers the central government to establish a Central Consumer Protection Council, which will act as an advisory body on consumer issues. The Central Consumer Protection Council would be headed by the Union Minister of Consumer Affairs, Food and Public Distribution, with the Minister of State as Vice-Chairperson and 34 other members from different fields. The council has a three-year term. A minister-in-charge of consumer affairs from two states from each region – North, South, East, West and North-eastern region is also included in this council. There is also a provision for having working groups from amongst the members for specific tasks.

BENEFITS OF THE ACT FOR THE CONSUMERS

The present legislation helps the consumers in protecting their right through its various rules and provisions. The new Act will help the consumers in safeguarding their interests and rights, especially against unfair trade practices and unethical business practices. The Act also enables regulations to be notified on e-commerce and direct selling with a focus on the protection of interest of consumers. This would prevent the unfair trade practices that are employed by the e-commerce platforms. Another important feature of the Consumer Protection Act is that under this Act the cases are to be decided in a limited time period.

Liability on Endorsers

The Act also fixes the liability on the endorsers for making false claims. This would prevent the consumers from being influenced by the celebrities acting as brand ambassadors. The Act would now force the endorsers to take the onus and exercise due diligence to verify the veracity of the claims made in the advertisement to refute liability claims. The Act also has incorporated an exclusive product liability provisions. This will deter manufacturers and service providers from delivering defective products or deficient services. This would safeguard the consumer from falling prey to unfair trade practices adopted by the manufacturers.

Provision for Mediation

Another noteworthy aspect of the Consumer Protection Act is the provision for mediation. The Act provides statutory recognition to mediation process. This will make the process of dispute adjudication simpler and quicker and also provide a better mechanism for disposal of consumer complaints in a speedy manner. This would help in the disposal of a large number of pending cases in the consumer courts across the nation.

Enhanced Pecuniary Jurisdiction

The Act has enhanced the pecuniary jurisdiction of Consumer Dispute Redressal Commissions. The Act also enables the filing of complaint from any jurisdiction and it also provides for hearing parties through video conferencing. All these measures will help to reduce the inconvenience and harassment for the consumers. These measures would also help to simplify the process of consumer grievance redressal and dispute resolution mechanism.

JURISDICTION OF CONSUMER DISPUTE REDRESSAL COMMISSIONS

The Consumer Protection Act, 2019 has enhanced the pecuniary jurisdiction of Consumer Dispute Redressal Commissions. The Act provides for the establishment of Consumer Dispute Redressal Commissions at the national, state and district level to entertain consumer complaints. The jurisdiction of Consumer Dispute Redressal Commissions are summarized below:-

a) **District Commission** : The District Commission has the jurisdiction to entertain complaints where the value of the

goods or services paid as consideration does not exceed one crore rupees.

b) **State Commission** : The State Commission has the jurisdiction to entertain complaints where the value of the goods or services paid as consideration, exceeds Rupees one crore but does not exceed Rupees ten crore. The State Commission can also entertain complaints against unfair contracts, where the value of goods or services paid as consideration does not excess ten crore Rupees.

The State Commission can hear appeals against the orders of any District Commission within the state. The State Commission can call for the records and pass appropriate orders in any consumer disputes which is pending before or has been disposed by any District Commission within the state in cases where such District Commission has exercised a jurisdiction not vested in it by law, or has failed to exercise a jurisdiction so vested or has acted in exercise of its jurisdiction illegally or with material irregularity.

The State Commission has the power to transfer any complaint pending before a District Commission to another District Commission within the state if interest of justice so requires either on the application of the complainant or of its own motion.

c) **National Commission** : The National Commission has the jurisdiction to entertain complaints where the value of the goods or services paid as consideration exceeds Rupees ten crore. The National Commission can also entertain complaints against unfair contracts, where the value of goods or services paid as consideration exceeds ten crore rupees.

The National Commission can hear appeals against orders of State Commission and the Central Consumer Protection Authority. The National Commission has the power to call for records and pass appropriate orders in any consumer dispute which is pending before or has been decided by any State Commission in cases where such State Commission has exercised a jurisdiction not vested in it by law or has failed to exercise a jurisdiction so vested, or has acted in the exercise of its jurisdiction illegally or with material irregularity.

The National Commission shall have the power to review any of the order passed by it if there is an error apparent on the face of the record, either of its own motion, or an application made by any of the parties within thirty days of such order.

APPEAL AGAINST ORDER OF NATIONAL COMMISSION

Any person aggrieved by an order issued by the National Commission may prefer an appeal against such order to the Supreme Court within a period of thirty days from the date of the order. The Supreme Court may even entertain an appeal after the expiry of the said period of thirty days if it is satisfied that there was sufficient cause for not filing it within that period. However, no appeal by a person who is required to pay any amount in terms of an order of the National Commission shall be entertained by the Supreme Court unless that person has deposited fifty per cent of that amount in the manner as may be prescribed.

FINALITY OF ORDERS

Every order of a District Commission or the State Commission or the National Commission as the case may be shall be final if no appeal has been preferred against such order.

LIMITATION PERIOD

The District Commission, the State Commission or National Commission shall not admit a complaint unless it is filed within two years from the date on which the cause of action has arisen. However, if the complainant satisfies the District Commission, the State Commission or National Commission, as the case may be, that he had sufficient cause for not filing the complaint within the specific period, then a complaint may be entertained after the period specified.

However, no complaint shall be entertained unless the District Commission, the State Commission or National Commission, as the case may be, records its reason for condoning such delay.

ENFORCEMENT OF ORDERS OF DISTRICT COMMISSION, STATE COMMISSION AND NATIONAL COMMISSION

Every order made by a District Commission, State Commission or the National Commission shall be enforced by it in the same manner as if it were a decree made by a court in a suit before it.

PENALTY FOR NON-COMPLIANCE OF ORDER

Whoever fails to comply with any order made by the District Commission, the State Commission or the National Commission shall be punished with

imprisonment for a term which shall not be less than one month, but which may exceed to three years, or fine which shall not be less than twenty-five thousand rupees but which may extend to one lakh rupees or with both.

HEALTH CARE SERVICES COVERED UNDER CONSUMER PROTECTION ACT

In an important landmark case, Indian Medical Association v. V.P. Shantha, the Supreme Court held that healthcare services are not excluded from the ambit of the Consumer Protection Act. The court held that the definition of service is wide enough to include "services of any description" As a result of this judgment, medical profession has been brought under the ambit of Consumer Protection Act. The following categories of doctors/hospitals are covered under this Act:

a) All medical/dental practitioners doing independent medical/dental practice unless rendering only free service.

b) Private hospitals charging all patients.

c) All hospitals having free as well as paying patients and all the paying and free category patients receiving treatment in such hospitals.

d) Medical/dental practitioners and hospitals paid by an insurance firm for the treatment of a client or an employee.

It exempts only those hospitals and the medical/dental practitioners of such hospitals which offer free service to all patients.

Even in the recent case, Medicos Legal Action Group v. Union of India (Public Interest Litigation No. 58 of 2021, decided by Bombay High Court on Oct. 25, 2021), the Supreme Court has affirmed the Bombay High Court verdict which held that doctors and healthcare service providers are covered under the ambit of the Consumer Protection Act, 2019.

CONCLUSION

The Consumer Protection Act, 2019 is a benevolent social legislation that lays down the rights of the consumers and provides for the promotion and protection of the rights of the consumers. The main object of the legislature in the enactment of this Act is to provide for the better protection of the interests of the consumer and also to make provisions for establishment of consumer councils and other authorities for settlement of consumer disputes. Though the Consumer Protection Act, 2019 is a consumer

specific legislation designed to provide for speedy and inexpensive remedy to the consumer, its awareness among is not adequate. Hence, there is a need to raise the awareness among health professionals about consumer protection laws, so that there is an increased professional concern about the welfare of patients. There is also a need to ensure that medical practice conforms to the welfare of patients.

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Clinical Update

BRONJ- A CLINICAL UPDATE

DR Nidhin R S*, Dr Akhilesh Prathap

***Post graduate Student, Pushpagiri College of Dental Sciences**

INTRODUCTION

Bisphosphonates are a class of drugs that prevent the loss of bone density, used to treat osteoporosis and similar diseases. They are the most commonly prescribed drugs used to treat osteoporosis. They are called bisphosphonates or diphosphonates because they have two phosphonate ($PO(OH)_2$) groups. Bisphosphonates (BPs) are the drug of choice for osteoporosis, hypercalcemia of malignancy, bone metastasis of solid malignant tumors, and Paget's disease of the bone [1]. However several incidences of osteonecrosis of the jaw occurred secondary to bisphosphonate therapy [2]. Bisphosphonates are classified into nitrogen- and non-nitrogen-containing bisphosphonates. The non-nitrogen containing bisphosphonates are built into ATP and can no longer be used as a source of energy in the cells. The nitrogen-containing bisphosphonates inhibit the farnesyl pyrophosphate synthase in the mevalonate pathway leading to decreased osteoclastic function. The potent nitrogen-containing BPs (e.g. pamidronate, zoledronic acid, alendronate, risedronate and ibandronate), predominantly when administered intravenously have been more often associated with this disease. It has been first mentioned in 2003 by Marx et al [3].

DEFINITION

The bisphosphonate-associated osteonecrosis is defined as the occurrence of the necrotic bone of the jaws that has been persistent for at least 8 weeks with a current or previous history of bisphosphonate use. Along with this criteria, it is also mandatory that the patient had had no former head and neck radiation [4].

INCIDENCE

The incidence of BRONJ remains undefined and it ranges from 0.8 to 12% for i.v. preparations; the incidence for oral preparations ranges from 0.01 to 0.06 % and after oral invasive treatments this rate increases from 0.07 to 0.34% [5].

ETIOLOGY

The main factor is the use of nitrogen-containing bisphosphonates. Administered bisphosphonates will be incorporated in the bone. It is unclear if and how long these bisphosphonates are active. The development of bisphosphonate-associated osteonecrosis can be triggered by oral factors—this is usually a wound in the oral cavity: periodontal disease, surgical procedures, etc. Out of this invasive invasive dental procedures are the major precipitating event.

MECHANISM OF ACTION

The mechanism of action of bisphosphonates is not yet well understood, but it essentially involves a powerful inhibition of bone resorption as a result of the reduction of osteoclast activity; as far as nitrogen-

containing BPs are concerned they are also thought to have antiangiogenic effects[6].

LOCATION

BRONJ is more often localized in the mandible than in the maxilla (2:1 ratio), it is usually caused by a dental surgical procedure (60-70% of cases) or a prosthetic trauma and it is more rarely spontaneous. Only the mandible and maxilla appear to be susceptible, highlighting their unique nature compared with other parts of the skeleton. The jaws are the only bones in the human body that are in frequent contact with the outside world and are subject to repeated microtrauma through the presence of teeth and the forces of mastication; moreover the turnover of alveolar bone is 10-fold greater than in the long bones. While BPs can decrease this turnover, the alveolar remodeling still remained higher compared with the long bones [7].

STAGE [8]

Stage 0 patients are patients that do have some symptoms without any visible uncovered bone. Stage I, the necrotic bone becomes visible. Patients in this stage usually do not have any symptoms.

Stage II, an additive infection is existent.

Stage III, further complications occur such as necrotic areas involving the base of the mandible or the sinus or pathologic fractures are existent.

THERAPY

The osteonecrosis should be treated since the lack of treatment usually ends in the progression with more extended areas of necrotic bone and a potential switch in the stage of the osteonecrosis. There are several approaches in the therapy of the bisphosphonate-associated osteonecrosis of the jaws. Smaller osteonecrosis can be treated conservatively or with a moderate surgical intervention. Perioperative antibiotic treatment should be initiated. After the debridement or resection of the necrotic bone, a plastic coverage of the bone should be performed.

CONCLUSIONS

Prevention has led to a progressive reduction in the prevalence of BRONJ. Since BRONJ patients' poor health and uncertainty of surgical outcomes, conservative management is to be preferred. In our experience medical treatment is often sufficient to keep the disease under control and to lead to the healing of the lesions by spontaneous loss of the sequestrum. This approach seems to be very effective in patients who were treated with oral BP preparations; BRONJ seems to have a more benign clinical behaviour in these patients.

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Review

APPLICATIONS OF FORENSIC ODONTOLOGY IN PEDIATRIC DENTISTRY

Dr Amala Jose*, Dr Subbalekshmi

*Former CRI, Pushpagiri College of Dental Sciences, Thiruvalla,

ABSTRACT

Forensic odontology is a branch of forensic science that uses the skill and expertise of a dentist in person identification,age estimation,sexual assault and crime investigation etc.It is rapidly evolving and has a wider scope of advancement in the future. Each dental speciality has eminent role in forensic identification. A pediatric dentist can help a forensic odontologist in understanding and reporting child abuse,dental profiling,identification of bite marks,age estimation etc.The aim of this article is to provide an overview on the role of a pediatric dentist in forensic odontology and its medical and legal implications.

INTRODUCTION

Forensic odontology is one of the rapidly developing branch of forensic medicine and forensic science. It has immense importance in examining dental evidence and in the identification of victims of mass disaster, abuse or organized crimes.

Forensic dentistry is defined as a branch of dentistry which, in the interest of justice, deals with the proper handling and examination of dental evidence, and with proper evaluation and representation of dental findings (Keiser Neilson-1970)[1]. Dr. Oscar Amoedo is considered as the father of forensic odontology.[2]

Forensic odontology relies on the indestructibility of the tooth in various environments. Teeth are preserved in the close cavities of the mouth and are generally resistant to the threatening environmental conditions that may be associated with the death of an individual, making them very useful in forensic investigations. Human dentition is considered as hard tissue analogue to the fingerprints. It is unique to an individual and helps in person identification. [3]

Pediatric dentistry is a dental speciality concerned with the diagnosis and treatment planning in children. The knowledge and expertise of a pediatric dentist can be utilized for identification of individuals, age estimation studies and for

recognizing child abuse.

1. DENTAL PROFILING

Identification of an individual is a pre requisite for certification of death and for personal, social and legal reasons. Dental profiling is done to identify an unknown individual when ante mortem records are not available.It includes a triad of information-ethnic origin,sex and age obtained from data based on dentition. [16]Information from this process will enable a more focused search for ante mortem records.

- Race Determination

The ethnic origin of an individual can be identified by studying the racial characters of teeth. There are marked variations present in the size of the tooth between different populations. Morphological variations in the teeth like cusp of carabelli, shovel shaped incisors, accessory ridges on canines, lingual tubercles in the anteriors, protostylid etc are helpful in race determination.[4]

- Sex Determination

Determination of gender is one of the most important aspects for establishing the identitiy of an individual. Sex differences in dentition are based largely on tooth size and shape. Male teeth are larger whereas female teeth are smaller with less buccolingual width. Canines are considered sexually dimorphic than any other teeth. [5]There is also greater differences in size between maxillary central and lateral incisors in females as compared to males.

Mandibular canine index/dental index:-

Mandibular canines show the greatest dimorphism and greatest dimensional differences between males and females. Mandibular canine index is expressed as the ratio of the mesiodistal dimension of the canines and intercanine arch width. The higher MCI value indicates male and lower is female.[5]

Barr bodies found in the nucleus of female somatic cells plays a key role in human gender identification.Barr bodies are dormant X chromosome that display sexual diagnostic features when heated for 1 hour at 100 degree celcius.The Y chromosome contains **F bodies** which can also help in sex determination. F bodies present in the pupal tissue in males is the most efficient and reliable method for gender determination.[6] The **sex-determining Y (SRY) gene** extracted from pulp DNA can also be used in forensic samples for the purpose of gender determination.[7]

Sex determination is also possible using the **AMEL gene** which is different in males and females. The AMEL gene that encodes for female amelogenin is located on the X chromosome and AMEL gene that encodes for male amelogenin is located on the Y chromosome.[7] The

female has two identical AMEL genes whereas the males has two different AMEL genes. This can be used to determine the sex of the remains with very small samples of DNA.

- Age Determination

Teeth are among the most reliable tools in the process of identification of age, especially in the first and second decades. Forensic odontology has been helpful in computing the age from available records. Age determination is important in judicial punishment, attainment of majority, marriage, employment and criminal responsibility.

-Age estimation in prenatal, natal and post natal period

The knowledge and expertise of a pediatric dentist can be utilised in determining the developmental age in prenatal, natal and postnatal period. Dry weight measurement method,mineralization of deciduous teeth,first molar formation and neonatal line are reliable indicators in estimation of age.

Forensic dentist is involved in age determination of the unknown fetus in case of premature birth and abortion specimens.[8]Neonatal lines are present in both enamel and dentin of deciduous teeth and permenant first molars which indicate the development during the transitional period between intrauterine and extrauterine environments.The presence of neonatal line is an indicator of live birth.[9]It has legal implications in feticide and infanticide.

Certain drugs such as tetracycline,elements such as lead,strontium and fluoride produce characteristic incremental lines,which may help to determine the age at death.[10]

-Age estimation in children and young adults

Tooth eruption and tooth calcification are the two events that can be used to measure dental age in children and adolescents.[10] Estimation of age can be with help of skeletal structures such as fontanelles closure, hand wrist radiograph, mandibular structure, or with help of dental structures by various techniques such as Schour and Massler, Demigran, Cameriere, Nollas method.

Odontological age estimation of children upto 14 years depend on the eruption of teeth which can be either through visual or radiographic methods.Tooth maturation,emergence of clinical crown,radiographic evaluation of the developing dentition are often used in age determination at this age. Schour and Massler used a chart which permits direct comparison with the radiographs During the period of 14-20 years,third molar can be used for estimation of age.

The Demigran method used scoring system in which seven mandibular teeth on

the left side were divided into 8 stages and maturity score was evaluated.[10]

-Age estimation in adults

After the development of dentition,it becomes difficult to estimate age using teeth.Most of the methods used in adults use various regressive changes of hard and soft tissues of the teeth. Gustafson's method,Johanson's sectioning,Lamendin's regression formula are examples of some of the methods used in adult age estimation. The incremental lines of cementum will help to determine the age of adults. [10] Newer techniques like aspartic acid racemisation and translucent dentine have been proposed and proved to be highly accurate in adult age assessment.[11]

1. DNA FINGERPRINTING

DNA profiling or fingerprinting is based on the fact that although most of the DNA molecule is common to all humans, parts differ from person to person.With the exception of identical twins,the DNA of every individual is unique. DNA profiling plays an important role in the identification of decomposed human bodies in mass disaster. DNA fingerprinting shows the genetic makeup of a person or other living things.

Dental pulp is an excellent source of DNA.DNA of high quality can be isolated from the teeth which is less contaminated.[12] Teeth protect DNA from harsh environmental conditions as compared to other body parts.The bitemark also may contain DNA fragments from the salivary remains.PCR based DNA analysis helps in individual identification in criminal cases and paternity suits.

2. BITEMARK

McDonald defined bitemark as a mark made by the teeth either alone or in combination with other mouth parts.[13] Bitemarks may be found on living or dead individuals where the person may be victim of the crime or perpetrator of the crime. Bitemarks may be produced during assault of children or adults which are frequently associated with sex related crimes and child abuse.[13]

Bitemarks can be sexually oriented bites, aggressive bitemarks or self inflicted bitemarks.In child abuse cases either aggressive or sexually oriented type of bitemark is seen.Self inflicted bitemark is found mostly on the forearms of children caused by themselves. Mentally retarded and psychologically disturbed people may inflict bite injuries on themselves. A pediatric dentist is always in position to identify,document and report a suspicious bitemark.

Trace amount of saliva is also often

deposited with bitemark.Saliva obtained from swabbing the bitemark [14]is used to determine the blood group antigens.

1. CHIELOSCOPY

The wrinkles and grooves on the labial mucosa(sulcum labiorum) form a characteristic pattern called lip prints, the study of which is referred to as chieloscopy. [15] Lip print are genetically determined and remains unchanged from birth. Changes can occur in lip prints in case of trauma or surgery. The secretions of oils and moisture form sebaceous and sweat glands in the edge of lips enable development of latent lip prints, analogous to latent finger print.[16]Lip print recording helps in crime investigation and individual identification. It also shows gender differences and aids in sex determination.[17]

2. RUGOSCOPY

Rugoscopy,also known as palatoscopy is the study of palatal rugae pattern to ascertain person's identity.It remains unaffected from birth to death and is unique to a human as his/her finger print.Rugae pattern do not change due to growth of an individual and reappears after trauma or surgical removal.Hence it can be used for accurate identification of an individual.[18]The anatomical position of the rugae inside the mouth surrounded by cheeks,lips,tongue,buccal pad of fat,teeth and bone keep them well protected from trauma,high temperature and other assaults.The rugae pattern may vary in different ethnic group and is useful in race determination.Rugoscopy is thus a reliable method in the forensic personal identification and racial group specification.[19]

3. CHILD ABUSE

The Journal of Child Abuse and Neglect defines it as "any recent act or failure to act on the part of a parent or caretaker which results in death, serious physical or emotional harm, sexual abuse or exploitation, an act or failure to act which presents an imminent risk of serious harm. [20]Child abuse has serious physical and psychosocial consequences which adversely affect the health and overall well being of a child.Since a substantial number of abused children have injuries in or around the mouth,it would seem likely that dentists would be significant source of child abuse reporting.

Dentists are in a favourable position to recognize abuse related facial injuries. Screening for maltreatment should be an integral part of any clinical examination performed on a child.Any traumatic injury of the child should be evaluated with suspicion.

Pediatric dentists are in a position to

observe the parent child relationship as well as changes in the child's behaviour.Pediatric dentists have unique opportunity and a legal obligation to assist in the the struggle against child abuse.Any suspicion should be properly identified,documented and reported to the legal authorities.

4. POISONING

Oral cavity is the first source to identify or analyse the poisonous features and different manifestations observed in post mortem.[21]The type of poison can be identified by the colour changes in the oral cavity and is of great importance in forensic investigations

CONCLUSION

Pediatric dental proffessionals have the skill and expertise in identification of children in mass disasters,age estimation,bitemark analysis and reporting child abuse.They can work in alliance with the forensic personnel in crimes involving children.They can provide valuable information and assist the physicians and law in reporting and treating children subjected to abuse.

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Clinical Perspective

Scope of Guided Endodontic Access in Dental Practice

Dr. Manuja Nair Dr Devadhathan

Pushpagiri college of Dental Sciences

Abstract:

The new mantra in dentistry is Maximum Conservation and Minimum Invasion. We have come a long way in Operative Dentistry from "extension for prevention" to "prevention of extension". We have something similar in Endodontics called **Minimal Invasive Endodontics (MIE)** which will change the future of dental practice. It includes preservation of structural integrity of tooth, alternate access cavity designs, guided endodontic access, modern burs, cleaning and shaping, 3D irrigation and disinfection, magnification aids like loupes and dental operating microscope. Longevity of an endodontically treated tooth depends mainly on its remaining structural integrity after access preparation. The concept of Conservative endodontic cavities (CEC) was introduced to preserve the pericervical dentin (PCD), which is crucial to transfer the occlusal load to the root. In traditional endodontic cavities (TEC) much of PCD is lost which reduces the fracture resistance of tooth. Guided endodontic access was introduced as an attempt to preserve the PCD. It ensures predictable outcome without any procedural errors. This review is an attempt to narratively summarize the scope of Guided endodontic access in dental practice and explain its benefits to the practitioners compared with conventional technique.

Keywords: 3D endoguide, CBCT, endoguide, guided access, guided endodontics.

Introduction:

Guided endodontic access is a technologically driven approach to prepare smallest possible customized access cavity with minimal tooth structure removal for ensuring long term survival and function of an endodontically treated teeth[1]. Krastl et al were the first to describe the endodontic guided procedure and recommend it for teeth with calcified canals[2]. Guided endodontics includes CBCT, digital impression systems, 3D printing technology, template designing software and dynamic navigation. It provides safe and predictable

treatment outcome with least invasive procedures even in most

challenging cases compared to conventional treatment strategies[1]. Accurate diagnosis and appropriate treatment plan with help of conventional radiographs solely depended on the skill and experience of the clinician. 3D guided endodontics not only helps with diagnosis and treatment plan but also in execution of the planned treatment. With advanced CBCT imaging and software, clinicians can not only assess the root canal anatomy, length and location but also virtually plan the access cavity design for individual tooth with 3D scanner and 3D templates. This virtual planning will help to preserve the tooth structure and avoid any procedural errors.

Types of Guided Endodontic Access:

Guided endodontics can be Static or Dynamic.

Static Guided Endodontics: It involves use of CBCT with optical impression, where both the images are merged creating platform for design of a virtual drill path with help of sleeve guide.

Dynamic Guided Endodontics:

Information from patients CBCT is used to plan access cavity, overhead tracking cameras relate

the position of bur in 3D by looking at the software interface, clinician gets immediate feedback about position of bur as it relates to the position of planned access and the tooth.

Technological advancements have enabled inter-operability between 3D imaging devices, 3D virtual planning systems and 3D printers to process, manipulate and create data for producing 3D printed guides.

What is 3D Endodontic Guide?

3D Endodontic Guide is a template fabricated to guide drills into pre-planned positions for localization and exploration of root canal orifices[1]. Endodontic guides are also called Endoguide, Endodontic Template, 3D Endodontic Guide/Template, and Guide Sleeve.

Steps in 3D Guide Planning and Designing:

Step 1: CBCT of the involved tooth

Step 2: Surface Scan using intra-oral scanner or scanning a model made after an impression. The scan has to cover atleast one quadrant of the tooth arch to secure a stable

support for the guide.

Step 3: Merging CBCT scan with Surface scan using software. Superimposition of CBCT data and surface scan is very crucial to get accurate fit of the guide. Three to six reference landmarks or

points are marked on both scan files and then software automatically merges them.

Step 4: Designing the Endoguide**,** which is mainly done by tracing the canal, creating virtual drill path by deciding the target point, angle of the drill and diameter of the drill and finally Sleeve selection. These Endoguides are printed with the help of 3D printers.

Krastl et al noted that skill or experience of clinician does not affect the accuracy of guided endodontic procedure[2]. In addition to conserving remaining tooth structure it also reduces the chair side time compared to conventional techniques especially in difficult cases like calcified canals or teeth with developmental anomalies[2]. Zubizarreta-Macho et al in 2020 compared two types of guided endodontics and found that Dynamic guided endodontics are more accurate than Static guided endodontics[4].

Limitations:

Some of the limitations of Static guidance are that it will work only for straight parts of root canals, might require drill guide for each canal increasing the cost in multiple canal cases, tooth has to be stable during scan and guided drilling, presence of metallic restorations may lead to artefacts resulting in inaccuracies in treatment planning, limited availability of armamentarium, requires time to prepare Endoguides before procedure, and does not allow even minor changes in treatment plan[1,4].

Dynamic guidance however can overcome this limitations as clinician can visualize the bur on the screen in 3D and control the removal of tooth structure to keep it as minimal as planned. High speed drills and burs can be used, no guide rings are required, and any changes in treatment plan can also be accommodated. However limited mouth opening could pose problems especially in posterior teeth[1,4].

Conclusion:

Technological advancements are happening in all the fields and dentistry is no exception. Guided endodontics is the quantum leap in technology for Dentistry. Guided access techniques are technologically driven treatment protocol which not only helps in

planning the treatment but also its precise execution. Guided endodontics lowers the risk of procedural errors and preserves the structural integrity of tooth even in most challenging cases. Like they say “its not the matter of if, but when”.

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Case report

External Inflammatory Root Resorption: Management of a Tooth with hopeless Prognosis

R Abhilash, Jithin Balan, K Shoba, MR Sreelakshmi

Practitioners

INTRODUCTION

External root resorption is a progressive and destruc- tive loss of tooth structure initiated by a mineralized or denuded area of root surface[1,2] and is considered as a major resorptive condition without symptoms.[3] The process involves interplay of inflammatory cells and hard tissue structures.

It is known to be initiated and maintained by many factors,[1,4,5] but pulpal necrosis, trauma, periodontal treatment, endodontic treatment, and tooth whitening agents are the most commonly described stimulants.[6] Apart from local causes, systemic factors are involved in the etiology of external root resorption.[7] Hyperpara- thyroidism, hypertension, and genetic disorder mainly contribute for the same.

Resorptive lesions can be most simply classified as external or internal. There have been many attempts at classification, of which the system proposed by Andreasen[8] is widely acknowledged (Flow Chart 1).

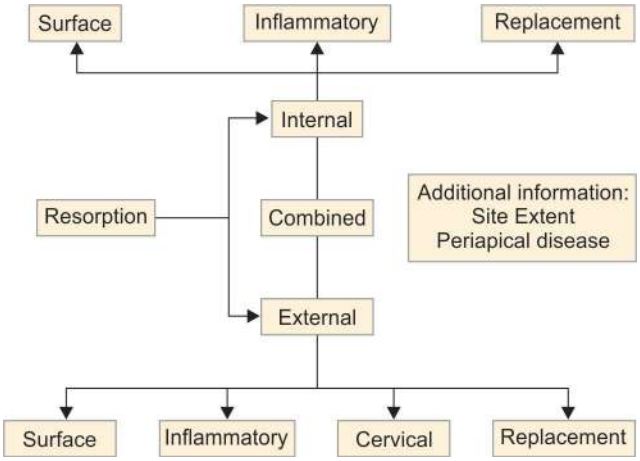
Of the several types of external root resorption, the most common is the external inflammatory root resorp- tion.[9,10] If the resorptive defect is progressive and lead to communication between the oral cavity and root canal, surgical intervention[11-14] will be necessary to remove the granulation tissue, to debride and repair the defect, and even to enable endodontic therapy.

CASE REPORT

A 13-year-old male patient reported to the Department of Conservative Dentistry and Endodontics, with a chief complaint of broken upper front teeth. The tooth had suffered previously from a traumatic injury 2 years back. His medical history was noncontributory.

On examination, Ellis class II fracture was noted in relation to 21 along with deep periodontal pocket of 13 mm with respect to mesiobuccal aspect of 21. Other findings included grade I mobility

of 21 and pain on verti- cal percussion for both 11 and 21. Vitality tests revealed nonvital 11 and 21.



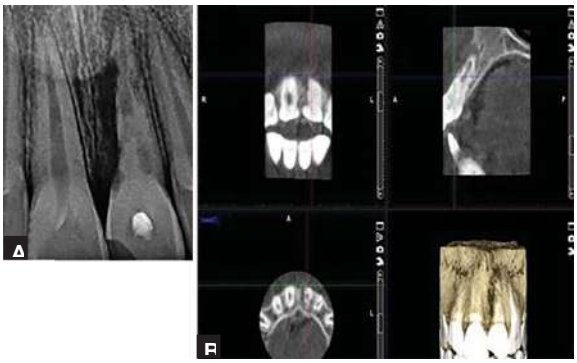
PREOPERATIVE RADIOGRAPHIC FINDINGS

Intraoral periapical Radiograph

The intraoral periapical radiograph revealed several resorptive bowl-shaped lesions on the external root surface of 21 combined with a radiolucent lesion around root apex of the involved tooth. Lesions were visible along entire root length of 21 extending along both mesial and distal root outlines, more marked with respect to mesial aspect. Apical periodontal widening was noted with respect to root of 11 (Fig. 1A).

Cone Beam Computed Tomography

Cone beam computed tomography (CBCT) has found vast application in the field of endodontics, particularly in resorption where it acts as an invaluable diagnostic aid in assessing the three-dimensional (3D) orientation and extent of resorptive lesion.[15-18] The 3D extent of the lesion was precisely determined using the various sec- tions of CBCT (3D, Planmeca, Proface). Coronal section revealed resorption involving mesial and distal root outlines along the entire root length and with irregular borders. The lesion communicates through and through at the junction of middle and apical third. Sagittal section shows bowl-shaped resorptive lesions along buccal and palatal root borders. This lesion communicates with root canal at apical third. Periapical radiolucency is evident in sagittal section. Buccal cortical plate discontinuity was observed in axial section (Fig. 1B)



TREATMENT PROCEDURE

Possible therapeutic procedures were discussed with and explained to the patient and it was decided to proceed with a combined endodontic, surgical, and restorative therapy. The treatment goals pertaining to the case included retaining

the tooth, endodontic treatment and restoration of the radicular defect, regeneration of osseous deformity, and improved stability and esthetics.

Conventional root canal therapy was the choice of treatment for 11. The root canal of 21 was negotiated with No. 10 K file and was debrided under rubber dam isolation. The canal was cleaned and shaped in a crown-down approach. Chlorhexidine being relatively nontoxic was used as irrigant. Calcium hydroxide (Metapex, METABIOMED Co. Ltd) was placed in the canal for 1 month.

Preliminary hematological investigations were done followed by thorough oral prophylaxis. Surgical site was anesthetized using 2% lignocaine and 1:80,000 adrenaline (Lignox 2% A, Warren, Indoco Remedies).

Crevicular incision was placed extending from distal aspect of 11 to distal aspect of 22. Vertical-releasing inci- sions were placed at the ends of crevicular incision. Full- thickness mucoperiosteal flap was reflected. Curettage of granulation tissue replacing the buccal cortical plate and occupying the resorption lacunae was performed. Resec- tion of apical 5 mm of root segment was done to eliminate the lateral canals as well as resorptive lesion extending palatally, which were deemed unrestorable. The resected radicular margins were smoothed with a round bur while constantly irrigating with saline.

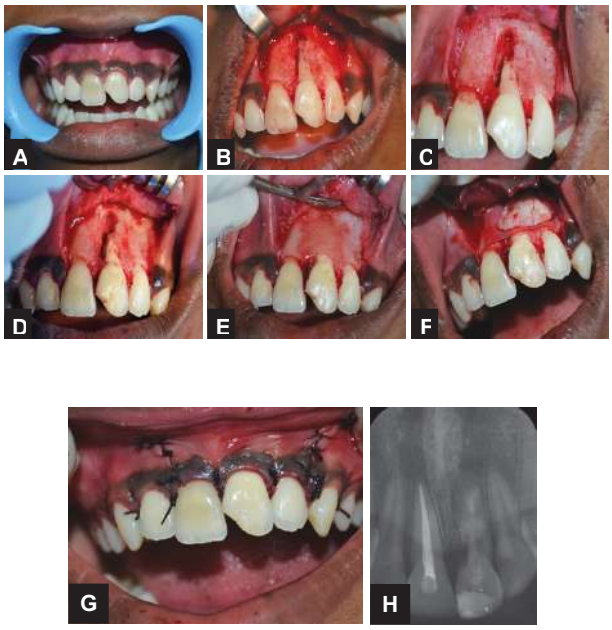
The resorptive site was sealed and the entire root canal was obturated using Biodentine™ (Septodont, Saint- Maur-des-Fosse's, France) which was mixed according to the manufacturer's instructions.

Freeze-dried demineralized xenograft (Osseograft, Advanced Biotech, India) was placed for osseous regeneration. Over this, bioresorbable collagen barrier membrane (Healguide, Advanced Biotech, India) was placed. Platelet-rich fibrin (PRF) which was prepared according to Choukroun's protocol further covered the membrane. The gingival tissue was stabilized using simple interrupted sutures and periodontal pack was placed (Coe Pack).

Patient was prescribed analgesics, antibiotics (Amoxi- cillin 500 mg thrice daily for 5 days), 0.2% chlorhexidine mouthwash, and was advised soft diet. He was reviewed after 24 hours to evaluate presence of bleeding and intact- ness of sutures and pack (Fig. 2).

Follow-up

Patient is under regular follow-up and is asymptomatic; 12-month postoperative radiographs reveal satisfactory bone fill and arrest of resorptive lesion.



Figs 2A to H: (A) Preoperative; (B) mucoperiosteal flap reflection; (C) curettage and root end resection; (D) sealing with biodentine; (E) osseograft placed; (F) collagen membrane and PRF in position; (G) suturing; and (H) 12-month postoperative radiograph

DISCUSSION

Even though a wide variety of factors are deemed to be causative for external root resorption, the most common is trauma, particularly in cases where injury results in pulpal necrosis and damage to root surface. Bacteria, bacterial by-products, and tissue breakdown products from within the root canal system stimulate inflammation in the adjacent periodontal tissue and lead to aggressive and progressive resorption of defect leading to external inflammatory root resorption.[6]

The diagnosis of external inflammatory root resorp- tion has always been a dilemma in the field of endodon- tics. Newer diagnostic modalities like CBCT have added precision in determining the 3D orientation and exact extent of resorptive lesions.

Since its introduction, calcium hydroxide has been widely used in the treatment of external root resorption.[19] It is a strong alkaline substance with a pH of 11 to 13. It also has antimicrobial activity and tissue-dissolving ability,[20] inhibits resorption,[1] and induces repair by hard tissue formation.[21,22]

Biodentine is a novel tricalcium silicate-based material with setting time of less than 12 minutes, high mechani- cal strength, and excellent sealing ability. The calcium hydroxide ions stimulate the release of pyrophosphatase, alkaline phosphatase, and bone morphogenetic protein 2, which enhances mineralization.[23]

This biointeractive material is a fast-setting alterna- tive to conventional calcium silicate mineral trioxide aggregate (MTA)-like cement and does not require a two-step obturation unlike MTA. It also has a better consistency after mixing and offers ease of

placement.[23] Zhou et al[24] have stated that this material can be safely used in procedures requiring close approximation with the periodontal tissue. Two percent chlorhexidine was used as irrigant as it is placed to be more effective against *Enterococcus faecalis* than sodium hypochlorite.[25] Use of osseograft which is osteoconductive along with collagen membrane and PRF enhances the regenerative potential.[26]

CONCLUSION

External root resorption jeopardizes the longevity of a tooth, causing its early loss. Therefore, early diagnosis is extremely crucial in the management. Sooner the treat- ment is done, less severe will be the long-term conse- quences of resorption. This defect demands intervention irrespective of etiology.

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Glimpses of 2022

Installation

Dentist Day celebrations

Women's Day celebrations

Quiz with a twist

Chilamboli 22

Onam Celebrations

Gentlemen & Ladies Tours

CDE Programs

Academic Sessions

Newsletter Release

Sports Team

CDH Activities

Team 2022