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Editorial:
Maintaining Competence in practice

Competence at graduation is taken for granted, it is assumed that when one graduates, they have acquired the necessary skills to practice dentistry. However, this is an assumption that should not be made since skills are maintained and improved through regular and repeated practice. The graduates may not have acquired all the necessary skills due to other competing interests. It is therefore imperative for the individual professional to ensure that they acquire the necessary skills either through experience from repeated practice or additional training in a particular area.

As professionals, we must commit to acquiring lifelong improvement to skills attained at graduation and acquire new ones. Currently, there are better equipment and materials on the market and the practice of dentistry has many more advanced procedures than ever before. It is important that these advance techniques should not be implemented ahead of adequate training and attainment of expertise.
Selecting the appropriate training and reading material is not that easy.

With more than one (1) article on dentistry being published every 20 minutes, and 6,000 dental publications worldwide, to select a suitable credible article, oral health care professionals need to have the ability to recognize and discern the signal from the noise. We need to recognize that the scholarly aspect of dentistry not only complements procedural skills but also should drive the change in how we treat our patients. The question facing dental educators is not how to graduate a competent dentist today but how to graduate a competent dentist today who is still competent 30 years later.

There are no obvious answers to this question, but the need to provide our dental students and practicing dentists with the tools to start thinking more critically may be part of the solution. We need to train practitioners to embrace the tools of critically analyzing scientific evidence. One of the ways of doing this is to encourage them to begin to write articles in refereed journals.

Oral health practitioners need to engage in regular skills training, reading journals and sifting information and doing research no matter how elementary. Reporting of cases managed by the dental practitioner, is one way of getting started.

This journal encourages dental practitioners to report unusual or even ordinary cases that they have managed and which have turned out better than expected. Documentation is the key to a good case report. Even reporting failures is a good guide to assist other practitioners to avoid making the same mistake as we learn from one another.

Unless we embrace the culture of reading and critically appraising the available scientific evidence that inform our practices, we will be failing our patients yet they deserve the best there is to offer in the practice of dentistry.

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Coverage of Dental Services by Health Insurance Companies Based in Nairobi, Kenya

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Abstract

Background: Dental insurance has been used over the years as a means of financing dental care, and has been claimed to improve access to oral health care. Different insurance companies have set various policies on coverage of dental services, annual limits and the process of acquiring approval. These have had a significant impact on the promotion of oral health. However, in Kenya, this has hardly been documented, hence the need for this study.
Objectives: To describe the scope of coverage of dental services by insurance companies in Kenya and the procedures required before treatment is provided.
Material and Methods: the study comprised of the Insurance companies which were registered by the Insurance Regulatory Authority at the time of the study and offered Medical insurance with headquarters or branches within Nairobi County. This was a descriptive cross-sectional study whereby a self-administered questionnaire targeting medical insurance companies was used to assess dental insurance coverage. The variables measured were dental services insured, the annual limits and the time taken and process of seeking treatment approval. The results obtained were analyzed using statistical package for social sciences (SPSS) version 25. Ethical approval was obtained from Kenyatta National Hospital and University of Nairobi Ethics and Research Committee.
Results: There were 27 companies that were authorized to offer medical insurance in Kenya, 15 were enrolled in the study and 13 (93%) were found to offer dental insurance services. All (13, 100%) the insurance companies covered costs on consultation, tooth extraction, filling of decayed or fractured teeth, root canal treatment and surgical or non-surgical disimpaction of teeth. Most of the insurance companies covered cost on management of oral and maxillofacial trauma (12, 92%), maxillofacial surgery (12, 92%), prescribed medication (11, 85%), biopsy (11, 85%) and imaging (10, 76%). However, few insurance companies covered costs of full mouth scaling (4, 31%), immobilization of loose teeth (4, 30%), prescribed mouthwashes (3, 23%), prescribed desensitizing agents (3, 23%), orthodontic treatment (2, 15%), oral prophylaxis (2, 15%) and masking of teeth (1, 8%). None of the assessed companies covered cost of prosthetic tooth replacement. The companies' annual limits ranged from 5,000 to 80,000 Kenyan Shillings (Kshs) with a mean of Kshs. 30,000 ±10,000. All (13, 100%) the companies assessed required preauthorization. The estimated period for preauthorization for the utilization of dental services ranged from 5 minutes to 3 days.
Conclusions: Most of the accessed medical insurance companies integrated dental health coverage. However, only management of carious teeth was covered by all insurance companies. The cost of management of sensitive teeth, periodontal diseases and orthodontics was covered by few medical insurers while prosthetic procedures were excluded. Preauthorization was required before dental treatment and the duration of approval of dental procedures took 5 minutes to 3 days. The annual limits ranged from 5,000 to 80,000 Kenyan shillings.
Keywords: Dental insurance, Nairobi

Introduction

The demand for health care, unlike other basic needs, is unpredictable and is determined by exogenous shocks and not by one's planning. The population may not know when they need medical care and many a times cannot afford them when the need comes, hence, insurance is typically needed[1]. Financial barriers to dental care have negative effects with respect to frequency of dental visits and oral health outcomes especially for adults in low socioeconomic status [2,3,4].

Health care is both the responsibility of the government and individual patients [2,3,5,6,7,8,9,10]. In Kenya, the budget allocated to health in 2018/2019 financial year was only 5.1% of the national budget while the county

government allocated 27.2% to health [11]. Therefore, the burden of preventing and treating disease is largely upon the patient. Globally, financing includes out of pocket, employer-based reimbursement plans or private or public health insurance [2,7,9,10].. In Canada, dental health is also financed through community grants, loans or leasing of property (10).

According to the 2014, Kenya Demographic and health survey, only 19.6% of 15-49 years old had a health insurance cover which was an increase from 8.2% recorded in 2009. Majority (82%) were covered by (National Health Insurance Fund) NHIF, 17% by employer based insurance while 1% were under other schemes (Mutual health organization/community based insurance, privately procured commercial insurance and prepaid scheme) [7, 8]. Currently, it's upon each county government to take care of the oral health of its people since health services have been devolved. Offering quality oral health treatment is capital intensive translating to high cost of delivering oral health care. Most public health sectors do not have the adequate infrastructure for dental

clinics leaving the burden to the private sector. Accessing health care in the private health facilities is the responsibility of the patient and financing it is from their pockets or by insurance. As at 2012, financing of healthcare in Kenya was largely by the Ministry of Health (32%), households catered for 19%, National Health Insurance Fund catered for 5%, while private insurance companies catered for 7% [12].
Dental insurance is a kind of health insurance in which part or whole of the expenses incurred in dental care are paid by an insurance company. The Kenya National Oral Health Survey Report 2015 indicated that 12.8% of the population had dental insurance which is low compared to developed countries like Canada and Australia where 66% and 60% respectively have dental insurance [2,4,12].

Six domains of health care quality as defined by the Institute of Medicine (IOM) are that it should be safe, equitable, patient-centered, timely, efficient and effective[13]. To achieve this, it's upon the health care provider in this case the dental team and the financer who in this study will be the insurance company to ensure provision of quality health care. The process of getting dental services paid for by the insurance company is such that the dentist has to request for an approval from the insurance company. This helps in ascertaining that the insurance cover is valid, whether the available dental cover is within the annual limit and that the services to be provided are covered by the insurance company. The insurance protects itself from adverse selection or over utilization by having exclusions.

A study on utilization of dental insurance in Nairobi indicated that having a dental insurance increased the use of dental services but the range of procedures covered was limited. It also indicated that 43% of the respondents had dental insurance cover but only 23% of the insured were satisfied with the cover8. A study in USA on insurance related barriers to dental care showed that the insurance, both private and public, was insufficient to pay for the care needed, such as root canals and tooth replacement. The option left was mainly extractions, besides, inability to obtain immediate dental care after enrolling in an insurance company was reported since one had to wait for the dental insurance to take effect. There was also a big gap in utilization of dental services by those under private and public insurance cover[13].

There is a wide range of policies that may limit utilization of dental insurance; these include dentist participation, low reimbursement rates and cost-sharing. Dentist participation may be limited due to low reimbursement rates after providing the services. A recent study done in Kenya indicated that 90% of dentists were not satisfied with the annual dental cover limit offered to patients, with the majority having a limit of Kshs. 10,000-20,000. Majority of dentists were dissatisfied with the exclusions of some important dental procedures, process of pre-authorization and time taken for approval by insurance companies to commence dental treatment.[14]

The research question was; are the services offered timely, effective and patient-centred? The various dental procedures covered by insurance companies and the process of approval for dental treatment and exact duration taken to do so have not been locally investigated by most researchers, hence the need for the study.

Methodology

This was a descriptive cross-sectional study. A list of authorized insurance companies in Kenya was obtained from the Insurance Regulatory Authority.

The list was dated 7th January 2020 and had 56 companies that were authorized to offer insurance services (car, health, life, education etc) whereby 27 companies offered medical insurance[15].Majority of the insurance companies' headquarters are located in Nairobi, which is the capital city of Kenya. Insurance brokers and companies not offering medical insurance were excluded. Consecutive sampling method was used and the companies that consented to participate in the study were enrolled.

An interviewer-based questionnaire was administered to the CEO of the company or their representative. The information collected was on duration of provision of dental insurance, dental services being insured, annual limits, approval protocols and duration taken to approve the procedures. The data collected was analyzed using the Statistical Package for the Social Sciences. It was then presented in figures below.

Results

Out of the 56 companies that were authorized to offer insurance services in Kenya, only 27(48%) offered medical insurance. There were 19 companies that were visited, [15] (79%) of them responded and majority (13, 93%) were found to cover dental related expenses. On average the insurance companies had offered dental insurance for 15 years with the longest duration being 30 years while the shortest was 5 years. All the companies offered annual insurance packages and the clients were expected to pay a premium either in full or as an instalment (monthly or semi-annually) before accessing insurance benefits. The insurance policy comprised of a contract between the insurance company and the individual which involves setting annual limits, family coverage, inclusions and exclusions of various medical services among other terms and conditions. The insurance policies were valid for 1 year and the clients could renew or terminate the contract.

All (13,100%) of them covered costs on consultation, tooth extraction, filling of decayed or fractured teeth, root canal treatment and surgical or non-surgical disimpaction. Most of the insurance companies covered the cost of managing oral and maxillofacial trauma (12, 92%), maxillofacial surgery (12, 92%), prescribed medication (11, 85%), biopsy (11, 85%) and imaging (10, 77%). However, few insurance companies covered costs on full mouth scaling (4, 31%), immobilization of loose teeth (4, 31%), prescribed mouthwashes (3, 23%), prescribed desensitizing agents (3, 23%), orthodontic treatment (2, 15%), oral prophylaxis (2, 15%), orthodontic treatment (2, 15%) and masking (1, 8%). None of the assessed companies covered cost of prosthetic tooth replacement with dentures, implants or crown and bridge work (Table 1).

Table 1: List of dental procedures covered by the insurance providers

DENTAL PROCEDURE	Frequency n=13	Percent
ORAL MEDICINE		
Tooth extraction	13	100.0
Consultation	13	100.0
Surgical disimpaction	13	100.0
Oral and maxillofacial surgery	12	92.3
Biopsy	11	84.6
Management of maxillofacial trauma	12	92.3
Prescribed medication	11	84.6
Imaging	10	76.9
CONSERVATIVE AND RECONSTRUCTIVE		
Tooth filling	13	100.0
Root canal treatment	13	100.0
Desensitizing dentifrices	3	23.1
PERIODONTAL THERAPY AND AESTHETICS		
Oral prophylaxis	2	15.4
Full mouth scaling and polishing	4	30.8
Immobilization of loose teeth	4	30.8
Prescribed mouthwashes	3	23.1
Tooth whitening	0	0.0
Masking	1	7.7
PROSTHETICS AND ORTHODONTICS		
Orthodontic treatment	2	15.4
Dentures	0	0.0
Crown and bridge	0	0.0
Implants	0	0.0

The annual limit ranged from Kshs. 5,000 to 80,000 with a mean of Kshs. 30,000 ±10000. However, some companies indicated that the limit could go higher depending on the premiums paid by the client (Figure 1). On average 5-10 members of the family were covered. However, 4 companies covered unlimited members of the family but they had to keep their spending within the specified annual limits.

All (13,100%) the companies assessed required preauthorization. The procedure involved filling of preauthorization forms by the dental practitioners after examining the patient, making a provisional diagnosis and the treatment plan. The filled form was then sent to the insurance company for vetting and approval. Factors considered by various companies included: validity of the member, medical necessity of the procedure to be undertaken, cost of the procedures, benefits available for the client, exclusions and the credentials of the requesting dentist. The insurance companies indicated that the estimated period for the approval ranged from 5 minutes to 3 days. The cause of the delays included time taken to vet the planned dental procedures in terms of whether the procedure been requested is an exclusion or not and if the treatment plan is for the elicited diagnosis. Secondly, the client's eligibility in terms of benefits, balance and whether the premiums paid are up-to-date. Thirdly, the cost and pricing of the requesting dentist was considered.

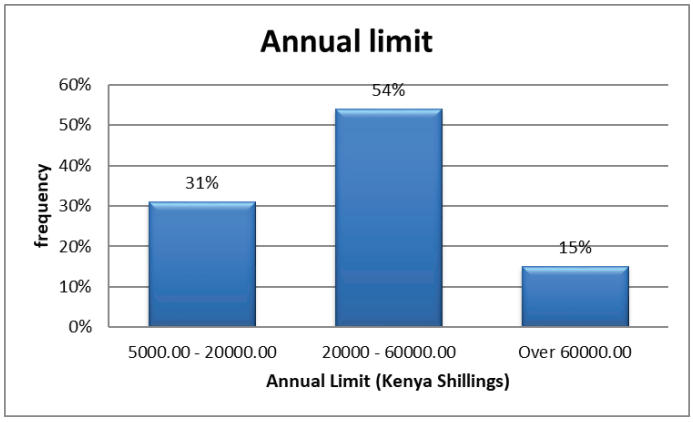

Fig. 1. Annual limit of Dental Insurance covers

Majority (12, 92.3%) of the investigated medical insurers worked with paired dentists. Only half (7, 53.8%) of the insurance companies allowed their clients to visit their dentists of choice. There were 8 (61.5%) companies which allowed the patients to pay from their own pockets and then seek reimbursement at customary rates.

Discussion

Our study found that dental health coverage was integrated within the medical insurance as an additional benefit. This has also been reported in India where companies which specialize in oral health insurance hardly exist. There exists other oral health care insurance plans around the world such as indemnity plans (the client pays a percentage of the dentist fees), dental health maintenance organization (DHMO) (insurance pays dentists a fixed fee depending on number of treated patients), preferred provider organizations (PPO) (a group of patients visit a designated group of dentists who charge less fees than normal)[9].

The current study found a very wide range in annual limits though we could not establish the limit chosen by majority of customers. However, a study done on Kenyan dentists reported that majority of their patients had annual limits of 10,000 to 20,000 Kenyan shillings. This amount was reported to be inadequate for proper service delivery [14]. In our study, the annual limit of 31% of the companies was below Kshs. 20,000. Insurance policy is a contract between the insurance company and an individual which entails setting the annual limits, inclusions, exclusions, among many other details[16]. It's upon this information that patients or employers choose the preferred or most affordable annual premiums which consequently limit the annual health coverage. The doctors are expected to offer services guided by the established policy otherwise patients have to finance any extra expenses.

Kenya Medical Practitioners and Dentists Board govern doctors' fees in Kenya. Consultation fee for instance, as per doctors' fees guidelines of 2012, ranged from a minimum of Kshs. 1000 to 2000 for general practitioner dentist and Kshs. 2000 to 4000 for specialist dentists. Taking into account one of the common procedures, root canal treatment, the cost ranges from Kshs. 7,000 to 20,000 depending on the specialty of the dentist and the tooth under treatment. Hence, one root treated tooth may exhaust the entire family's benefit [17]. This then leads to the fact that annual limits are quite inadequate. People may end up opting for cheaper procedures such as tooth extractions that lead to early tooth loss leading to compromised mastication and aesthetics. In Iran, extractions were found to be high in non-insured patients since they were cheaper than conservative procedures.[18]

It is also worth noting that most insurance companies preferred to work with paired dentists. The concept of paired dentist is such that there is an agreement between an insurance company and the dentist. It entails setting prices of various services and terms of payment. This in a way helps the insurance company in setting up of customary prices. Therefore, it follows that clients of the insurance company will have to visit specified dentists. The means of coming up with the pre-negotiated prices was not assessed in this study. The customary prices are likely to be lower than what experienced and specialized dentists charge, hence, few of them would be willing to join in the panel of paired dentists.

This would limit the client from accessing specialized health care or visiting experienced dentists. There is need for collaboration amongst relevant stakeholders so as to help set the insurance premiums, annual limits and charges for dental procedures at a reasonable level that is affordable and beneficial to all stakeholders. The situation is different in Japan whereby most doctors are registered under the public health insurance scheme and the price of dental services are the same in both public and private dental facilities. Hence, dentists have an equal chance in benefiting from the insurance scheme. Moreover, the patients are only required to pay 30% of the total cost while the insurance scheme caters for the rest of the charges[6].

Gum disease is the most prevalent of all oral diseases (98.1%)[12] and is commonly managed through good oral hygiene practices and professional intervention including full mouth scaling, oral prophylaxis and use of mouthwashes. These services were however covered by few insurers. Dental practitioners consider preventive treatments to be paramount in promoting good oral health as compared to curative procedures. In this way, preventive procedures that have a limited cover will compromise the overall goal of promoting oral health care.

Management of dental caries is through tooth fillings, root canal treatment, extractions and fabrication of crowns. All the companies assessed covered these procedures save for crown and bridge work which none of the assessed companies covered. This service coverage should be adequate if dental caries lesions are managed early enough. Tooth loss is largely a consequence of oral disease and can largely affect the oral health related quality of life. Individuals will then seek tooth replacement through prosthetic management such as dentures, implant or crown and bridge. These services are cost intensive which could explain lack of insurance coverage from the assessed companies. A similar situation was reported in China[5] while in Japan only high cost prosthesis such as gold crown and bridges as well as implants are excluded from coverage6. However, it should be noted that once oral diseases are well managed incidences of tooth loss and subsequent need for replacement would be low.

Oral mucosal lesions have a prevalence of 20% in Kenya[19]. The diagnosis of these lesions is through biopsy and management is through medication and, or surgery which were covered by most insurance companies. Kenya presents with a 23.7 % prevalence of fluorosis[12]. Management of dental fluorosis is through bleaching or tooth whitening, veneering or crowning. There was little dental coverage offered for these services. The low insurance coverage could be due to consideration of these procedures as cosmetic and could be classified as exclusions in various insurance companies. The data on insurance coverage of specific dental procedures may be limited since the questionnaires were self-administered and it cannot be verified whether some of the medical terms were understood or not. An accurate report could be obtained by examining contracts between dental practitioners and insurance companies which was beyond the scope of the current study.

The process of preauthorization of a procedure is necessary for both the insurance company and dental practitioner for management and financial security. All assessed insurance companies offering dental insurance required approval of dental procedures with a varied waiting period. Delays in preauthorization could lead to more discomfort in the patient. The approval duration reported by insurance companies could be the expected ideal time, however, the accuracy of the length of delay would be better assessed from the dentists' practice by examining the chronology of the preauthorization process. A research done among Kenyan dentists reported that majority of the companies responded within the same day or same week. A small number responded that the approval duration was more than 1 week.

14 In non-emergency situations, preauthorization duration of less than a day may be considered

adequate. In cases where urgent or emergency service is required, a waiting period of several days could be questioned whether it is beneficial to the patient. This may also lead to breach of contract whereby the service is provided before the preauthorization hence complicating the reimbursement process.

The application of information and communications technology in health has revolutionized the turnaround time through the utilization of electronic medical insurance cards. Health facilities are able to easily access relevant patient's information including validity of the insurance cover as well as the accessible financial benefits [20,21]. The dentists also have a role to play in preventing delays to patient management. This includes appropriate and prompt filling and sending of the preauthorization forms to the insurance companies as well as immediate follow up. On the whole, the client, insurance company and the service provider have to effectively play their roles in order to make the utilization of insurance services prompt and beneficial.

The main goal of dental treatment is improving on health. As practitioners offer services they may get limited to providing services that are not the best for the patient because of various limitations as discussed above. This means that there are generally limitations to provision of best of dental care. It is however good to note that as dental insurance covers dental services that would be otherwise quite unaffordable for the patient it promotes oral health. It is also worth noting that discussions between service providers and insurance companies would be beneficial in improving health.

The study results could be limited due to recall bias by the Insurance company respondents. There were no documents that were examined to verify the given information and the investigation was only one sided since neither clients nor the service providers were enrolled in the study. Further comprehensive studies are highly recommended.

Conclusion

Most of the accessed medical insurance companies integrated dental health coverage. However, only management of carious teeth was covered by all insurance companies. The cost of management of sensitive teeth, periodontal diseases and orthodontics was covered by few medical insurers while prosthetic procedures were excluded. Preauthorization was required before dental treatment and the duration of approval of dental procedures took 5 minutes to 3 days. The annual limits ranged from 5,000 to 80,000 Kenyan shillings.

There is need for further patient education and collaboration between insurance company and dental service provider in order to make utilization of insurance services prompt and beneficial.

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Unsuccessful Closed Surgical Exposure of an Impacted Maxillary Canine Managed by Open Surgical Exposure

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Abstract

Background: Unerupted canines lead to aesthetic and functional deficiencies. Moreover, canine impaction has been reported to result in root resorption of neighbouring permanent teeth. For that reason, a diagnosis of an impacted canine should be done at the earliest possible moment and followed by treatment to resolve the problem. Presently, there are two major surgical exposure techniques routinely used: the open and the closed technique followed by orthodontic traction. A multidisciplinary treatment approach is recommended with teamwork of a number of dental specialties including prosthodontics, orthodontics, periodontics and oral surgery

Case Report: This report presents a case of an unsuccessful closed surgical exposure of an impacted maxillary canine which was then managed successfully by open surgical exposure. A 15-year-old patient was first managed unsuccessfully by closed surgical exposure with orthodontic treatment. When this treatment option failed to give the desired outcome, a decision was made to surgically expose the crown of the impacted canine, followed by the placement of a supporting orthodontic attachment and alignment of the tooth. This second option of treatment yielded good results and was considered as a better treatment choice to the extraction of the tooth.

Conclusion: Open surgical exposure and orthodontic alignment thus provides a predictable treatment option for palatal impacted maxillary canines.

Key words: Closed surgical exposure, open surgical exposure, impacted maxillary canine

Introduction

As regards the most common displaced and impacted teeth in the oral cavity, research has shown that canines come second only to the third molars [(1)]. The prevalence of maxillary canine impaction is twice as high as that of their mandibular counterparts [(2)]. Canine impaction has a preference for the palatal side over the labial side [(3)]. Two thirds of them get impacted on the palatal aspect whereas a third are found on the buccal plate and more females are likely to present with canine impaction than males [(4)].

Impaction of canines leads to aesthetic and/or functional challenges. Moreover, canine impaction has been reported to result in root resorption of neighbouring permanent teeth [(5)]. For that reason, diagnosis of an impacted canine is often important followed directly by an effort to offer a solution for the impaction. The most common approaches for the management of impacted canines comprise of early interceptive methods [(6)] or late mediation [(7)] Early interceptive approaches include auto-transplantation [(8)] and extraction [(9)] whereas late mediation can be achieved by surgical exposure of the canine and subsequent alignment orthodontically [(10)]. Canines are considered to have a high functional and aesthetic value. A combined surgical and orthodontic method to reposition the impacted canine in its appropriate place in the dental arch is considered ideal.

Currently, there are two major surgical techniques routinely used: the open and the closed technique. The closed technique consists of surgically exposing the tooth and bonding an attachment, usually a button and gold chain, onto the exposed tooth. After exposure and attachment, the palatal flap is repositioned and sutured, allowing the chain to exit through the mucosa. The

availability of self-etch adhesive bonding systems has simplified the bonding technique. After healing, an orthodontic brace is used to apply mild forces to get the canine to its right position onto the dental arch. With time, the eruption happens through the mucosa to its correct position [11]. Lewis and his colleagues described the open technique [12]. The procedure involves surgical exposure of the tooth and bonding an attachment on the exposed tooth during surgery. A window is then left open, after tissue removal to leave the tooth exposed. To cover the exposed area, a periodontal dressing is placed for approximately 10 days. Thereafter, the tooth is left to erupt naturally or is orthodontically moved to its correct position [12]

Case report

A 15-year-old female patient was referred to the University of the East Post-Graduate Endodontics-Periodontics clinic (Manilla Philippines) from the Post-Graduate Orthodontic clinic for review and further management of a missing canine.

History of Present Illness

Patient presented to the University of the East Postgraduate Orthodontics clinic for orthodontic treatment. After 11 months of initiation of the treatment and completion of the levelling and alignment phase, the patient was referred to the Endodontics-Periodontics clinic for management of the missing canine.

Upon examination tooth 23 was clinically missing with retained tooth 63 (Fig. 1). Palatal bulge coinciding with the region of the 23 was palpable (Fig. 2).

Fig. 1 and 2. Pre-operative picture; showing the labial tooth 23 as being clinically missing with retained deciduous tooth 63. Lateral view. Fig. 2. Pre-operative picture; palatal bulge coinciding with the region of the 23 is visible and palpable

Fig. 3. Dental Panoramic Tomogram showing impacted tooth 23 overlapping the root of tooth 21 and tooth 22

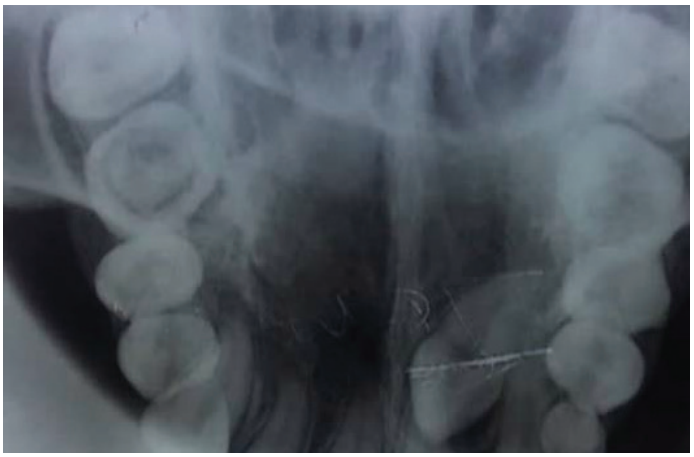

Fig. 4. Upper standard occlusal view showing impacted tooth 23

Fig. 5.

Fig. 6.

Fig 5 and 6: Periapical radiographs with the SLOB technique (Same Lingual Opposite Buccal) were taken to establish the exact location of the impacted canine.

Diagnosis

The diagnosis of palatal impaction of the upper left canine tooth (FDI nomenclature 23) was made.

First Treatment

Closed surgical exposure technique

A full thickness flap was raised on the palate with full reflection to expose the roof of bony crypt present which was gently removed using surgical carbide bur. The exposed dental follicle was enucleated from bony crypt using curettes 2R/2L with copious irrigation using normal saline was done. The tooth was cleaned, etched and the gold chain bracket bonded on the tooth. The flap was replaced to its original position and then sutured using interrupted suture. Bracket bond was placed (figures 7, 8).

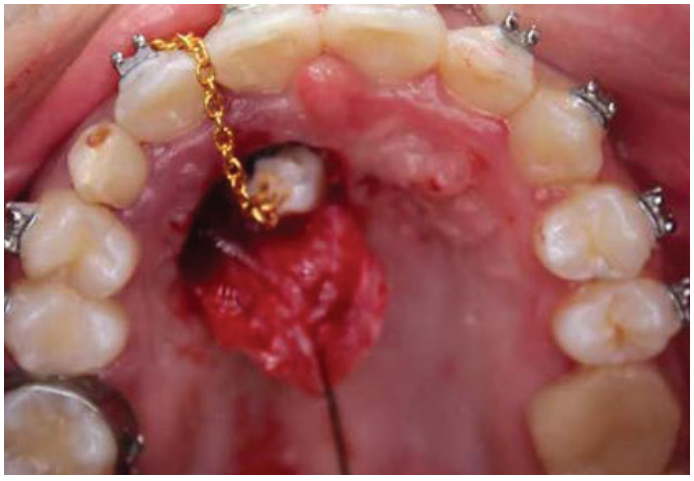

Fig.7. Attachment of the gold chain

Fig. 8 Flap placement and suturing

After eight (8) months of treatment, the results were not satisfactory as the tooth did not erupt and this can be seen in figures 10 and 11.

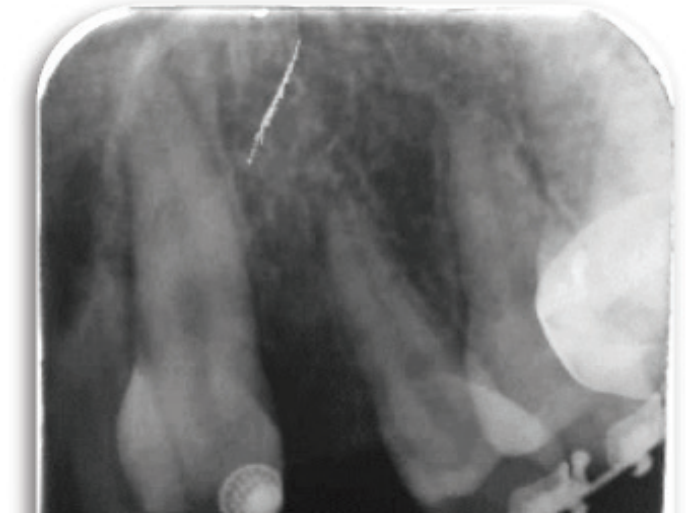

Fig. 10 and 11. Unsuccessful eruption of 23 after eight (8) months of orthodontic treatment following closed surgical exposure. Fig. 11. Slight movement shown on periapical radiograph.

Following this unsuccessful treatment option of, closed surgical exposure and orthodontic treatment for eight (8) months, a decision was made to use the open surgical technique instead of extracting the tooth.

Second treatment

Open surgical technique

A full thickness flap was raised with two (2) lateral releasing incisions. After the tooth was exposed, a horizontal incision was made to excise the palatal tissue (figure 12). Bracket adjusted. A periodontal dressing, Coe-Pak™ (GC America Incorporation) placement on the surgical site was done for 10 days (figure 13). Surgical review was done after 10 days for removal of the Coe- Pack. Healing of the surgical wound edges with an exposed tooth was seen (Figure 14).

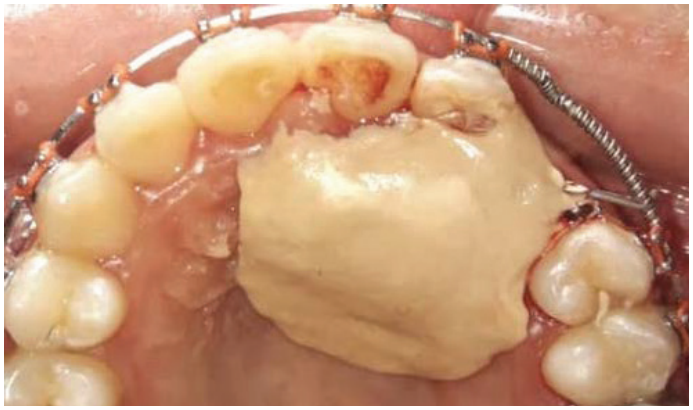

Fig. 12 and 13: Surgical excision of the upper left canine Fig. 13. Periodontal dressing known as Coe-Pak was place to protect the healing wound site.

Fig. 14 and 15: 10 days post-operative, showing the erupting canine. Fig. 15. Progressive eruption of tooth 23 into position.

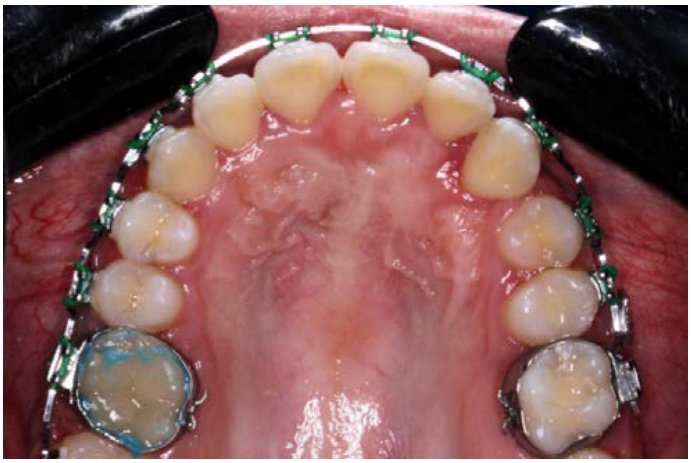

Fig. 16. Successful alignment of the canine into the dental arch

Discussion

This case report demonstrates the need to correctly manage impacted canines through a multi-disciplinary approach. In this particular case, a multidisciplinary approach was done through the involvement of a periodontist for the surgical exposure and an orthodontist in alignment of the exposed tooth [13].
During mixed dentition, timely diagnosis and intervention can shorten treatment time, as well as reduce the costs and avoid more complex treatments during permanent dentition [14]. In this case, treatment was started at the age of 14 years therefore making the orthodontic treatment more complex and lengthy.

Clinical diagnosis is undeniably the first step, where key signs may indicate the occurrence of the existing problem. Such signs include: prolonged retention of deciduous canines after the age of 14-15 years; presence of a palatal eminence; absence of the labial canine eminence; delayed eruption of the permanent canine; delayed eruption and abnormal migration or distal tipping of the lateral incisors [4].

In this case study, the palatal impacted maxillary canine successfully erupted after open surgical exposure and had adequate space for proper alignment in the arch.
In order to have an accurate diagnosis, the clinical examination should be complemented with imaging tests, such as radiographs and CT scans [15]. In the current case, panoramic view, upper standard occlusal view and periapical views were used to establish the position of the impacted upper left canine.

One retrospective study reported a higher failure rate in alignment of impacted canines with the closed technique and attributed this to improper traction direction, presence of dense connective tissue in the way of the canine and presence of car tissue [16]. As seen in the current report, initial management by the closed surgical technique was unsuccessful and therefore the open surgical technique had to be used. Finally, open surgical exposure of impacted canines has been reported to be better than the closed method in terms of minimal initial alignment period and reduced risk of ankylosis [17].

This report presents a case of an unsuccessful closed surgical exposure of an impacted maxillary canine managed by open surgical exposure. Open surgical exposure and orthodontic alignment thus provides predictable treatment option for palatal impacted maxillary canines.

Conflict of interest

The authors report no conflict of interest related to this work.

Acknowledgement

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Sodium Perborate Walking Bleach: A Minimally Invasive Treatment Option For Restoring Esthetics

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Abstract

Tooth discoloration is a cosmetic problem and regardless of the etiology, the patients' main concern is usually to have improved esthetics. Discolorations are broadly categorized into intrinsic and extrinsic. Pulpal necrosis is one of the causes of intrinsic discoloration. In management of intrinsic discolorations, bleaching procedures have been shown to be more conservative, affordable and relatively easy to carry out than restorative techniques. This case report presents a necrotic discoloured maxillary lateral incisor in a 23-year old female patient managed successfully by endodontic treatment and sodium perborate walking bleach technique. Two years post-treatment the periradicular tissues remained healthy and there were on clinically visible signs of recurrence of discoloration.

Key words: Discoloured, Walking bleach, intrinsic

Introduction

Changes in tooth color or transluscency can be attributed to various etiologies. These changes clinically present with varying degrees of severity,and differences in appearance and localization [1]. Discolorations incorporated into the tooth structure are termed as intrinsic. On the other hand extrinsic discolorations are attached on the surface of the tooth. Extrinsic and intrinsic discolorations may present in combination affecting enamel, dentin or the pulp. Disclorations in teeth may be associated with the patient's behaviour, age, disease, genetics or caused by medical or dental treatment [1, 2].

Extrinsic discolorations are more often than not caused by smoking, beverages like coffee and tea, food, antibiotics, and metals such as copper and iron [3]. Intrinsic discolorations occur secondary to trauma, endodontic treatment, pulp necrosis, restorative procedures and also due to systemic factors [2, 3].

Pulp necrosis can result from chemical, mechanical or microbial insult. By products from the disintergrating pulp may become incorporated into dentinal tubules causing dentin discoloration. The degree of the discoloration has been found to be proportional to the time the necrotic pulp remain in the chamber [4].

For a discolored tooth, bleaching, veneering or placement of a full coverage crown are the treatment options available. Discolored necrotic teeth tend to respond favourably to intracoronal bleaching. In such cases, a coronal orifice seal and an apical seal are necessary to prevent the infiltration of the bleaching agents into the periradicular tissues thus avoiding complications.

Intracoronal bleaching can be achieved using various agents. These include sodium perborate[5, 9], hydrogen peroxide[6, 8], and carbamide peroxide [7]. Previous case series reports indicate shades lighter than what was anticipated being achieved after two weeks of sodium perborate intracoronal bleaching [10,11]. In cases where sodium perbotare was mixed 10% carbamide peroxide, the desired shade was chieved in 7 days [11]. In other cases, where a 2 week or 3 week bleaching period was utilized, the bleaching agent was replaced after 1 week. The procedure for the placement of sodium perborate was repeated every 1 week in two-time or three-time interval.

Case report

A 23 year-old female patient visited the Postgraduate Clinic, Department of Endodontics and Periodontics, at the University of the East College of Dentistry. She sought treatment of her discolored maxillary left lateral incisor.

About 5 years prior to consultation the patient began experiencing sensitivity whenever she drank cold water on one of her upper left front tooth. The sensitivity was short lived. There were no symptoms when she took anything hot. She visited a dentist and the tooth was restored. The patient did not experience any symptoms after the restoration. Four years prior to consultation she began experiencing sensitivity again, when she drank cold water. She visited her dentist again and the restoration was replaced.

She did not have any problem until about two years prior to consultation, when she started experiencing pain. Initially, the pain was mild but with time the intensity increased. A number of times she had to take analgesics to relieve the pain. She visited her dentist again and had the restoration replaced. She reported moderate pain, which subsided gradually within a week. She used medication prescribed by her dentist to relieve the pain. Thereafter, the tooth remained free from symptoms until one year prior to consultation when she suddenly had a swelling associated with the tooth. It was accompanied by moderate, throbbing pain. She took Mefenamic acid during that time and the swelling went down gradually within one week.

Over time, she noticed that her tooth was becoming darker in color compared to the other teeth. She had recurrent swellings associated with her tooth a number of times. However, she reported that the last time she experienced a swelling associated with the tooth was about 6 months prior to consultation. Since then, she had no pain associated with the tooth.

The patient visited the Endodontics-Periodontics postgraduate clinic and wanted the discoloration addressed.

Clinical and radiographic examination

Upon examination, the upper left lateral incisor (22 according to FDI nomenclature) had a composite restoration with poor margins [Fig. 1]. There was a healing fistula on the labial aspect. The probing depths were within normal range and there was no bleeding on probing. There was no tenderness elicited to percussion. Moreover, the tooth was non-vital with no response to thermal changes, both heat and cold tests. An intraoral periapical radiograph taken showed radiopacity consistent with restorative material extending to the pulp chamber. The lamina dura appeared disrupted with widening of the periodontal ligament space and slight periapical radiolucency [Fig. 2].

Diagnosis

After considering the clinical and radiographic findings the diagnosis arrived at was, Necrotic pulp, Chronic Apical Abscess [AAE 2013] , with intrinsic discolouration secondary to necrotic pulp, VItapan classical shade C4.

Fig. 1. Pre-operative clinical photograph of tooth 22

Fig. 2. Pre-operative radiograph of tooth 22

Treatment

1st Visit

For the treatment, after rubber dam isolation access cavity was prepared. Discoloration was noted on the labial wall [fig. 3].

Patency was done and working length determination using Root ZX mini apex locator [J. Morita Japan] and further confirmed by taking an initial apical file radiograph.

Cleaning and shaping was done using WaveOne® Gold [Dentsply Sirona], preparation with EDTA cream and copious irrigation with 2.5 % sodium hypochlorite. A master apical file radiograph was taken.

Since the canal was dry, a master cone radiograph was taken and obturation done (this was a single visit treatment from acess , obturation to application of the blaching agent) using lateral compaction technique, with Sealapex™ [Kerr Dental].

After placement of Fuji VII Glass Ionomer Cement [GC Dental Japan] coronal orifice seal, the entire old composite restoration was removed and proper build up done with composite DiaFil [International-Korea]. Vaseline petroleum jelly was applied on the soft tissue around tooth 22. This was done to protect the tissues from irritation in case of contact with the bleaching agent.

Sodium perborate tetrahydrate [Loba chemie Pvt. Ltd., India] was mixed with sterile water into a thick consistency of wet sand and placed over the discoloured labial wall.

A Fermin [Detax GmbH-Germany] temporary restoration was placed to cover the access cavity .A clinical photograph was taken for reference. (Fig 3)

Fig. 3. This picture shows the access cavity that was prepared and discoloration on the lateral wall

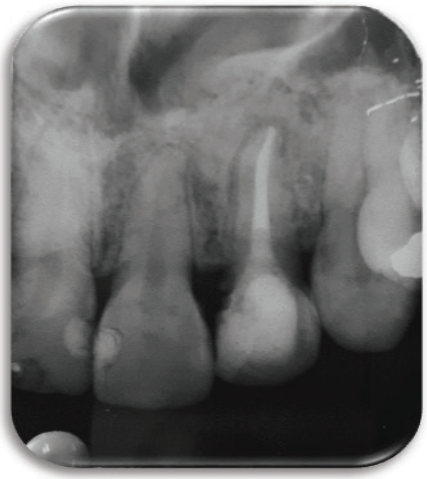

Fig. 4. Radiograph showing the tooth after initial build-up and placement of bleaching agent and temporay restoration

2nd Visit

The patient was reviewed after 14 days, the correct shade, Vitapan Classical A2 had been achieved, from the initial Vitapan Classical shade C4. The bleaching agent was removed and a temporary restoration placed using Fermin [Detax GmbH-Germany]. The patient was adviced to come back after 2 weeks for the final composite restoration.

3rd Visit

Two weeks later, composite restoration was done using DiaFil [DiaDent International-Korea] [Fig. 5].

Fig.5. Picture showing the final composite restoration

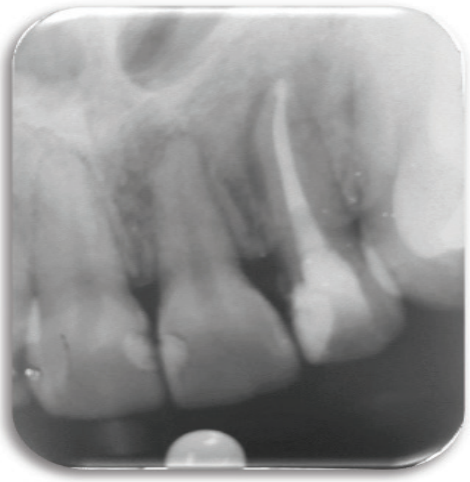

Fig.6. A radiograph showing the final restoration

Fig. 7. one year recall

Fig. 8. Two year recall

Clinical photographs showing the correct shade after bleaching of tooth 22 stilll maintained 2 years postoperative.

Discussion

There are many different bleaching agents currently available in the market, however the most commonly used agents are Hydrogen peroxide, Sodium perborate and Carbamide peroxide. Hydrogen peroxide and carbamide peroxide are mainly indicated for extracoronal bleaching whereas sodium perborate is the agent of choice for intracoronal bleaching [6,9].

In the current case, Sodium perborate was used for bleaching. Sodium perborate is an oxidizing agent available in a powdered formulation or as various commercial preparations. It contains 95% perborate, corresponding to 9.9% of the available oxygen and is stable when dry. Commonly used Sodium perborate preparations are alkaline. Three preparations are available depending on the oxygen content and these are: monohydrate, trihydrate and tetrahydrate. The oxygen content determines the bleaching efficacy [9, 12]. Sodium perborate is easier to handle and safer than concentrated Hydrogen peroxide solutions. A combination of Sodium perborate and 30% hydrogen peroxide has been shown to bleach faster. However, the long-term results obtained are similar to sodium perborate mixed with water. Thus, the combination of sodium perborate and hydrogen peroxide should not be used routinely[5].

Research has shown that intracoronal bleaching of root treated teeth may be successfully carried out many years after discoloration and endodontic therapy. Successful outcome depends on etiology, correct diagnosis & proper selection of bleaching technique [13]. The rate of discoloration and patient's age have no major effect on the long-term stability of bleaching [14].

Whitening of discolored root treated teeth employ the use of either the walking bleach technique or the thermocatalytic technique. In the current case, the walking bleach technique was preferred because it requires less chair time, is safer and more comfortable for patients compared with the thermocatalytic technique. Walking bleach technique should first be attempted in all cases requiring intracoronal bleaching and if not successful then the thermocatalytic technique can be considered [15,16].

A thick layer of at least 2mm of protective cement barrier is required to cover the obturation and protect

dentinal tubules. The barrier should also conform to the external epithelial attachment of the tooth. In the current case a Fuji VII [GC Dental Japan] GIC barrier was placed. The bleaching agent diffuses through the dentinal tubules resulting in inflammation of the periodontal ligament, necrosis of the cementum and subsequent external root resorption [17]. This process is likely to be enhanced in the presence of bacteria [18]. Etching of dentin with phosphoric acid prior to bleaching may not improve the prognosis. In one study, results showed no significant difference between walking bleach carried out with prior dentinal etching using 50% phosphoric acid and those bleached without etching [19].

After removal of the bleaching agent from the pulp chamber, a temporary restoration was placed and the patient is reappointed for the final restoration after two weeks. This was done to allow the residual peroxides that affect the bonding strength of composites to leach out of the tooth structure [20]. Sodium perborate mixed with water has been shown to result in much less loss of bond strength than does concentrated hydrogen peroxide [21].

Tooth discoloration often results from leaking or discolored restorations in some cases, cleaning the pulp chamber and replacing defective restorations may suffice. In the current case, it was noted that there was an improvement in the appearance of the tooth after the entire old composite restoration was replaced [22, 23, 24].

Evaluation of tooth color was done and photographs taken pre-operatively and after the procedure to provide a reference point for future comparison. Although initial bleaching is successful, rediscoloration can occur after several years. Patients must be informed of the possibility of occurrence. Rebleaching has been shown to be successful after rediscoloration [25].

A recall done two years postoperative showed that the tooth still remained with the patient's acceptable shade [Fig. 8].

Conclusion

As seen in this case, Sodium perborate tetrahydrate walking bleach is a minimally invasive treatment option for restoring esthetics of a discolored non-vital tooth. Nonetheless, proper treatment planning and execution are key to achieving optimal results and preventing post-operative complications.

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Conflict of interest

The authors declare no conflict of interest related to this report.

INFORMATION FOR CONTRIBUTORS

The Journal of Kenya Dental Association (JKDA) is a quarterly publication that provides a forum for publication of original scientific articles, reviews, clinical case reports and opinion pieces concerning the dental sciences and oral health care.

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Articles should report data from original research that is relevant for the provision of oral health care in developing countries. Reviews must be objective, comprehensive analyses of the subject matter, giving a current and balanced view of the issues discussed. Case reports must be authentic, appropriately illustrated and of critical significance to the practice of dentistry. Letters to the editor should not be more than 800 words and should contain only one illustration and not more than 5 references. Priority shall be given to letters responding to articles published in the journal in the last four months.

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World Health Organization. World Health Report (Online) 2005. URL: http://www.whot.int/whr/2005/r; accessed on 05.06.05.Editorial

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