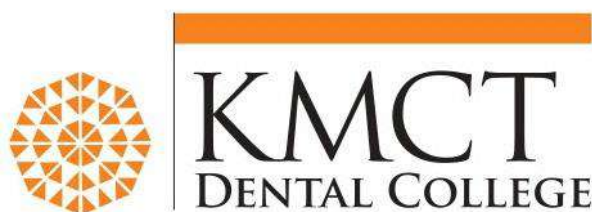


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Editorial

KMCT Group of Institutions has started incubation center with the objective of promoting specialized knowledge in the field of entrepreneurship development, innovation and creative ideas. Incubation & innovation centre fosters innovation, research, and entrepreneurial activities in technology-based areas. It provides a platform for start-ups by budding entrepreneurs and intrapreneurs to convert their innovative ideas into commercially viable products.

Incubation is the hard part between discovery and success. For a company to successfully implement opportunities that stretch its strategic boundaries, there needs to be room to experiment in a non-deterministic, non-linear way. There needs to be a way, not only to tweak the design of a new opportunity, but also to challenge and reshape its underlying value proposition and business case throughout the process. For strategic innovations to be successfully pursued by a company, there needs to be an iterative cycle of experimentation – testing, learning, adapting, and testing again – until you get it right (or abandon it!). This period of experimentation requires a certain mindset, specific behaviours, a methodology that includes the appropriate tools, and a guide that can be used to check if you are on the right path. This is what is called ‘incubation’.

Incubation is the period between having a well-reasoned concept and an actual artefact (product, service, platform, business model, etc.) that can thrive in the world. The reason for having an incubation period (during which you are incubating a new opportunity) is to design and conduct experiments (and use the results) to get as close to a true, valuable manifestation of a new artefact as possible.

Knowledge, experience and competence on a specific domain that have been acquired through continuous learning and real world experiences makes us unique. When we build a product or start up, our understanding of the depth and breadth of that domain makes a huge difference. With years of industry knowledge and real world problem solving, we have to create platforms, services, tools and techniques that you can re-use from day one. These accelerators propel the transformation of your start up like no other.

THE VALUE OF AN IDEA LIES IN THE USING OF IT, YOU DON'T LEARN TO WALK BY FOLLOWING RULES; YOU LEARN BY DOING AND FALLING OVER.....

Best wishes

Dr Manoj Kumar KP

Editor

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Case Report

SURGICAL DEPIGMENTATION – A CASE REPORT

*Dr. Subisha SB, **Dr. Anu Mathew

Abstract

Gingival tissues play major role in maintaining harmony of smile along with shape, position and the colour of the teeth. Although melanin pigmentation of the gingiva is completely benign and does not present a medical problem, complaints of “black gums” are common, particularly in patients having a very high smile line. Perio-esthetic treatment modalities include all the procedures to achieve a harmonious inter-relationship of the pink with white. Different treatment modalities have been reported for gingival depigmentation, such as bur abrasion, scraping, partial thickness flap, cryotherapy, electrosurgery, and laser. The present case report discusses surgical depigmentation in a young patient.

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Introduction:

The word esthetic denotes beauty as opposed to the merely pleasing, indicating that the most desirable attributes are present. Achieving optimal oral beauty involves many factors, one of which is gingival appearance. Colour of the gingiva varies from light to dark brown or black. It varies in different individuals and it is thought to be associated with cutaneous pigmentation.¹ The gingival colour depends

primarily upon the number and size of vasculature, epithelial thickness, degree of keratinization and pigments within the gingival epithelium. Melanin, carotene, reduced haemoglobin and oxy-haemoglobin are the prime pigments contributing to the normal colour of the oral mucosa.²

Gingival pigmentation is presented as a diffuse deep purplish discoloration or as irregularly shaped brown and light brown or black patches, striae or strands. It results

from melanin granules, which are produced by melanoblasts. Melanin, a non-hemoglobin derived brown pigment, is the most common of the endogenous pigments and is produced by melanocytes present in the basal and suprabasal cell layers of the epithelium.³ Excessive deposition of melanin located in the basal and supra-basal cell layers of the epithelium will result in gingival hyperpigmentation.⁴

Gingival hyper-pigmentation is removed or reduced by using different techniques of gingival depigmentation. The first and foremost indication for depigmentation is patient demand for improved esthetics. Various depigmentation techniques have been employed, with similar results. Selection of a technique should be based on clinical experience and the individual's preference.⁵ Though the initial results of de-pigmentation procedure are highly encouraging, repigmentation is a common problem. The large variation in time of repigmentation may be related to the depigmentation procedure used and the race of the patient. The repigmentation is described as spontaneous and this process

may be attributed to the fact that active melanocytes from the adjacent pigmented tissues migrate to the treated areas.

Gingival depigmentation procedures:

According to Roshna and Nandakumar⁶

Surgical methods

- a. Scalpel surgical technique
- b. Bur abrasion method
- c. Electro-surgery
- d. Cryosurgery

Lasers - carbon dioxide (10.600 nm), diode (810 nm), Neodymium: Yttrium Aluminium garnet (1.064 nm) and Erbium: YAG (2.940 nm) lasers

Radiosurgery.

Chemical methods- eg: phenols, ascorbic acid

Methods used to mask the gingival pigmentation

- a. Free gingival graft.

b. Acellular dermal matrix allograft.

Table 1: Represents the history, advantages and disadvantages of various depigmentation procedures.⁷

Technique	History	Advantage	Disadvantage
Scalpel surgical technique	First illustrated by Dummet and Bolden in 1963	Simple, easy to perform, non-invasive, cost effective, does not require any extensive armamentarium and faster healing	Causes unpleasant bleeding during and after the operation, more chances of infection in scalpel surgery
Bur abrasion method	The first documented case using this technique was reported by Ginwalla et al in 1966.	It is relatively simple, safe, non-aggressive method, shows less discomfort, easy to perform, can be readily repeated, does not require any sophisticated equipment and it is economical.	The procedure requires 45 min to 1hour for completion. It is difficult to control the depth of de-epithelialization. Moreover, bleeding and postoperative pain are anticipated.

Electro surgery	The first documented case report using electro surgery for depigmentation was by Ginwalla et al in 1966	It was found that this method controls hemorrhage, permits adequate contouring of tissues, causes less discomfort to patient, less scar formation and lesser chair time.	Requires more expertise than scalpel surgery. Prolonged or repeated application of current to tissue induces heat accumulation and undesired tissue destruction. This technique is uncomfortable to patients due to foul odor
Laser	Trelles et al, (1992) were the first to treat patients with gingival pigmentation by Argon laser	Dry and bloodless surgery. Instant sterilization of surgical field. Reduced bacteremia, Reduced mechanical trauma Minimal post-operative swelling and scarring. Minimal post-operative pain Epithelial regeneration is delayed.	Treatment is very expensive. Loss of tactile feedback while using lasers. Gingival fenestration and bone exposure may occur. More time is required for the healing of the periodontal tissues. Less rate of recurrence.

Cryosurgery	First cryosurgical depigmentation was documented by Tal et al in 1987.	Easy and rapid to apply. Does not need anesthesia or suturing. It does not cause any bleeding or scars	Depth control is difficult, and optimal duration of freezing is not known. Prolonged freezing increases tissue destruction. Expensive specialized equipment is required. Cryosurgery is followed by considerable swelling and increased soft tissue destruction
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Radiosurgery	Drs. Arikan and Gurkan have reported on numerous cases of gingival depigmentation using radiosurgery	The main advantage of radiosurgery is its ability to produce coagulation. Patients are less apprehensive due to the lack of bleeding, It makes a pressure less incision. It is self sterilizing and produces a sterilized cut. Some hand pieces and electrodes can be autoclaved. It produces little or no scar tissue. It requires hand support and finger rest. It eliminates bleeding or hemorrhage; there is better visibility. It is small in size; maintenance and repair are readily available.	It requires at least two sittings within 2 weeks for completion of treatment. Cannot be used on patients with poorly shielded pacemakers. Cannot be used near inflammable gases. This technique is uncomfortable to patients due to foul odor The initial cost of the equipment is far greater than the cost of a scalpel.
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Free gingival autograft	Tamizi M and Taheri M in 1996 documented the treatment of physiologic gingival pigmentation with free gingival autografts	More esthetic results. Less recurrence rate.	This technique required the use of additional surgical sites with added discomfort Healing is slow and painful. The amount of tissue available in the donor area is limited. Furthermore, the presence of a demarcated line commonly observed around the graft in the recipient site may itself pose an esthetic problem
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Acellular dermal matrix allograft	Novaes AB Jr et al in 2002 demonstrated the use of acellular dermal matrix allograft for the elimination of gingival melanin pigmentation	Reduced surgical time compared with free gingival graft (due to elimination of the surgical procedure for donor tissue) Decreased postoperative complications Unlimited amount of graft material A predictable and satisfactory esthetic result. one surgical site and less post operative discomfort	It is expensive and requires clinical expertise. Possibility of graft contraction.
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Criteria for Selection of Technique

Patient's skin colour, extent of gingival pigmentation, lip line, upper lip curvature, esthetic concern and expectation from the treatment, influence the orchestration of treatment plan, and selection of technique. However, the procedure adopted should be simple, cost effective, and comfortable to the clinician as well as patient with less pain and minimal tissue loss.⁸ Caution must be employed to avoid injury to soft tissues and

adjacent teeth. Inappropriate technique or inadvertent application can result in a gingival recession, damage to attachment apparatus, underlying bone, as well as enamel.

Scalpel Surgical Technique

It is also called as split thickness epithelial excision⁹ and surgical stripping.¹⁰ Conventional scalpel method involves the surgical excision of gingival epithelium using a scalpel and allowing the denuded connective tissue to heal by secondary intention.¹¹ It is simple, most economical

and convenient to perform with minimum time and efforts.¹² Healing with this technique is faster in comparison to other surgical techniques.¹³ Although lower cost and lower rate of recurrence favour the surgical stripping of gingiva, it is associated with pain, post-operative discomfort, intra- and post-operative bleeding and requires placement of periodontal dressing.¹⁴ Thinner gingival biotype and narrow papillary areas contraindicate the use of this technique¹⁵.

Case report

24-year-old female patient reported with a chief complaint of dark gums to department of Periodontics Government Dental college, Trivandrum [Figure 1]. Surgical depigmentation procedure was planned from canine to canine region in both arches. The entire procedure was explained to the patient and written consent was obtained. Routine oral hygiene procedures were carried out and oral hygiene instructions were given. Depigmentation of upper and lower arches were conducted in 2 weeks interval.

Procedure was done under local anaesthesia. Using a number 15 Bard

Parker blade, split thickness incision was made from distal gingiva of 13 to distal gingiva of 23 and distal gingiva of 33 to distal gingiva of 43. Removal of the pigmented epithelium up to the level of the mucogingival junction was carried out, leaving the connective tissue intact [Figure 2]. A periodontal dressing (Coe-Pak) was placed on the surgical wound area for patient comfort and to protect it for 1 week. The patient was given analgesics for a period of 5 days and was advised to use 0.12% chlorhexidine gluconate mouthwash for 2 weeks postoperatively. During postoperative period, the wound healing was uneventful without any discomfort. Three months postoperative examination showed well-epithelialized gingiva, which was pink in colour and pleasant, but with few sites showing remnants of pigmentation [Fig 3].



(Figure 1: Preoperative Photograph)



(Figure 2a: Intra operative Photograph)



(Figure 3b: Immediate Post operative Photograph)



(Figure 2b: Intra operative Photograph)



(Figure 4: 3 weeks Post operative Photograph)



Figure 3a: Immediate Post operative Photograph)



(Figure 5: 6 months Post operative Photograph)

Discussion

Pigmented gingival tissue many a times forces the patients to seek cosmetic treatment. Several treatment modalities have been suggested and presented in the literature, ranging from a simple scalpel method to sophisticated lasers. According to Cicek (2003), melanin pigmentation is caused by melanin deposition by active melanocytes located in the basal layer of oral epithelium¹⁶.

The depigmentation procedure by scalpel technique is simple, easy to perform, noninvasive, and above all, cost effective. According to Almas and Sadiq (2002)¹⁷, the scalpel wound heals faster than that in other techniques. But scalpel surgery causes unpleasant bleeding during and after the operation. Covering the exposed lamina propria with periodontal dressing for 7–10 days may reduce patient's discomfort.

6 months follow up of this patient showed some areas of mild melanin pigmentation in the gingiva. A study by Perlmutter et al. (1986) showed that gingival surgical procedures performed solely for cosmetic reasons offer no permanent results. Repigmentation refers to the clinical

reappearance of melanin pigment following a period of clinical depigmentation. The mechanism suggested for the spontaneous repigmentation is that the melanocytes from the normal skin proliferate and migrate into the depigmented areas¹⁸.

Conclusion

The growing esthetic concern requires the removal of unsightly pigmented gingival areas to create a pleasant and confident smile, which altogether may alter the personality of an individual. This could be easily attained by gingival depigmentation even though spontaneous repigmentation occurs. In this case surgical depigmentation produced desired results, and above all, the patient was satisfied with the outcome, which is the ultimate goal of any therapy that is carried out.

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Literature Review

PROBIOTICS IN PERIODONTAL HEALTH

*Dr. Nikhila.TM, ** Dr. Harish Kumar V.V

Abstract

The use of probiotics for use in oral care applications is gaining importance. Probiotics are live microorganisms administered in adequate amounts with beneficial health effects on the host. This article reviews the role of probiotics for management of periodontal diseases and explores its potential as a novel treatment strategy.

Keywords-Periodontal diseases, Probiotics, Lactobacillus

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Introduction:

Periodontitis is a chronic inflammatory condition affecting both the hard and soft tissues surrounding the teeth, caused by a combination of specific bacteria and inflammatory host responses and resulting in the destruction of the connective tissue of the gingiva, periodontal ligament and alveolar bone.¹ Traditionally, the main treatment modality for chronic periodontitis is non-surgical periodontal therapy, including oral hygiene

instructions and scaling and root planing.²

Adjunctive therapies, such as antibiotics or probiotics, may prove useful in these multifactorial conditions where scaling and root planing therapy alone is not successful. Systemic antibiotics may offer additional benefits in conjunction with scaling and root planing, but they are not innocuous drugs. Antibiotics have side effects, and there is the potential for emergence of antibiotic-resistant bacterial strains.³ As a result of these side effects, efforts have commenced to explore the use

of probiotics as a method to modulate the composition of pathogenic biofilms in conjunction with scaling and root planing.⁴

The first scientist to lay down the foundations for the concept of beneficial bacteria was the Ukrainian born Nobel laureate bacteriologist Ilya Ilyich Mechnikov, known as “the father of modern immunology.” Other scientists continued Metchnikov’s work and in 1965 the term “probiotics,” meaning “for life,” was introduced by Lilly and Stillwell.⁵

Definition and Sources of probiotics

The current definition for probiotics is given by the World Health Organization, which defines probiotics as live microorganisms, most often bacteria (sometimes fungi), which, when consumed, confer beneficial effects to the host.⁶

Probiotics are bacterial strains usually isolated from human commensal microbiota and adequately characterized for strain identity, content, stability, and proven health effects. The most commonly used species of probiotics belong to the *Lactobacillus*, *Bifidobacterium*,

Escherichia, *Enterococcus* and *Bacillus* genera.⁷

Mechanism of action

The effects of probiotics can originate from three local or systemic main modes of action:^{8, 9}

1. Indirectly, probiotics compete with pathogens for essential nutrients; they can also restrict the pathogens’ adhesion capabilities by changing the environmental pH.
2. Directly, probiotics are involved in the production of antimicrobial substances (lactic acid, hydrogen peroxide, bacteriocins) that can kill or inhibit the growth of periodontal pathogens.
3. Probiotics can act on the host by modulating the host’s innate and adaptive immune response (reducing the production of pro-inflammatory cytokines: IL-6, IL-1 β , TNF α and increasing production of anti-inflammatory cytokines: IL-10) and by improving the intestinal barrier integrity.

Probiotics and Periodontal diseases

Rationale of its use

In order for a probiotic candidate to be used orally in periodontal disease related conditions, it must first be tested using *invitro* experimentation. Similar to probiotics used in the gastrointestinal tract, probiotics for periodontal disease applications should demonstrate the absence of pathogenic gene sequences and the presence of antibacterial activity against periodontopathic bacteria, colonizing ability on oral epithelial cells, and the ability to modulate the immune response in the presence of periodontal pathogens.¹⁰

Therapeutic effectiveness

➤ Reducing inflammation

Streptococcus oralis and *Streptococcus uberis* have reported to inhibit the growth of pathogens both in the laboratory and animal models. They are indicators of healthy periodontium. When these bacteria are absent from sites in the periodontal tissues, those sites become more prone to periodontal disease.¹¹

Staab et al observed reduction in activity of MMP-3 and elastase enzymes in subjects with plaque induced gingivitis after

consuming probiotic milk containing *Lactobacillus Casei* species for a period of 8 weeks.¹²

Twetman et al used *L. reuteri*-containing chewing gum in 42 healthy patients and assessed its effects on crevicular fluid volume, cytokine (interleukin-1 β , interleukin-6, interleukin-10, and TNF- α) levels, and bleeding on probing. Crevicular fluid volume, as well as TNF- α and interleukin-8 levels, and bleeding were significantly reduced.¹³

➤ Bone formation

According to Narva et al, during the fermentation process in milk, *Lactobacillus helveticus* produces short peptides that act on osteoblasts and increase their activity in bone formation. These bioactive peptides could thereby contribute in reducing bone resorption associated with periodontitis.¹⁴

➤ Reduction in probing depth

Shimauchi et al demonstrated that the oral administration of a tablet containing *L.salivarius* WB21 decreased plaque index significantly and pocket probing depth markedly in smokers and reduced salivary lactoferrin at the end of 8-week trial.¹⁵

Shimazaki and colleagues, in an epidemiological study found that individuals, particularly non-smokers, who regularly consumed yoghurt or beverages containing lactic acid exhibited lower probing depths and less loss of clinical attachment than individuals who consumed few of these dairy products. A similar effect was however not observed with milk or cheese.¹⁶

➤ **Guided Pocket Recolonization (GPR)**

Teughels et al reported that the subgingival application of a bacterial mixture including *Streptococcus sanguinis*, *Streptococcus salivarius* (*S. salivarius*), and *Streptococcus mitis* after scaling and root planing significantly suppressed the re-colonization of *Porphyromonas gulae* (canine *P. gingivalis*) and *P. intermedia* in a beagle dog model. This novel approach of Guided Pocket Recolonization may provide a valuable addition or alternative to the armamentarium of treatment options for periodontitis.¹⁷

➤ **Role in Halitosis**

Halitosis or oral malodour refers to the foul and unpleasant odour emanating from the

oral cavity due to volatile sulphur compounds (VSC). Bacteria responsible for VSC production are *Fusobacterium nucleatum*, *Porphyromonas gingivalis*, *Prevotella intermedia*, and *Treponema denticola*.¹⁸

Weissella cibaria, a probiotics strain has been shown to inhibit VSC production under both in vitro and in vivo conditions. This is likely to be because of its ability to co-aggregate with VSC producing species like *F. nucleatum*, thus reducing the source for malodorous compounds in oral cavity and also by producing hydrogen peroxide which inhibit *F. nucleatum* as reported by Kang et al.¹⁹

S. salivarius K12 taken in a lozenge after a mouthwash could reduce oral VSC levels in 85% of the test groups according to study by Burton et al.²⁰

Commercially available Probiotics for periodontal disease management

Few products containing probiotics (such as tablets, lozenges, chewing gums or tooth pastes) are currently available.²¹

➤ **Gum PerioBalance**

This is probably the first probiotic

specifically formulated to fight periodontal disease. It contains a patented combination of two strains of *L.reuteri* specially selected for their synergistic properties in fighting cariogenic bacteria and periodontopathogens. Each dose of lozenge contains at least 2×10^8 living cells of *L. reuteri* Prodentis. Users are advised to use a lozenge every day, either after a meal or in the evening after brushing their teeth, to allow the probiotics to spread throughout the oral cavity and attach to the various dental surfaces.

➤ **PeriBiotic**

This toothpaste is an all-natural, fluoride-free oral hygiene supplement containing Dental-Lac, a functional *Lactobacillus paracasei* probiotics not found in any other toothpaste.

➤ **Bifidumbacterin, Acilact , Vitanar**

This probiotics preparation of a complex of five live lyophilized lactic acid bacteria, is claimed to improve both clinical and microbiologic parameters in gingivitis and mild periodontitis patients. After routine mechanical debridement, 2 tablets to be dissolved in the mouth, three times a day

for 20-30 days for improved outcome.

➤ **Wakamate D**

This probiotic tablet contains 6.5×10^8 colony forming units (CFU) per tablet of *Lactobacillus salivarius* WB21 and xylitol (280 mg/ tablet) was originally prepared to contribute for the intestinal microbial balance by providing acid tolerant *L. salivarius* WB21.

➤ **Prodentis**

This probiotic lozenge is a blend of two *Lactobacillus reuteri* strains containing a minimum of 1×10^8 colony forming units (CFU) for each of the strains DSM 17938 and ATCC PTA 5289.

Additional studies are however required to evaluate the long-term effects of using these commercially available products.

Conclusion

Although administration of probiotics generally can be considered safe, each strain of probiotics has specific properties that should be considered before its use in any patient. A lozenge form or chewing gum tablet or gum might better serve the needs for periodontal health

prophylaxis. Controlled clinical trials and long term studies are required to investigate the concentration of probiotics bacteria in the specific means of administration.

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Literature review

MANAGEMENT OF THUMB SUCKING HABIT

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Abstract

Thumb sucking is a behavior that can be grouped under a list of habits known as non-nutritive sucking habits. Non-nutritive sucking habits are common in young children, and as they grow older, they tend to stop them. In most cases, this habit ceases spontaneously between 2 and 4 years of age. Nevertheless, if thumb sucking continues, negative consequences can occur, such as a deformity of the nail or paronychia. If the habit persists while the permanent dentition is erupting, malocclusion can occur. Clinicians must be aware of the non-nutritive sucking habits, including thumb-sucking and their negative impact on oral health, as well as the complications that can arise with them. Referral to a pediatric dentist to evaluate dental complications can be considered when the non-nutritive sucking habits persist beyond the 4 years of age despite appropriate behavioral interventions. This article discusses the different management methods of thumb sucking habit.

Key Words: Habits, Appliance, Thumb sucking

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Introduction

A habit is a repetitive action that is being done automatically. Repetitive behaviours are common in infantile period and most of

them are started and finished spontaneously. One of the most common repetitive behaviours in infantile period is hand sucking. Hand sucking developed in

89 % of infants in the second month and in 100% of them in the first year of age. The prevalence of this habit is decreased as age increases and mostly it is stopped by 4 years of age (Maguire 2000; Larson 1985).¹

Suckling is a physiological act that provides nourishment and comfort to a baby. A baby's sucking can either be nutritive or non nutritive. Nutritive form provides essential nutrients, while non nutritive sucking insures a feeling of warmth and a sense of security. Non nutritive sucking can turn in to a continuous behavior practiced unconsciously, leading to a harmful oral habit.²

Thumb sucking has 2 types

ACTIVE; In this type, there is heavy force by the muscles during sucking and if this continues for a long period, position of permanent teeth and shape of mandible will be affected.

PASSIVE; In this type, child put his or her finger in mouth, but because there is no force on teeth and mandible, so this habit is not associated with skeletal changes.¹

Clinical features of thumb sucking;

Thumb sucking is a habit causing several dentofacial changes depending on the duration and time of doing the habit. Also, the position of finger in mouth, dental arches relation and child's health affect the severity of changes.

In children who do the sucking habit for 6 hours or more, especially during night or sleep, severe abnormalities in dentoalveolar system and minor skeletal effects will develop.³

Effects of thumb sucking include:⁴

- Maxillary anterior proclination and mandibular retroclination
- Anterior openbite
- Increased overjet
- Posterior crossbite
- Compensatory tongue thrust
- Deep palate
- Speech defect
- Constriction of maxillary arch
- Decreased lip competence
- Enlarged adenoids
- Hypotonic upperlip
- Hyperactive lowerlip



Fig1: Clinical features of Thumb sucking

Diagnosis of Thumbsucking

1. History of thumb sucking

Information from the parent regarding:

- ❖ Frequency
- ❖ Intensity
- ❖ Duration
- ❖ Parental care
- ❖ Feeding patterns
- ❖ Remedies that have been tried at home

2 Emotional status of the child:

Familial well-being, emotional security

3 Extra oral examination:

Digits involved in the habit appear

reddened, exceptionally clear, chapped and a short finger nail; dishpan thumb.

- 4 Position of lips at rest & during swallowing observed. In chronic thumb suckers short, hypotonic upperlip and hyperactive lowerlip causing further proclination of upper anterior teeth.
- 5 Profile: Usually convex profile.
- 6 Active thumb sucking has a higher incidence of middle ear infections and frequently have enlarged tonsils accompanied by mouth breathing.
- 7 Intra oral examination:

Type of malocclusion caused by digit sucking depends on a number of variables like position of digit, associated orofacial muscle contractions, mandibular position during sucking, facial skeletal pattern, intensity, frequency and duration of the habit

8 Radiographic examination

OPG image helps to assess any ectopic eruption of tooth, constriction of maxillary arch

Lateral cephalography helps to determine constriction of airway due to enlarged

adenoids

Pedodontist should refer to otolaryngologist, if the patient has airway obstruction due to change in dentofacial features as a result of prolonged thumb sucking. For such patients there is a chance of developing obstructive sleep apnoea or any sleeping disorders.⁵

Management and Treatment

Three specific avenues of approach

Depends on dental age of the patient, and pedodontist's ability to relate to and influence the child and his / her parents.

1.Primary Dentition: 2-5 years

2.Eruption of permanent incisors in progress:6-8 yrs

3.Eruption of all permanent incisors :9 years and above

I)Primary dentition (2-5yrs)

No intra oral appliances are given at this age, because it can act as punishment.

- Pedodontist should take effort for counselling the child and parent
- Don't criticize the child if habit

continues

- DUNLOP'S Beta hypothesis: - If a subject can be forced to concentrate on the performance of the act at the time he practices it, he can learn to stop performing the act. The child is asked to sit in front of a mirror and asked to suck his thumb, observing himself as he indulges in the habit.

II) During the eruption of permanent incisors (6-8yrs)

Pedodontist has to attempt to enlist the child's co-operation in stopping this digit sucking by selecting a self-help program.

Self-help programs include: -

1.Simple appeals to the child to improve his appearance, avoid criticism, do not be demanding or forceful

2.Reminder therapy-

a) Restrictive methods

1) adhesive/elasticbandage

2) thumb guards

3)Bitter substances like neem or Pepper paste

b)Chemical application: Quinine and

asafetida

Daily record therapy- Child is instructed to call dentist once a week to report how many times he sucked his thumb/digit. Later if frequency is diminished, the calls can be further apart.

Reminder therapy

- Chandler recommended a behavioral approach to management by suggesting that the infant or child sleep in gown without openings for the arms
- Levin suggested a similar modification to the child pajamas
- Heckman and Breedy -Tubes are attached around elbows
- Benjamin- Gloves around wrist
- Thermoplastic thumb post (finger guard) devised by Allen

Thumb home concept: A cap covering thumb (fig:2) addressed as “home for thumb to sleep”. Patient is asked to wear it on thumb on every night before going to bed



Fig:2 Cap covering thumb

Thumb buddy to love: it is a story book – Thumbuddy to love thumb/finger puppet and story book.⁷

If self-help program is not successful an intra oral appliance is indicated

III) All permanent incisors erupted -9yrs and above

Consider an intra oral appliance

All home remedies must be stopped

Child and parent must understand how much deleterious effect thumb/digit sucking habit have contributed to malocclusion. Their cooperation is very important.

It can be removable or fixed appliance

Aversive –Conditioning Techniques

On the basis of the available evidence, the most efficient techniques of eliminating undesirable sucking behaviors employ the

aversive conditioning techniques or the so called punitive appliance.

Punitive appliances

1) Vertical appliances

These provide a vertical barrier or “wall” preventing the child from inserting a digit

a) The Rake

b) The vertical crib

2) Horizontal Appliances

These do not form a barrier to the digits entry but lie horizontally in such a way as to partially cover the palate. These prevent the digit from making pleasurable contact with the palatal tissue and prevents the formation of a seal to enable suction to take place. It is also claimed that they act as reminders to the child rather than physical preventive measures.⁷

a) The palatal Bar

b) The horizontal crib;(Fig 3)



Fig:3 Horizontal crib

3) Combination and Special appliances

There are two habit appliances

a) Graber appliance: - This combines the blunt rake, the palatal bar and the horizontal crib into a single appliance, allowing adjustments of the treatment by the practitioner.

b) The bluegrass Appliance ;-(Fig 4)
This is a totally unique type of habit appliance in that it uses a Teflon roller or several beads that are free to rotate on a palatal bar. The child is encouraged to treat it as a toy and so the underlying philosophy of the appliance is totally different from the other fixed intraoral habit appliance.⁸



Fig:4 Bluegrass appliance

Conclusion

As in modern era of easy and fast internet usage, both children as well as parents are more aware of different options for treatment of habits like thumb sucking. So it's a prime role of a pediatric dentist to act both as dentist, counsellor and psychologist at the same time. A pediatric dentist should be aware about new options of treatment modalities like Thumb Buddy love, The Oliver Bear story book which will ease the tension and uncooperation of child patient.

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Original Research

EVALUATION OF AWARENESS ON DENTURE HYGIENE AMONG PATIENTS WEARING REMOVABLE DENTURES

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Abstract

Aims and objectives: The aim of the study was to assess the denture hygiene knowledge and practices among patients using removable dentures who have undergone treatment in the department of prosthodontics, KMCT Dental College.

Materials and methods: A questionnaire survey was conducted using a self-administered questionnaire. The study subjects were patients using removable dentures (both RPD and CD) who had undergone treatment from Department of Prosthodontics, KMCT Dental College. A total of 100 patients were reviewed with 50 of them using removable partial denture and the other 50 patients using complete denture. 46% of patients used to clean their dentures twice daily whereas about 41% cleaned them more than twice a day. More than half of the patients stored their prosthesis in dry environment while not in use and 40% stored them in water. All patients involved in study had been using denture cleansers. Only 2% of patients changed their dentures annually.

Conclusion: Based on the findings of the study, it was found that the denture hygiene measures of most of the patients were not satisfactory. Thus, it is important to spread awareness among dentists to educate their patients about correct method and practices to clean and maintain their dentures. Patients should also be trained for routine dental check-ups.

Key words : Denture Hygiene, Denture wearers, Patient awareness, Oral health

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Introduction

The awareness of prosthetic treatment among patients has seen an increase lately, and hence surge in the prosthetic treatment. In order to achieve optimal oral health, denture wearing patients should be advised to maintain high standards of both oral hygiene and denture hygiene. Dentures can accumulate plaque and develop calculus deposits in a manner similar to natural teeth. Inadequate denture hygiene can also lead to increased risk of developing oral and dental diseases such as dental decay, periodontal disease and denture stomatitis. Denture care is an imperative step to maintain good denture quality and also to ensure good oral health status. But the rehabilitative treatment is successful only when patients are aware of correct prosthesis use and hygiene. Food particles located between the denture and gingiva or between the denture and the palate allows multiplication of candida albicans and bacteria and they also serve as reservoirs for infections with gastrointestinal and pleuropulmonary involvement. Hence cleaning and disinfecting of dentures are essential for maintenance of oral health.

Aim

The aim of the study was to evaluate the awareness on denture hygiene in completely and partially edentulous patients and to establish any deficiencies in patient's knowledge regarding maintenance of removable prosthesis.

Objective

- To assess the knowledge of denture wearers on denture hygiene
- To identify any possible changes that should be implemented.

Material and methods

This study was conducted on 100 patients with removable dentures who had undergone treatment in Department of Prosthodontics at KMCT Dental College. Sampling was done using systematic random sampling.

Study criteria

Inclusion criteria

- Subjects using partial or complete removable prosthesis in maxillary or mandibular arch for at least 6 months.
- Subjects within age group of 35-60 years.
- Dentures fabricated under the guidance of an experienced doctor

Exclusion criteria

- Uncooperative patients
- Subjects with medical complication

A questionnaire was used to assess the knowledge of two groups consisting of 50 people each, to evaluate their awareness in maintenance of denture hygiene.

Group 1- Completely edentulous patients

Group 2- Partially edentulous patients.

Survey consisted of general information and questionnaire. The general information regarding name, age, gender, occupation, address, education and socioeconomic status were collected from the patient. A structured questionnaire was prepared regarding the kind of prosthesis, period of usage, frequency of wearing, denture cleaning habits, frequency of denture cleaning, materials used to clean dentures, denture adhesives etc.

Results

A total of 100 patients were reviewed with 50 of them using removable partial denture and the other 50 patients using complete denture. Among them, majority i.e., more than

50% have been denture wearers for less than 5 years. Almost 40% have been using dentures for more than 5 years. 73% of patients have been wearing dentures during day time. Rest of them have been using dentures during day and night. 46% of patients cleaned their dentures twice daily whereas about 41% cleaned them more than twice a day. More than half of the patients stored their prosthesis in dry environment while not in use and 40% stored them in water. All patients involved in study have been using denture cleansers. Only 2% of patients changed their dentures annually. Majority of patients (84%) were not using their dentures while sleeping. About 72% of patients had soft tissue reactions during denture wearing. When the patients were asked, if they received any instructions from their dentist regarding denture cleaning, only 15% were said to have received instructions on denture cleaning while 85% replied negatively. Most of the patients (91%) had their dental check-ups only in case of need. Routine dental check-ups were not followed by them.

Table 1 – Duration of using denture

Storing Denture while not in use				
Storage Denture	Water	Dry Env.	NaOCl	Soap Water
CD	0	50	0	0
RPD	40	3	0	7
TOTAL	40	53	0	7

Table 2 – Duration of wearing Denture/day

Duration of wearing Denture/day			
Duration Denture	Day & night	Day Time	While chewing
CD	0	50	0
RPD	21	23	6
TOTAL	21	73	6

Table 3- Frequency of Cleaning Denture

Frequency of Cleaning Denture				
Duration Denture	Once Daily	Twice Daily	>Twice Daily	After Meals
CD	0	24	26	0
RPD	3	22	15	10
TOTAL	3	46	41	10

Table 4- Storing Denture while not in use

Denture Age: How long have you been using denture				
Duration Denture	1 Yr.	< 5 Yrs.	>5 Yrs.	>10 Yrs.
CD	3	27	20	0
RPD	23	8	18	1
TOTAL	26	35	38	1

Table 5- Use of Denture Cleanser

Type of Denture Cleanser				
Cleanser Denture	Cold water	Water & Brush	Water & Soap	Water, soap & Brush
CD	0	50	0	0
RPD	2	9	29	10
AL	2	59	29	10

Table 6 - Type of Denture cleanser

Use of Denture Cleanser		
Denture	YES	NO
CD	50	0
RPD	50	0
TOTAL	100	0

Table 7- Use of Denture Adhesive

Use of Denture Adhesive		
Yes/No Denture	YES	NO
CD	0	50
RPD	3	47
TOTAL	3	97

Table 8 - Frequency of changing denture

Frequency of changing denture		
Yes/No Denture	Annually	When needed
CD	0	50
RPD	2	48
TOTAL	2	98

Table 9- Denture wearing while sleeping

Denture wearing while sleeping			
Freq. Denture	Often	Sometimes	Never
CD	0	0	50
RPD	8	8	34
TOTAL	8	8	84

Table 10- Soft Tissue reaction during denture wearing

Soft Tissue reaction during denture wearing		
Yes/No Denture	YES	NO
CD	15	35
RPD	13	37
TOTAL	28	72

Table 11- Frequency of Dental check-ups

Frequency of Dental check-ups			
Freq. Denture	Once in 6 months	Annually	When needed
CD	1	4	45
RPD	0	4	46
TOTAL	1	8	91

12- Received instructions from Dentist

Received instructions from Dentist		
Yes/No Denture	YES	NO
CD	49	1
RPD	36	14
TOTAL	85	15

Discussion

Cleaning and disinfecting of dentures are essential for the maintenance of oral soft tissue health. Adequate cleansing habits render biofilm formation difficult, in analogy to what happens on the natural dentition.

In this study, a total of 100 patients were reviewed of which 50 were RPD patients and 50 of them CD patients. Data analysis in this study showed that majority of patients have been using dentures during day time for all days in a week. Most of the patients involved

in study cleaned their dentures once or twice daily. None of them cleaned their dentures after having meals. This shows that the cleansing habits of patients were not proper. Majority of them used water and brush as cleansing agents and stored their prosthesis in dry environment while not in use. Most of them have not received proper denture cleaning instructions from their dentists. Data analysis from this study showed that the denture hygiene among the elderly patients were unfortunately inadequate. Similar results were obtained from some of the previous studies on denture hygiene. In a previous study by Namrata M, Dhanraj Ganapathy most of their patients used dentures during daytime. Another study by Abhishek Apratim, Sanket S Shah and Manish Sinha reported inadequate denture hygiene as the frequency of cleaning dentures among their patients were comparatively less. In another study by Dr. Sweta Rokade, Dr. A.J.Pakham, Dr.S.R.Godbole and Dr.Seema Sathe, majority of patients stored their prosthesis in dry environment. This is similar to the results obtained in our

study. A study conducted by Hoad Reddick et al and Marchini et al showed that majority of respondents did not receive proper denture hygiene from their dentists. This result is also similar to our data analysis. All these studies showed that the denture hygiene maintenance among the elderly were not satisfactory and should be improved. Dentists should provide proper denture hygiene instructions to their patients and make them aware of the consequences of poor oral and denture hygiene.

Conclusion

Based on the findings of the study, it was found that the denture hygiene measures of most of the patients are not satisfactory. Many patients are not cleaning the dentures after meals. Many patients' method of denture storage is not appropriate. They are storing their dentures in a dry environment. Many patients report soft tissue reactions during denture wearing. It was found that most of the patients are not following routine dental check-ups. It was also found that majority of the patients do not receive any instructions

on denture hygiene from dentists. Thus, it is important spread awareness among dentists to educate their patients about correct method and practices to clean and maintain their dentures. Patients should also be trained for routine dental check-ups.

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SELF ADMINISTERED QUESTIONNAIRE					
1	How long have you been using the denture?	One year	Less than 5 years	More than 5 years	More than 10 years
2	How long you use the denture a day?	Day and night	During day time	Only while chewing	
3	How often do you clean your denture?	Once daily	Twice daily	More than twice a day	After every meal
4	How do you store the denture when not in use?	Water	Dry environment	Sodium hypochlorite solution	Soap water
5	Do you use any denture cleansers?	Yes	No		
6	What type of denture cleansers are you using?	Cold water	Water and brush	Water and soap	Water, brush and paste
7	Do you use denture adhesive?	Yes	No		
8	How often do you change your denture?	Annually	In case of need		
9	Do you wear denture while sleeping?	Often	Sometimes	Never	
10	Have you experienced any type of soft tissue reaction during denture wearing period?	Yes	No		
11	How often do you go for dental check-up?	Once in 6 months	Annually	In case of need	
12	Have you received instructions from dentist about denture cleaning?	Yes	No		

Literature Review

CORONAL SEAL - THE SILENT KILLER IN ENDODONTIC FAILURES

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Abstract

The primary goal of endodontic treatment is to keep the pulpal space free of microorganisms and to prevent recurrent infection. Oral bacteria and their by-products can penetrate this space if there is inadequate coronal or apical seal. Apical leakage leading to reinfection of an obturated canal has been the major cause of failed endodontic treatment. However, recently, attention has been drawn to the significance of coronal seal in endodontic success. Microbial contamination through the occlusal surface, leading to coronal leakage constitutes a large percentage of failed root canal treatments. This article highlights the clinical and biological implications of coronal leakage and the means to prevent the same.

Keywords: Coronal seal, permanent restoration, post and core

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Introduction

Oral bacteria and their by-products play a major role in the production of pulpal and periradicular diseases. Keeping the pulpal space free of these microorganisms is a challenging task as these microorganisms have the capacity to penetrate through the minutest of spaces. A thorough debridement and shaping of the root canal along with a “fluid-tight” obturation can prevent bacterial ingress and ensure a

favourable endodontic outcome. For years, the focus of endodontists has been on the apical third of the root canal. No doubt, it is a proven fact that apical leakage leads to reinfection, thus causing maximum endodontic failures. So then, why do we find a 20-30% failure rate in well-sealed teeth?¹

The apical third of the root canal has an intricate anatomy, it cannot be seen with naked eyes and is difficult to seal. The coronal part of the canal, on the other hand, has a more predictable anatomy, it can be visualized and therefore is easy to seal. Hence, unknowingly, the coronal seal was taken for granted.

The data derived from a retrospective clinical study² suggest that a favourable endodontic treatment outcome may be achieved even in poorly filled root canals when the quality of the coronal restoration is adequate. Those results appear to be supported by epidemiologic data showing that inadequately filled root canals can remain in a normal state of periapical health.³

Etiology

Coronal leakage can occur in the following instances:

- Delay in placement of coronal restoration following root canal treatment
- Compromised or inadequate temporary filling
- Tooth fracture
- Leakage during post placement
- Failure of final restoration
- Recurrent decay at restoration margins.⁴

Preventing coronal leakage

A clinician gets several opportunities to prevent coronal leakage during root canal treatment. They are as follows:

Case selection

Any endodontic treatment should be started keeping the end in mind. It is not advisable to start endodontic treatment in a tooth which is non restorable. If the post-endodontic restoration fails, coronal leakage can lead to endodontic failure. As a thumb rule, at least 2 mm of sound tooth structure must be present circumferentially for ferrule effect. Only if the clinician can visualize a sound post -endodontic restoration, should he begin an endodontic treatment.

Pre-endodontic tooth preparation

The following are predisposing factors for coronal leakage and should be checked:

- Ensuring complete removal of caries or defective restorations
- Examining the tooth carefully for any cracks or fractures. This can be done with transillumination or dyes
- Establishing sound tooth margins above gingival tissues.
- Isolation with rubber dam is necessary to reduce microbial contamination.



Access cavity preparation

Retention of as much sound tooth structure as possible to enhance structural integrity limits coronal leakage. Protecting cusps in the areas of significant function also minimize the crown fracture thus maintaining occlusal seal.

Cleaning and shaping of the root canals

A thorough cleaning and shaping with copious irrigation are mandatory to prevent leakage. A clinician has an array of instruments and materials to aid him in effectively performing this step. Smear layer serves as a major hindrance to a perfect seal. If not removed, it can serve as a pathway for bacterial leakage. It also clogs the dentinal tubules, preventing sealer penetration. This in turn aids leakage. Removal of this layer opens the dentinal tubules and enhances the adaptation of the obturating material to the canal walls. Alternating the irrigating solutions (sodium hypochlorite and 17% EDTA) along with adequate instrumentation will aid in removing the smear layer.^{5,6}

Obturation

The main goals of obturation are to prevent microorganisms from re-entering the root canals and to isolate the remaining microorganisms in the canal space from

nutrition from tissue fluids. No matter how well we seal the root canal, if the coronal end is not adequately sealed, bacterial leakage will occur in no time. Clinicians should try to attain as near perfect seal as is possible to prevent this complication. After obturation, all excess gutta-percha in the floor of the pulp chamber should be removed which can serve as a pathway for bacterial ingress. Some advocate placement of a layer of resin-modified glass ionomer cement (GIC) or adhesive resin immediately after obturation to seal accessory canals in furcation area.⁷ Root canal sealers are as important as the obturation materials.

Improper sealer usage or lack of sealer usage is an invitation to leakage and subsequent failure. Zinc oxide eugenol and calcium hydroxide sealers exhibit solubility thus aiding leakage. Resin sealers have adhesive properties, but their shrinkage is a major disadvantage. On setting, shrinkage of the sealer allows it to pull away from the gutta-percha core, thus creating a micro gap through which bacteria can pass.⁸

Provisional restoration

A temporary or provisional restoration is required either in between appointments for a multivisit root canal treatment, or is



required after obturation, before placing a permanent restoration.

A faulty temporary restoration is one of the major causes of coronal leakage. It can be due to:

- **Inadequate thickness:** Usually, a large cotton plug is placed in the pulp chamber over which a thin layer of temporary restoration is placed. This does not produce an adequate seal. A minimum 4–5 mm thickness of temporary is recommended to prevent leakage. This thickness also prevents potential lifting or dislodgement of the temporary
- **Improper placement:** Unfortunately, scant attention is given to temporary placement, which is a critical step. It should be properly placed so that it seals all avenues of leakage. It should be placed incrementally with no gaps or voids
- **Failure to evaluate occlusion after placement:** This will lead to fracture of the provisional restoration and in turn promote coronal leakage. Hence, it is important to check the occlusion before relieving the patient. Intracanal medicament should be given in intermediate restorations. They act as a barrier to microbial ingress. Calcium hydroxide is the preferred material. However, intracanal medicament should

not be used as a substitute for a well-placed temporary restoration. Provisional restorations should be placed for the least possible time since they are all leak. Any temporary can provide adequate seal for maximum up to 3 weeks. Beyond this period is an invitation to coronal leakage and failure. Because of the drawbacks of provisional restorations, some researchers advocate using permanent restorative materials such as GIC or composite resin as a provisional restoration.⁹

Timing of permanent restoration

The earlier the tooth is permanently restored; the lesser will be the leakage. Safavi *et al.* advocated immediate placement of a permanent restoration after obturation.¹⁰ This immediate post-endodontic buildup can prove to be advantageous. Since rubber dam isolation is already present, the buildup becomes an extension, rather than an invasion, of the endodontic seal. Delaying the permanent restoration allows teeth with periapical radiolucency to demonstrate healing prior to the placement of permanent restoration. This is unnecessary in the current scenario because, the literature suggests that sealing the canals as soon as possible after endodontic therapy dramatically improves their long-term success rate.¹¹



Choice and integrity of permanent restoration

The presence of adequate ferrule at the crown-root interface is critical for the long-term success of the crowned endodontically treated tooth. The ferrule is the circumferential ring of sound tooth structure that is enveloped by the cervical portion of the crown restoration. A minimum 2 mm of ferrule provides a bracing, casing, or hugging action to improve the integrity of the endodontically treated tooth.¹² This in turn helps in retaining an adequate coronal seal. The clinician should ensure that the permanent restoration does not violate the biologic width. The correlation between coronal leakage and biologic width is that if the latter is impinged upon, the patient experiences discomfort, especially during brushing. Thus, he will not keep that area clean, leading to plaque accumulation, recurrent decay, and subsequently coronal leakage. Ensure that the tooth is in atraumatic occlusion. A traumatic occlusion will cause disruption of occlusal seal or fracture of the tooth or final restoration.

A sandwich technique post endodontic restoration with GIC base and overlaying composite restoration is also an effective restoration. The GIC base also serves to

seal the accessory canals in the furcation area of molars.

Post and core

Not all endodontic teeth require a post and core build up. Post and core procedures increase the chances of damaging the occlusal seal thus promoting leakage. Contemporary research has shown that bonded restorations or corono-radicular restorations provide adequate retention and also limit leakage. Only gross tooth destruction should warrant the use of posts.

If indicated, meticulous precautions should be taken during post and core procedures. Parallel, serrated, and threaded posts are preferred as they are able to distribute forces more evenly along the root. Post space preparation should be done under isolation with a rubber dam to prevent contamination. Heat should be used to remove the bulk of gutta-percha from the root canal as rotary instruments can disrupt the apical seal. A 4-5 mm of apical gutta-percha should be retained to provide adequate seal. Post placement should be done immediately after post space preparation, to limit contamination. Thus, prefabricated posts are preferred to custom posts as they can be cemented immediately. Core build up should be done as soon as possible after post cementation.⁴



Long-term follow-up

Follow-up evaluation of all cases is imperative because coronal leakage does not manifest immediately. It can be observed only after a period. The concerned tooth should be evaluated for signs and symptoms, integrity of permanent restoration, the presence of recurrent decay, and apical pathologies. An important point to be noted here is that a root canal treated or pulpless tooth does not have any sensory innervation. Hence, leaking coronal restorations may go unnoticed for months since the patient does not feel pain or sensitivity initially. By the time, it gets noticed, the damage is already done. Thus, coronal leakage is like a silent killer, which sneaks in unobtrusively and causes extensive damage. An awareness of the biological and clinical implications along with adequate precautions can help to overcome this hurdle.

Conclusion

Lack of coronal seal can lead to endodontic failure. Coronal leakage can occur at any time right from the beginning of endodontic treatment, till the post-endodontic restoration is completed. The lesser the time duration between access cavity preparation and permanent restoration, the lesser will be the leakage.

Basic precautions taken during every step of treatment can prevent this complication and ensure endodontic success.

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