ESTHETIC REHABILITATION AND COMPREHENSIVE MANAGEMENT OF MUTILATED PRIMARYTEETH: A CASE REPORT

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Abstract

Although there have been many technological advances in the field of dentistry yet early childhood caries (ECC) remains a serious threat to a child's oral health. Restoration of severely damaged teeth often poses difficulty and the treatment is a challenge for a paediatric dentist, thus, reporting a case of successfully managed mutilated primary teeth and recreation of lost aesthetics and function.

Keywords: Early childhood caries, full mouth rehabilitation, post and core, paediatric crowns

Introduction

Early childhood caries (ECC) is a severe socio-behavioural dental health problem that affects children who are of 71 months age or younger leading to premature tooth loss.[1]Early loss of tooth not only affects the function and aesthetics but has ill impacts on the psychology and overall health of the child. Saving and restoring possible number of teeth is a challenging task for a paediatric dentist, as the paediatric patients are amongst the youngest and most unmanageable group. Due to lack of knowledge and neglect, the severity of the disorder have impelled extraction in most of the cases, in spite of greater difficulty in convincing the parents as well as the clinicians.[2]

The advances in the field of restorative and endodontic procedures in paediatric dentistry have made the management of mutilated teeth a great success.[3]Although extraction is the fate of severely wrecked teeth but the understanding of space management plays an important role in rehabilitation of the oral health.

With the use of newer materials and techniques that have been incorporated in paediatric dentistry, achieving good oral health has become likely.

This article presents a case where severely mutilated teeth have been successfully managed and the overall aesthetics and functions are restored.

Case report

A male patient of age 4 years reported to Department of Pedodontics and Preventive Dentistry, TMDCRC with the complaint of decayed teeth in upper and lower teeth region since one year. On intraoral examination, root stumps in relation to(irt) 62, 63, 64, 72, 73, 74, 82, 83, 84,85 grossly decayed teeth irt53, 54, 55, 65, 71, 75 deep caries irt 52,81 internal resorption irt 51 were observed **[Figure 1].**Orthopantomogram of the patient showed normal development of permanent tooth bud.**[Figure 2]**

Pulpal therapy was planned for the primary teeth were found to be firm and restorable and extraction was planned for the hopeless teeth.

Figure 1: Multiple carious lesions (pre-operative)

Figure 2: Preoperative radiograph

Figure 3: Postoperative radiograph

Figure 4-Postoperative photograph

Figure 5- Twelve months follow-up

Step-wise treatment was carried out as mentioned:
• Pulpectomy followed by metapex obturation of 51, 52, 53, 62, 63, 72, 73, 83 and 85 was done. **[Figure 3]**
• Space was created by removal of the obturating material followed by placement of posts (biological, glass fibre and metal)irt 51, 52, 53, 62, 63, 72, 73, 83 and 85 with luting GIC cement. **[Figure 3]**
• After post and core build upit was followed by full coverage restoration by composite shell crowns in anterior and stainless steel crowns in posterior teeth. **[Figures 3 & 4]**
• Extraction irt 64, 74, 84 was done followed by band and loop space maintainer and extraction irt 82. **[Figure 3]**
• Composite restoration irt 71, 81 was done

Clinical and radiographic evaluation at three, six, nine and twelve months revealed the presence of intact crowns and the absence of pathology, confirming the success of the treatment. A positive attitude towards dental treatment and behaviour modification had been observed too.

Discussion:

Kapur *et al*[4]stated that despite of decline in overall caries prevalence, its incidence continues to be as high as 18% in 2 to4 year-old and 52% in 6 to 8 year-old children.

Total destruction of the dental structures in cases like early childhood caries requires use of intra-canal retainers to provide functionality, aesthetics and contour in such teeth.

In order to restore the teeth, aesthetics, function and mechanical resistance to fracture, use of various approaches and materials are needed. A pediatric dentist should have thorough knowledge regarding the same to implement them in patient's oral cavity.

Hence, the above-mentioned techniques are required for comprehensive management and establishment of function and excellent aesthetics in such cases.

Conclusions:

ECC not only has a debilitating effect on physiological and psychological well-being of a child but may also affect the succedaneous teeth. The role of a paediatric dentist is to correct the function and estheticsas well as instil positive dental attitude in both the child and the parents.

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ACOUSTIC HEALING-AN ULTRASONIC SOLUTION TO CHRONIC PAIN

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Abstract:

Treatment of myofascial trigger points which are hyperexcitable palpable discrete loci within taut bands of skeletal muscles has always been an area of continuous exploration. Various invasive and non-invasive therapies with positive results had been suggested by many authors in the literature. However, owing to the complex anatomic nature of temporomandibular joint and multifactorial etiology that leads to the disorders of the joint, a definite treatment modality cannot be assured.

One potential non-invasive therapy that has been suggested by authors is of therapeutic ultrasound massage therapy, which has been traditionally believed to have strong biophysical effect. Ultrasound massage contributes in healing of the temporomandibular joint via both thermal and non-thermal effects.

Because therapeutic ultrasound massage therapy, showed positive outcomes in TMDs, therefore an attempt was made to test the efficacy of the same in patients suffering with myofascial pain dysfunction syndrome.

Hence, we present case report of two patients, clinically diagnosed with myofascial pain dysfunction syndrome, were subjected to ultrasound massage therapy.

Keywords:

Temporomandibular Joint Disorders (TMDs), Ultrasound Massage Therapy, RDC Criteria

Introduction:

As diverse as the etiology of temporomandibular joint disorders, so are the available treatment modalities. Managing Temporomandibular joint diseases has always been multifold, owing to the complexity of the joint anatomy as well the factors influencing its normal physiology.

Literature states number of pharmacological and non-pharmacological methods of dealing with the orofacial pain rendered due to temporomandibular joint dysfunction. Some of the non-invasive therapies which have drawn attention in recent past includes: Transcutaneous Electrical Nerve Stimulation (TENS), physiological exercises, behavioral therapies, ozone oil therapy etc.

One such modality is Ultrasound Massage Therapy, which has been part of clinical practice since 1950s and still remains a popular intervention for wide range of clinical problems including musculoskeletal disorders of TMJ. Because of its ability to interact with tissues to bring about biological tissues, ultrasound massage therapy gives promising results.

However, this area holds immense potential to navigate

Ultrasound Massage Therapy:

Ultrasound is a form of mechanical energy, which is derived from soundwaves beyond the human audible limit (16Hz to something approaching 15-20,000 Hz). Usually, frequencies of 1MHz and 3MHz fall into the therapeutic range (1MHz = 1 million cycles per second).

Sound waves are longitudinal in nature, producing compression and rarefaction waves with each oscillation. These oscillations have two types of effects over tissues: thermal and non-thermal. [1]

An increase in the molecular vibrations within tissues will create heat within tissues, providing therapeutic thermal effect. Haar et al divided non-thermal effects into: cavitation and other mechanical effects, who was of the idea that majority of the healing effect of ultrasound massage is derived from the non-thermal interaction mechanism. [2]

Cavitation is defined as the formation and life of bubbles in liquids, which in ultrasound massage therapy refers to the tiny gas bubbles formed in the tissues as the result of vibration. Another mechanism that plays important role is "acoustic streaming", is described as "localized liquid flow in the fluid around the vibrating bubble. Microstreaming possess the ability to alter the tissue membrane permeability and enhances cell activity occurring at the boundary of cell membrane and tissue fluid. [3]

To have these effects over the masticatory muscles and the temporomandibular joint, it is essential for ultrasound wave to reach these regions, which will depend on the thickness of the tissue and the frequency at which the machine is used.

As it is difficult, if not impossible to know the thickness of each of these layers in an individual patient, average half value depths are employed for each frequency:

- 3 MHz 2.0 cm
- 1 MHz 4.0 cm

Because of the abundant literature available, describing the effective results in providing symptomatic relief to patients with temporomandibular joint disorders, an attempt was made to study the effectiveness of ozone oil as a treatment modality for temporomandibular joint disorders

CASE- REPORTS:

CASE REPORT 1:

A 32 year old male patient reported to the department of Oral Medicine and Radiology, Teerthanker Mahaveer Dental College and Research Centre, with the chief complaint of pain on the left side of the face while opening and closing the mouth since 3 months.

On elaborating the history of present illness, it was found that pain was of dull continuous nature that aggravated on chewing, especially hard food stuff. Pain referred to areas of forehead and was more on waking in the morning. No contributory medical and dental history was given by the patient.

On extra-oral examination, tenderness was present on the right pre-auricular region. There was no deviation or deflection noticed. Left pterygoid and medial pterygoid were found to be tender, on intra-oral examination. Oral hygiene was compromised with distal pocket present irt 38.

On the basis of the history given by the patient and clinical examination done, a diagnosis of Myofascial Pain Dysfunction Syndrome (MPDS) of left lateral pterygoid and left temporal muscle was given.

The diagnosis was made according to the Research Diagnostic Criteria, given by **Dworkin SF, Leresche L et al. 1992**

On VAS scale, tenderness was rated "MODERATE" for both the muscles at the first visit.

All the measurements were tabulated in patient's visiting chart.

CASE REPORT 2:

A 25-year-old female reported to the department of Oral Medicine and Radiology, Teerthanker Mahaveer Dental College and Research Centre, Moradabad; with the chief complaint of pain on right side of her face since 2 years.

On elaborating the history of present illness, pain was sudden in onset and is constant but dull in nature. Pain radiated to pre-auricular as well to the neck region. She had difficulty in chewing and while swallowing. She had consulted private physician for the same complain and was put on some unknown medications which rendered no relief. There was no other contributing past dental history. However, she mentioned about being stressed.

On examination, bilaterally temporalis, masseter, medial and lateral pterygoid were tender. Trapezius and sternocleidomastoid also presented with tenderness. Odontogenic factors for pain were ruled out. Oral hygiene condition was good with grade I stains and calculus.

On the basis of the history given by the patient and clinical examination done, a diagnosis of Myofascial Pain Dysfunction Syndrome (MPDS) involving all the above-mentioned muscles was given.

The diagnosis was made according to the Research Diagnostic Criteria, given by **Dworkin SF, Leresche L et al. 1992.**

Tenderness was graded "SEVERE" on VAS scale.

These measurements were tabulated in patient's visiting chart.

Cases	Visits	Masseter		Temporalis		Lateral Pterygoid		Medial Pterygoid	
		Right	Left	Right	Left	Right	Left	Right	Left
CASE 1	1st visit						Moderate		Moderate
	2nd visit						Moderate		Moderate
	3rd visit						Mild Pain		Mild Pain
	4th visit						Mild Pain		Mild Pain
	5th visit						No Pain		No Pain
CASE 2	1st visit	Severe		Severe		Severe		Severe	
	2nd visit	Severe		Severe		Severe		Moderate	
	3rd visit	Moderate		Moderate		Moderate		Moderate	
	4th visit	Mild pain		Mild pain		Mild pain		Mild pain	
	5th visit	No pain		No pain		No pain		No pain	

RIGHT ACESSORY AND STRAP MUSCLES	1STVIST	2NDVISIT	3RDVISIT	4THVISIT	5THVISIT
CASE 1	---------	---------	---------	---------	---------
CASE2 (SCM, Trapezius)	SEVERE	SEVERE	MODERATE	MILD	NO PAIN

TABLE 1: TENDERNESS TABLE

	1ST VISIT	2ND VISIT	3RD VISIT	4TH VISIT	5TH VISIT
CASE 1	MODERATE	MODERATE	MILD	MILD	NO PAIN
CASE 2	SEVERE	SEVERE	MODERATE	MILD	NO PAIN

TABLE 2: PAIN TABLE

TREATMENT:

Both the patients were advised to initiate the ULTRASOUND MASSAGE THERAPY.

MODE OF APPLICATION:

Patient was comfortably seated on the dental chair. Ultrasound Massage machine manufactured by the Physio Company was used under the following specifications:

- Frequency 1MHz
- Pulse- 1:1,1:3, 1:5, 1:10,
- Output power 2.5 W/ sq.cm
- Power source A.C adapter power supply

Each patient was administered 10 minutes ultrasound massage on either side of the jaw. Special attention was given to avoid bacterial contamination from the head source of the machine.

Both the patients were given five sessions once a week and the tenderness and pain score was recorded at each visit on VAS scale.

Patients were instructed to follow soft diet, avoid stressful events, physiotherapy exercises etc for prevention of aggravating episodes.

No pharmacological aid was provided to them during the entire 5 visits sessions.

At the third visits, both of them were advised to go for oral prophylaxis and pocket treatment (first patient).

DISCUSSION:

Temporomandibular joint is considered to be a compound joint controlling complex movements of jaw in coordination with masticatory apparatus. Together, the TMJ joint and masticatory muscles, allows a person to chew and talk. Therefore, even slight disturbance disrupting the balance of TMJ will hamper person's day today life activities.

People with compromised temporomandibular joint activity, experiences crucial pain and discomfort which can be acute or even last for chronic periods. TMDs are common between age groups of 20-40 and effects women with higher frequency. There are many symptoms of TMDs including per-auricular pain, joint clicking, reduced mouth opening, referred pain to temporal and cervical region etc.

However, diagnosis of TMDs can be a tiring process because the signs and symptoms resemble that of toothache, neuralgias, sinusitis, earache etc. A thorough history and clinical examination can guide a dentist towards the provisional diagnosis of musculoskeletal disorder of TMJ.

Treating the TMDs has always been an equally complex process with several modalities listed in literature such as pharmacolical approach, physiological methods, TENS, Ultrasound Massage therapy etc.

Since, many researchers such as *Majlesi et al* in 2004 reported positive results of therapeutic ultrasound massage therapy intreating temporomandibular joint pain disorders(musculoskeletal), therefore we tried to evaluate the effects of the same in the presented case reports.

In these case-reports, both the patients visited to the department of Oral Medicine and Radiology and were clinically diagnosed with Myofunctional Pain Dysfunction Syndrome, a musculoskeletal disorder, which falls under the umbrella of Temporomandibular Joint Pain Disorders. The diagnosis was given based on the chief complaint of the patient, the explored history and the clinical examination done.

All the points were corelated with the RDC criteria and thereby a diagnosis of MPDS was given.

Patients were informed about the treatment modality given to them and informed consent was taken from both the subjects. Ultrasound Massage therapy was conducted in the department of Oral Medicine and Radiology for 20 minutes (10 minutes on each side) * 5 sessions in both the patients.

In the first visit, the tenderness on VAS scale for first patient was MODERATE and for second patient it was recorded to be SEVERE. By the third visits, both of them showed considerable improvement and VAS was noted to be MILD and MODERATE in first and second patients respectively.

By the end of the fifth visit, they had considerable relief, marking the VAS scale with NO PAIN.

CONCLUSION:

Myofunctional Pain Dysfunction syndrome is one of the most debilitating disorders encountered by the oral physicians. The entity is characterized by the presence of trigger points (hyperirritable spots within taut bands of skeletal muscle fibers).

The syndrome is recognized by the muscle's tenderness, referred pain, increased pain while opening mouth and on wakening few patients. History plays an important role in formulating the diagnosis. Parafunctional habits as history of stress or long duration of work can be contributing factors.

Since time immemorial, there have been no definite treatment modality for the particular dysfunction. However, literature is flushed with some promising therapeutic modalities, one of which is Ultrasound Massage Therapy.

Early applications were those for which tissue heating was the goal, and so it was used for soft tissue injuries such as may be incurred during sport. More recently, attention has been drawn both to high intensity focused beams that may be used for thermal ablation of selected regions, and also to low intensity fields that appear to be able to stimulate physiological processes, such as tissue repair, without biologically significant temperature rises.

Because the ultrasound therapy is a non-invasive treatment modality, thus can be applied to heal the chronic pain of temporomandibular joint disorders more frequently in clinical practice.

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SPACE MANAGEMENT AND RESTORING ESTHETICS IN PRIMARY DENTITION: A CASE REPORT

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Abstract

Primary tooth loss frequently encounters in children's due to grossly carious teeth which results in arch length discrepancy, speech difficulty, malocclusion, poor masticatory function and space loss over a period of time. Space management is required to overcome the future consequences of loss of primary teeth by fixed space maintainers. In addition, the anterior primary teeth also play a vital role in terms of aesthetics and phonetics. Hence, presenting a case of 6 year old child where space was managed with bilateral band and loop and nance palatal arch space maintainers in lower and upper arch and restoring esthetics in pulpally compromised teeth.

Key words: *Space maintainer, Esthetic restoration*

Introduction

Worldwide, dental caries is prevalent in children characterized by causing pain, discomfort and functional limitations. Early childhood caries (ECC) is one of the most virulent form of dental caries which usually occurs in children less than 71 months of age. Initially, it presents in smooth surface affecting the primary maxillary incisors. As the disease progresses, decay spreading to other teeth including primary molar which cause destruction of primary dentition.[1] In childhood, untreated carious lesion is the alarming condition for teeth loss and compromised esthetics which not only affects a child's permanent dentition but also have an considerable impact on physiological and psychological nature, ultimately leads to space los. Thus, space management after loss of primary dentition is one of the central concern by the provision of a space maintainer appliance.[2] It also offers proper alignment to the eruption of permanent successor. In a child patient, various appliances have been designed to maintain space depending on the jaw involved, stages of tooth development, and missing deciduos teeth.

In addition, maintaining esthetics with the use of an intra-canal post after endodontic treatment is a different aspect in case of severely damaged crown structure.[3]

This report highlights a case of space management with the use of bilateral band and loop and nance palatal arch space maintainer and aesthetic rehabilitation.

Case

A six year female child came to the Department of Peadodontics with the chief complaint of several carious teeth and pain was present in the lower right and left back teeth region since 5 days. In order to relieve the spontaneous nature of pain, medication was prescribed by the local dentist.

On diagnosis, clinical and radiographic examination revealed multiple decayed teeth with pulp exposure i.r.t 51, 52, 55, 61, 62, 74, 75 and 85.

Fenestration was observed i.r.t 74. The coronal portion was grossly decayed i.r.t 54, 64 and 84. Thus, a diagnosis of severe early childhood caries was made. (Figure 1 and 2)

Figure 1: Pre-operative intraoral view

Figure 2: Pre-operative orthopantogram

Patient parent's was explained about the type, time and cost of entire treatment and consent was obtained. In the emergency phase, extraction was perfomed i.r.t 74 and 84 after administration of local aneasthesia.

Figure 3: Nance palatal arch space maintainer

Figure 4: Bilateral space maintainer

Figure 5: Post-operative view

Corrective procedures performed are as follows:

- Single visit pulpectomy i.r.t 51, 52, 61, 62, and 65 was carried out followed by metapax obturation.
- Custom made biological post i.r.t 51, 61 and omega post i.r.t 52,62 was placed with glass ionomer cement after removing obturating material till 3 mm. then after etching and bonding, strip crown was given to build up a pleasant smile.
- Full coverage restoration i.r.t 64 was given.
- Lesion sterilization and tissue repair therapy was performed i.r.t 75, 85 followed by cementation of stainless steel crown using luting glass ionomer cement.
- Conventional bilateral band and loop space maintainer was fabricated after banding of 74, 84 and cemented with luting glass ionomer cement.
- Intital carious lesion of 55 was restored with restorative glass ionomer cement.
- Extraction of 54 and 64 was done after administrating local aneasthesia.
- Construction of Nance palatal arch with 19 gauge wire was constructed on the dental cast and acrylic button was then inserted into the anterior palatal surface for better retention and cementated into the patient's mouth with luting glass ionomer cement i.r.t 55 and 65.

Postoperative Instructions were given to maintain oral hygiene and follow up was scheduled after every three months. At recalled visit, treatment outcome was found to be excellent and no further new lesion was noticed.

Discussion

The most challenging task for a paediatric dentist is to reduce the pain, restoration of masticatory and speech efficiency, preservation of space and restoring aesthetics. Thus, some factors such as post caries removal surface area, different restorative material, treatment expenditure and child cooperation plays an important role to attain a good esthetics.[4] In this case, strip crowns using composite restorative material after endodontic treatment appeared to be pleasant for patient and her parents. Thus, to provide strength in such teeth, use of intra-canal retainers (biological and omega post) was used. Subsequently, space was preserved after extraction to avoid any destruction in permanent teeth arrangement includes crowding, opposing teeth supra-eruption, and impaction.[5] Albati et al revealed some of the advantages of space maintainers which includes that it should be easily constructed, adequate strength to withstand the shearing and functional forces, and allow proper oral hygiene. Also, they do not interfere with jaw and tooth development, pattern of eruption, masticatory function and not require any kind of tooth preparation.[6] Also, in case of multiple extractions.[7] Hence, bilateral band and loop and nance palatal arch space maintainers were used.

Conclusion

Space maintainer proves to be a valuable treatment to preserve arch integrity for future permanent teeth and also aesthetic mantainence shows a significant effect to re-establish positive attitude toward dental treatment.

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BILATERAL MODIFIED ERUPTION GUIDANCE APPLAINCE: A CASE REPORT

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Abstract

Primary dentition is essential for space maintenance, chewing, proper phonation, and occlusion growth. Losing this dentition prematurely causes space loss, deep bite, crowding, tooth impactions, and midline change. Deciduous second molar directs the first permanent molar that rises in its location following the eruption route forward and upward. Preventing the space loss due to early primary second molar loss has always been a concern for pedodontists. Numerous designs are proposed which guide of secondary 1st molar eruption, the most popular design has always been the Willet appliance. However the traditional design usually varies with loss of deciduous 2nd molars on both sides. Therefore the traditional designs must be modified as per the patient's needs. This paper presents a unique case of bilateral modified eruption guidance appliance in a 5 year old child

Key words: *Guiding appliance, Interceptive orthodontics, Space maintainer*

Introduction

No other aspect in preventive and interceptive dentistry plays a more important role than the survival of milk teeth until its exfoliation. Early loss of primary tooth or more number of primary teeth may contribute to a broad range of consequences.[1] Deep tooth decay, injury, or congenital absence can both result in the loss of primary tooth, which can pose serious complications for a developing kid.[2] As stated by Stallard, Lyons, Willet, and many others in the early twentieth century, early loss of milk teeth causes space loss.[3] Approximately 70 % of the prematurely lost 2nd deciduous molars in a particular quadrant lead to reduction of space with resutant malposition of secondary tooth.[1]

When the primary 2nd molar is lost prior to first permanent molar eruption, it is suggested that the intra-alveolar form of space maintainer has certain contraindications, such as conditions like blood dyscrasia, immune system suppression, congenital heart disease(CHD), individuals with bad oral hygiene maintenance and many other.[4] For situations where loss of second primary lower molars on both sides is there, the traditional model presents a number of problems. Changing the traditional designs for convenience, co-operation and performance for different pediatric patients is required.[1]

This report puts a light on a case of space management on premature loss of deciduous second molars bilaterally using modified eruption guidance appliance type space maintainer.

Case

A five-year-old child walked to the Department of Pedodontics and Preventive Dentistry with a grievance of pain in the lower right and left back teeth region of jaw since 7-8 days. Clinical evaluation indicated a shallow carious lesion and the involvement of pulp was noticed in IOPA radiograph in respect to the lower both sides deciduous 2nd molars. Preparation of the access cavity on lower 2nd deciduous molars was carried out, and temporary restorative cement was used for dressing. Sadly, the patient missed his next visit and returned to the department with swelling across his lower right and left back teeth. Clinical evaluation disclosed mobility of grade 3 with respect to lower right and grade 2 with respect to lower left primary 2nd molars associated with swelling of surrounding mucosa [Fig-1]. X-ray picture revealed enormous furcal radiolucency [Fig-2].

Figure 1: Pre-operative intraoral view

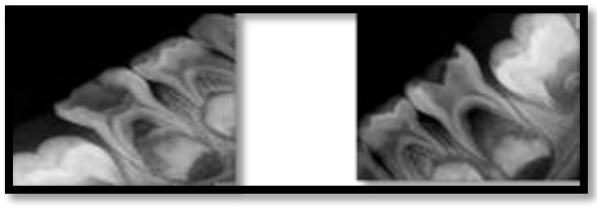

Figure 2: IOPA radiograph in relation to 85 and 75

It was then planned to extract both the second primary molars. In this scenario, space maintainer type of distal shoe appliance was suggested. Distal shoe space

maintainer alteration was suggested for space management of the bilateral loss of primary molars. The treatment plan was conveyed to members of the patient's family and written consent was received from the child's parents.

Figure 3: Adaptation of wire component

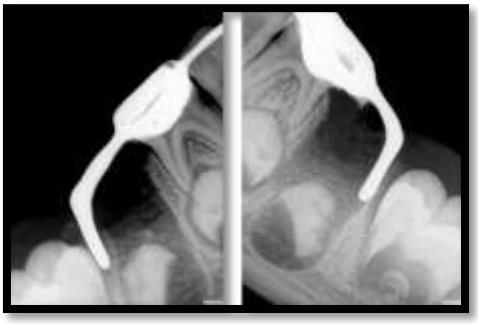

Figure 4: Periapical radiographs before cementation

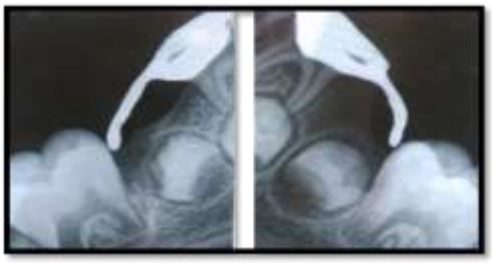

Figure 5: Radiograph after removal of intra-alveolar extension

Figure 6: Post-operative view

Corrective procedures performed were as follows:

• Two consecutive appointments were planned.

• In first appointment, extraction in relation to 75 was carried out under local anesthesia and post extraction instructions were given.

• In following next appointment band adaptations were made on lower right and left primary first molars.

• Alginate impression of lower jaw was recorded followed by extraction in relation to 85 under local anesthesia and antibiotic coverage.

• Adapted bands in relation to 74 and 84 along with extracted 85 were transferred on to recorded alginate impression and dental stone cast was poured.

• 85 was then extracted from dental stone cast, which provided vertical depth of intra-alveolar projection on right side of lower jaw. Whereas the perpendicular extent of the intra-bony part of appliance was measured with x-ray, and space was created in the cast and 19-gage wire was used to adapt the wire components [Fig-3]. The wire part was configured as a lingual arch in the front and a distal shoe in the back. The deciduous second molar represented as a guide for measuring the horizontal distal extension length on the working model.

• Both sides of the wire pieces were soldered to bands. To build a guiding plate on the both sides of the posterior wire, solder material was flowed in middle of the buccal and lingual wires.

• The modified appliance's intra-alveolar projection was positioned within the socket to contact and direct the unerupted permanent mandibular 1st molar vertical eruption route of both sides. The neutral contact between the secondary 1st molars' mesial ends on both sides and the appliance until cementation was verified through periapical radiographs [Fig-4]. Postoperative instructions were given to maintain oral hygiene, and after every three months the recall appointments were scheduled to examine the modified distal shoe appliance and supporting teeth for any distress.

On recall after 7 months, clinical examination showed partially erupting (mesial cusp tips) permanent mandibular first molars on both sides of lower jaw. It was then decided to remove the vertical intra-alveolar projection of modified appliance [Fig-5 and Fig-6]. The horizontal arm was planned to be maintained until the mesial marginal

ridge of both the first permanent molars was visible clinically.

Discussion

Pedodontists face the challenge of treating patients with premature loss of more than one primary molars. In the event of a loss of 2nd deciduous molar prior to the secondary 1st molar eruption, a space maintainer must be placed to direct the permanent molars into the right course. Eruption guidance appliance have always been frequently and effectively used in these cases.

However, this appliance can't be used in various cases, i.e. loss of multiple deciduous molars.[5] Removable appliances are often related with a slew of downsides, i.e. the importance of complete patient support, as well as the possibility of breaking or failure of the design.[6] As a result, an economical treatment that needs a decent amount of patient support and can direct the eruption of the first permanent molars into their right place in the jaw is ideal. To this end, it would be suggested to use altered intraalveolar design of space maintainer as the treatment modality. This design is thought to be a temporary device that will be changed by other equipment after the secondary 1st molars and incisors have erupted. Placing a wire on the posterior surface of anterior teeth such as a lingual arch might well meddle with the eruption of permanent teeth and necessitate more periodic recall with shorter time span. Various studies have however demonstrated that in the scenario of premature loss of deciduous molars, the permanent 1st molar erupts quickly than anticipated.[7,8]

Gujjar et al.[9], Dhindsa and Pandit[1], and Bhat et al.[10] fabricated rigid bilateral appliances without chair side adjustability. Another design was made by Gegenheimer, in which the gingival extension could be removed after the 1st permanent molar eruption.[11] The limitations of the designs were their rigidity and technique sensitivity which were the advantages of the presented design. In the present case, eruption guidance path was clearly illustrated by this modified appliance.

Conclusions

The altered design of bilateral distal shoe is efficient in time management, much more secure, more appreciated by the kids and matches all the requirements needed to preserve adequate space. In the present situation, the above mentioned design demonstrated some benefits against the regular appliance, such as improved strength and durability, reduced time on the chairside and much less patient cooperation.

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SMEAR LAYER IN ENDODONTICS TO KEEP OR REMOVE; A REVIEW

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Abstract
During root canal instrumentation, a smear layer were formed while using hand or rotary instruments which shields the walls of the prepared canal. The main components in this layer are organic and inorganic constituents such as remains of odontoblastic processes, bacteria and necrotic debris. Different investigators concluded different judgements on the significance of eliminating or preserving this layer. The smear layer removal permits the root canal wall in cleaning, disinfecting and improved adaptation of root canal filling materials. Yet, the smear layer existence also allowed to act as a seal to the dentinal tubules and reduce the bacteria capability and its toxins diffusing through the dentinal tubules. Thus, demand for keeping or eliminating this layer remains still controversial.
Key Words: Chemo mechanical instrumentation, Smear layer, bacterial penetration, root canal sealers.

INTRODUCTION

In root canal treatment, the success basically depends on the technique and quality of instrumentation, disinfection, irrigation and on permanent obliteration of the root canal by a nontoxic material. During biomechanical preparation, different types of hand or rotary files are used for instrumentation which leads to the creation of substantial amount of debris called as smear layer.[1,2]

Smear layer was identified firstly by **Eick *et al*** using scanning electron microscope (SEM). He found that this layer is prepared from different size of elements below 0.5 to 15 µm.[3]

Primarily, McComb & Smith in 1975 described this layer on the walls of instrumented root canals. They proposed that the smear layer encircles dentine, remains of odontoblastic processes, bacteria and pulp tissue .[1]

The smear substantial are divided into two parts by **Cameron and Mader et al :-**

1. The superficial smear layer roughly attached to the underlying dentine,
2. The material filled inside the dentinal tubules.

The smear debris was filled inside the tssubules with a depth of 40 µm.[4,5] Mader et al. disclosed that the superficial smear layer comprises of a thin layer of mineralized tissue with a thickness of 1–2 µm.[5] Goldman *et al* also reported that the smearlayer is about 1 µm.[6] Brännström and Johnson reported that the thickness of smear layer could range between 2 and 5 µm in thickness.[7] Difference in the thickness of smear layer depends on whether the dentin was instrumented in wet or dry field and the type and sharpness of the cutting instruments.[8,9] A thicker layer was formed after the movement and the proximity of the instrument to the dentine wall with an increased centrifugal forces and more hard to remove with chelating agents.[10] During motorized preparation, the quantity formed with GatesGlidden or post drills, has been conveyed as greater in capacity than that produced by the hand filing.[11] The smear layer components can also be forced into the dentinal tubules to variable distances to form smear plugs.[12,13,14] Brännström and Johnson and Mader et al. also conveyed that smear plug occurred due to the rotational movement of the burs and rotary instruments.[7,5] However, Cengiz et al. anticipated that the diffusion of smear substantial inside the dentinal tubules can also be due to the capillary action through the adhesive forces between the material and the dentinal tubules.[13]

Importance of smear layer

During root canal treatment, bacteria and infected dentine are removed from the root canals using the chemo mechanical method followed by an intracanal dressing and a root filling.[15] Another significant concern in endodontics is the final seal of root canal wall so as to inhibit the probable micro leakage which can lead to the upcoming failure in root filling.[1] Many investigators proposed that the dentinal tubules may be blocked if the smear layer is kept and might alter the dentinal permeability with lesser amount of bacterial or toxin penetration.[16-18] Few investigators conveyed that the smear layer should be removed as it is a loosely attached on the root canal wall and it can act as a reservoir of microbial irritants, where bacteria can survive, multiply and proliferate inside the dentinal tubules.[19-21]

Influence on diffusion of root canal medicaments and sealers inside the dentinal tubules

Ørstavik and Haapasalo disclosed the signifance of the smear layer presence or absence of the patent dentinal tubules used in reducing the time to attain the disinfecting effect of intracanal medications.[22] White *et al*. also reported that the smear layer absence leads to effective diffusion of different endodontic sealers and root filling materials inside the dentinal tubules. They also reported that in absence of smear layer, Roth 801, AH26, pHEMA, and silicone sealers extended consistently inside the dentinal tubules.[23,24] However, Saleh *et al*. disclosed that the smear layer removal did not require any improvement of bacterial resistance to penetrate along different types of sealers.[25]

DISCUSSION

Investigators had concluded different opinions on eliminating or leaving this layer. Some authors also supported the significance of removing the smear layer since it contains necrotic tissue, bacteria, and its by-products.[1,26] Keeping this layer might also inhibit the irrigants and medicaments penetration inside the dentinal tubules and the sealing capability of obturation materials could also be decreased.[27] Brännström found that these microorganisms inside the dentinal tubules can easily be destructed once the smear layer is removed.[28]

Haapasalo & Ørstavik in their studies concluded that liquid camphorated monochlorophenol disinfected the dentinal tubules completely when the smear layer was removed from the canals, while calcium hydroxide was not able to remove Enterococcus faecalis. Thus, smear layer can delay but did not completely eliminate the effect of disinfectant agent or intracanal medicament.[22,29] Okşan et al. also suggested that the sealers diffusion inside the dentinal tubules are stopped by this layer, yet in case of control groups there was no penetration of sealer observed.[30] Gençoğlu *et al*. stated that smear layer reduces the gutta-percha capability inside the canal wall for appropriate fitting irrespective of condensation techniques used; cold lateral or thermoplastic vertically.[31] Several authors encouraged that smear layer is a loosely nonhomogeneous adherent structure that can easily dislodged from the underlying dentin and potentially lead to bacterial contaminant and leakage between the filling material and the dentinal walls.[5,32] In contrast, this layer also acts as a wall to avoid bacterial passage inside the dentinal tubules.[18] Pashley proposed that the smear layer existence ends the bacterial attack in the infected canal entering through the dentinal tubules in case of inadequate canal disinfection or recontamination of the canal between treatment sessions.[33]

Williams and Goldman conveyed that this layer cannot act as a complete obstacle and its presence only postponed the bacterial invasion.[34] Madison and Krell in their study concluded that the smear layer made no variance in terms of leakage when ethylenediaminetetraacetic acid (EDTA) solution was used in a dye penetration study.[15] Chailertvanitkul et al. also established that the smear layer existence or absence made no changes in leakage properties, while the time period was short in that study. If the smear layer is not removed, the durability of the apical seal should be estimated for a longer period.[35] A systematic review by Shahravan et al estimated that the smear layer removal diminishes the outflow of obturated teeth in vitro and also conveyed that its absence increases the close-fitting of the root canal wall irrespective of the obturation technique or the sealer, which does not yield important effects.[36]

CONCLUSION

A deposit of organic and inorganic substantial termed as the smear layer are created during root canal instrumentation containing bacteria and their by-products. The diffusion of irrigants and intracanal medicaments into the dentinal tubules may be reduced by this layer as it shields the instrumented walls and can also affect the adaptation between filling materials and the root canal walls. Taking in consideration all the important points, the smear layer elimination should always be considered in day-to-day practice of endodontics.

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BIOCERAMICS IN ENDODONTICS – A REVIEW

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Abstract

Bioceramics are materials which include Alumina, Zirconia, Bioactive glass, Glass ceramics, Hydroxyapatite, resorbable Calcium phosphates, among others. They have been used in dentistry for filling up bony defects, root repair materials, apical fill materials, perforation sealing, as endodontic sealers and as aids in regeneration. They have certain advantages like biocompatibility, non toxicity and dimensional stability and most importantly in endodontic applications, being bio-inert .An extensive search of the endodontic literature was made to identify publications related to bioceramics used in endodontics. The outcome of laboratory and clinical studies on the biological and physical properties of bioceramic-based sealers along with comparative studies with other sealers was assessed. This review focuses on an overview of Bioceramics, classification, uses, advantages and retreatment of bioceramics. It also gives a detailed insight into individual bioceramic materials currently used in the fields of Endodontics along with their properties and applications.

Key Words: .

INTRODUCTION

Bioceramics allude to biomaterials that are utilized in direct contact with living tissues in the medical field. Different kinds of bioceramics that are accessible to medicine and dentistry incorporate bioinert bioceramics like Zirconia and Alumina that don't respond to the climate they are in contact with. Bioactivity of the materials alludes to its capacity to make a hydroxyapatite layer when in contact with tissue liquid wealthy in calcium and phosphate. This property permits the material to be exceptionally biocompatible, osteoinductive, osteoconductive, and enhances its property of sealability (1). Bioceramic-based sealers have just been accessible for use in endodontics for as far back as thirty years, their ascent to unmistakable quality compare to the expanded utilization of bioceramic innovation in the fields of medicine and dentistry. Bioceramics are earthenware materials planned explicitly for clinical and dental use. They incorporate alumina, zirconia, bioactive glass, glass earthenware production, hydroxyapatite, and calcium phosphates. The classification of bioceramic materials into bioactive or bioinert materials is an element of their association with the encompassing living tissue. Bioactive materials, for example, glass and calcium phosphate communicate with the encompassing tissue to energize the development of more tough tissues. Bioinert materials, for example, zirconia and alumina produce an insignificant reaction from the encompassing tissue, viably having no organic or physiological impact.(1)

According to the NIH Consensus Conference on Biomaterials (1987) a biomaterials is **"Any substance (other than a drug) or combination of substances, synthetic or natural in origin, which can be used at any period of time as a whole or in part of a system which treats, augments or replaces any tissue, organ or function of the body."** Williams described

CLASSIFICATION

Bioceramics can be categorized as:

1. Bioinert: Non interactive with biological structures.
2. Bioactive: Durable tissues that can go through interfacial communications with encompassing tissue.
3. Biodegradable, soluble or resorbable: Eventually replaces or joined into tissue. This is specially significant with lattice frameworks. (1)(3)

Advantages of Bioceramics

They have great biocompatibility because of their resemblance with organic hydroxyapatite. Inherent osteoinductive capacity in view of their ability to assimilate osteoinductive substances if there is a bone recuperating process nearby. Acts as a regenerative scaffold of resorbable lattices which prepares a framework that is finally dissolved as the body rebuilds tissue. Probability to accomplish incredible liquid tight seal, form a chemical bond with the tooth structure and have a great radiopacity. They have antibacterial properties because of precipitation in situ after setting, a phenomenon that causes bacterial sequestration. Bioceramics form porous powders which consist of nanocrystals of diameters of 1-3 nm, which forestall attachment of microorganisms. Sometimes, fluoride ions are constituents of apatite crystals, and the came about nanomaterial has antibacterial properties.(4)

USES

Endodontic uses- pulpotomy, resorption, apexification perforation repair, retrograde filling, sealers, obturation and regenerative endodontics.

Restorative uses- pulp capping, Dentin substitute, dentin remineralization and dentin hypersensitivity (4)

BIOCERAMICS IN CONSERVATIVE DENTISTRY & ENDODONTICS

Significant advances have been made in the field of bioceramics utilized for endodontic treatment. Bioceramics are biocompatible in nature and have amazing physico-chemical properties. They can work as cements, filling materials, root canal sealers and root repair materials, which have the benefits of antibacterial properties and better sealing capacity.(4,5)

Bioceramics used in endodontics are:

Calcium silicate based Cements-

Portland cement
Mineral trioxide aggregate (MTA)
Biodentine (Septodont, France)

Sealers

MTA Fillapex (Angelus, Brazil)
BioRoot RCS (Septodont, France)
Endo CPM Sealer (EGO SRL, Buenos Aires, Argentina)
TechBiosealer (Profident, Kielce, Poland).
EndoSequence BC Sealer (Brasseler, Savannah,GA, USA)
iRoot BP
iRoot BP Plus
iRoot FS (Innovative Bioceramix Inc., Vancouver, Canada),
Bioaggregate (Innovative Bioceramix Inc., Vancouver, Canada)
Tech Biosealer
Ceramicrete (developed at Argonne National Lab, Illinois, USA)
Total Fill

Mineral Trioxide Aggregate

Mineral Trioxide Aggregate(MTA), a noteworthy biocompatible material utilized for different clinical applications, introduced by Dr. Mahmoud Torabinejad and co workers in Loma Linda University. Commercially available MTA are ProRootMTA (Dentsply), White ProRoot MTA (Dentsply), MTA- Angelus (Solucoes Odontologicas), MTA- Angelus Blanco (Solucoes Odontologicas), MTA Bio (Solucoes Odontologicas).(6)

Composition: MTA is basically a mixture of three powder ingredients: Portland cement (75%), bismuth oxide (20%) and gypsum (5%). It consists of calcium oxide (50-75 wt %) and silicon oxide (15-20 wt %), which together constitute 70-95% of the cement. Blending of these raw materials produces tricalcium silicate, dicalcium silicate, tricalcium aluminate, tetracalcium alumino ferrite. There are two commercial types of MTA: grey and white and the difference lies due to the presence of iron in the white MTA which further forms the tetra calcium alumino-ferrite phase. (7)

Setting time: According to Torabinejad et al. setting time is 2 hours and 45mins for grey MTA. (6)

Mechanism of action: At the point when put in direct contact with human tissue it structures CH that discharges calcium particles for cell attachment and multiplication, establishes an antibacterial climate by its basic pH, tweaks cytokine creation, energizes the separation and relocation of hard tissue–delivering cells and structures HA (or carbonated apatite) on the MTA surface and gives a biologic seal.(6)

Compressive Strength: According to Torabinejad M et al., the compressive strength of MTA at 24 hours is 40.0 MPa and at 21 days is 67.3 MPa. (8)

Flexural Strength: A study done by Walker MP et al., showed that the flexural strength of MTA was 14.27 MPa when specimens were exposed to two-sided moisture after 24th hour of setting time.(7)

Radiopacity: Torabinejad et al. reported the mean radiopacity for MTA at 7.17 mm of an equivalent thickness of aluminum.(9)

Marginal adaptation and sealing ability: Torabinejad et al. (1995) explained that MTA has excellent sealing ability which may occur because MTA expands during setting reaction. Sealing ability of MTA is enhanced in presence of moist environment due to the setting expansion (6)

Biocompatibility and Cytotoxicity: A study done by Torabinejad indicated that MTA it isn't mutagenic and is significantly less cytotoxic contrasted with Super EBA and IRM. No DNA harm was seen with genotoxicity trial of cells after treatment of fringe lymphocytes with MTA. On direct contact they produce insignificant or no incendiary response in delicate tissues and are fit for initiating tissue regeneration. MTA developed cementum which was novel compared with other root-end filling materials in animal studies. MTA is additionally said to invigorate cytokine creation in human osteoblasts**.**(10)

Bioactivity and Regenerative Potential: The capacity of MTA and Biodentine to actuate reparative dentin synthesis and changing growth factor beta 1 (TGF-β1) secretions was assessed by Laurent P et al. They indicated that early odontoblastic differentiation and commencement of mineralization was seen with both MTA and Biodentine and thus forms reparative dentin synthesis. Subsequently MTA is considered as a bioactive material with osteoinductive properties.(7)

Biodentine

Biodentine was made commercially available in 2009 as a dentin replacement material by Septodont (France) in the form of a capsule containing the desirable ratio of its powder and liquid.(6)

Composition: Biodentine is available in the form of a capsule containing the ideal ratio of its powder and liquid (7). The powder contains calcium carbonate, dicalcium

silicate, tricalcium silicate and oxide filler, iron oxide shade, and zirconium oxide. Zirconium oxide acts as a radiopacifier. The liquid comprises of calcium chloride which functions as an accelerator and a hydrosoluble polymer that acts as a water reducing agent.(11)

Setting Time: The setting time of Biodentine as per manufacturer's instructions is 9-12 minutes. (11)

Compressive Strength: During the setting of Biodentine, compressive strength of Biodentine increments upto 100 MPa in the first hour and 200 MPa at 24th hour. It keeps on improving with time more than a few days reaching upto 300 MPa following one month which is comparable to the compressive strength of normal dentine i.e. 297 MPa. (7)

Flexural Strength: Flexural quality of Biodentine recorded following two hours, has been discovered to be 34 MPa. (7)

Microhardness: Goldberg et al., found the microhardness of Biodentine to be 51 Vickers Hardness Number (VHN) at 2 hour and 69 VHN after one month.(7)

Radiopacity: ISO 6876:2001 has set up that 3mm Al is the base radiopacity value for endodontic cements. (11)

Microleakage: Biodentine is discovered to be related with high pH (12) and deliver calcium and silicon ions which activates mineralization. This makes a mineral penetration zone along dentin-cement interface which bestows a superior seal.(7)

Marginal Adaptation and Sealing Ability: Micromechanical bonding of Biodentine permitted incredible versatility of Biodentine crystals to the base dentin. (7)

Bond Strength: Hashem DF et al., inferred that Biodentine has low strength during starting phases of setting.(7)

Biocompatibility and Cytotoxicity: In an investigation done by Zhou et al., Biodentine was discovered to be less toxic contrasted with glass ionomer during the 1-and 7-day perception period. Another examination done by P'erard et al. determined the gene expression ability and biocompatibility of Biodentine and found that it alter the multiplication of pulp cell lines.(11)

EndoSequence Root Repair Material/IrootSP/ IrootBP

As of late, another root repair material has been acquainted with the market i.e., EndoSequence Root Repair Material (ERRM; Brasseler, Savannah, GA). It is also commercially available as iRoot SP injectable root canal sealer and iRoot BP Plus putty root canal filling and repair material. It is made out of zirconium oxide, monobasic calcium phosphate, calcium silicate, tantalum oxide and fillers and is available as paste in preloaded syringes and furthermore in a putty form. Its working time is 30 minutes and a final set is accomplished in around 4 hrs. (4)

MTA Fillapex

MTA Fillapex (Angelus Solucoes Odontologicas, Londrina, PR, Brazil) is a recent calcium silicate-based bioceramic sealer. MTA Fillapex was made trying to join the physico-chemical properties of resin based sealer with the biologic properties of MTA. The composition of MTA Fillapex after Mixture is mineral trioxide total, natural resin, salicylate resin, silica and bismuth. As indicated by the producer, MTA Fillapex has a sufficient working time, high radiopacity, and easy handling. Its pH and dissolvability may profit the antibacterial efficacy of MTA Fillapex. (12)

MTA Plus

MTA Plus (Avalon Biomed Inc., Bradenton, FL, USA) is more fine powder, cheaper item that is similar to tooth-shaded ProRoot MTA, and can be blended in with a liquid or a gel. This tricalcium silicate and dicalcium silicate based material can be utilized as a root canal sealer when blended in with gel, which additionally improves handling and washout resistance. By utilizing a gel and fluctuating the powder to gel proportion, diverse setting times and physical properties can be achieved. MTA Plus indicated improved reactivity and delayed capacity to deliver calcium and increment the neighborhood pH to alkaline values contrasted with ProRoot MTA. The ion releasing property is interlinked with its porosity, fine powder, solvency, water sorption and the development of calcium phosphate minerals. (13)

Bioceramic gutta-percha

Dissimilar to customary gutta-percha, EndoSequence BC gutta-percha (Brasseler USA, Savannah, GA) is exposed to a restrictive cycle of impregnating and covering each cone with bioceramic nanoparticles. Each EndoSequence BC gutta-percha cone has gone through a novel hardening measure making them simple to work with inside the canal. At the point when utilized with BC Sealer, the maker guarantees that a monobloc can be accomplished by the chemical and mechanical bonding to both dentin and the EndoSequence BC Points. BC Sealer and BC Points permit a "three-dimensional" bonded obturation with no shrinkage.(13)

Bioactive glass

Bioactive glass (BAG), calcium sodium phosphosilicate, is a broadly contemplated bioceramic material utilized in the field of conservative dentistry, cariology, and periodontology because of its high biocompatibility and noteworthy bioactive ability in forming apatite-like structure. recent researches have demonstrated some potential for its utilization in endodontic procedures. Mohn et al. mixed BAG particles with 50 wt% bismuth oxide as a potential root canal filling material, and discovered radiopacity with a likeness 4.94 mm

aluminum and high pH value. Another investigation joined BAG with composite materials and found sealing capacity was improved. BAG has a directly and an indirectly pH-related antibacterial effect. Nanometric bioactive glass delivers more alkaline species, and therefore showed a more grounded antimicrobial impact against clinical confines of enterococci than the micron-sized BAG.(13)

Generex A

Generex A (Dentsply Tulsa Dental Specialties, Tulsa, OK, USA) is a calcium-silicate-based material that has a few similitudes to ProRoot MTA however is mixed in with remarkable gels rather than water utilized for MTA. Generex A material has totally different handling properties in contrast with MTA. Generex A mixes to dough like consistency, making it simple to fold into a rope-like mass like IRM. (4)

Capasio

Capasio (Primus Consulting, Bradenton, FL, USA) is composed primarily of dental glass, bismuth oxide, and calcium alumino-silicate with a silica and polyvinyl acetate-based gel. A recent study found that Capasio and MTA enhance apatite deposition when exposed to synthetic tissue fluid thus had the mineralization capacity. When used as a root-end filling material, Capasio is more likely to penetrate dentinal tubules. (4)

Bioaggregate

BioAggregate (Verio Dental Co. Ltd., Vancouver, Canada) is made out of nanoparticles sized tricalcium silicate, calcium phosphate, silicon dioxide, tantalum oxide and presents improved execution compared with MTA. Tricalcium silicate is the primary component phase, tantalum oxide is added as a radiopacifier and it is aluminum free. On hydration, the tricalcium silicate produces calcium silicate hydrate and calcium hydroxide. Tricalcium silicate is stored around the cement grains, while calcium hydroxide responds with the silicon dioxide to produce extra calcium silicate hydrate. This outcomes in decrease of calcium hydroxide in the aged cement. (4)

Ceramicrete

It is a flexible phosphate ceramic, altered for use in dentistry and medicine. This self-setting phosphate ceramic sets by an acid base reaction, to form a potassium magnesium phosphate hexahydrate ceramic lattice phase. Its mechanical properties are improved by adding calcium silicate whiskers to create a phosphosilicate ceramic material. Hydroxyapatite is produced on surface, when set ceramicrete material is inundated in a phosphate containing liquid. The material is nonporous and produces calcium and phosphate particles during the setting it is utilized as a rootend filling material. Due to possessing radio opacity like root dentin, ceramicrete is a superior apical fixing material.(14)

Doxadent

It is a calcium aluminate item commercially available in powder liquid form that can be utilized as a restorative material for permanent restorations. The fundamental parts in Doxadent are zirconium dioxide, alumina, water, calcium oxide and other antacid oxides. As the powder and liquid are blended, water disintegrates the calcium aluminate powder that prompts the development of calcium, aluminum and hydroxyl particles which forms katoite and gibbsite.(14)

RETREATMENT OF BIOCERAMICS

Bioceramic sealer cases are certainly treatable. The key in retreatment of bioceramic cases is to utilize a ultrasonic with a plentiful amount of water. This is especially significant toward the beginning of the strategy in the coronal third of the tooth. Work the ultrasonic with copious water down the channel to roughly a large portion of its length. Now, add a solvent to the canal (chloroform or xylol) and switch over to an EndoSequence file (#30 or 35/0.04% taper) run at a speed of 1,000 RPM. Continue with this file, right to the working length, utilizing solvent. An option is to utilize hand files for the last 2-3 mm and afterward follow the gutta-percha evacuation with a rotary file to ensure synchronicity. (3,15)

CONCLUSION

The advent of bioceramic technology has changed the outcome of both surgical and non-surgical endodontic treatment. These materials provide a number of advantages and have a promising future in dentistry. However limitations still exist when compared to the ideal material. While MTA was the benchmark in bioceramic materials, material advances have constantly tried to
overcome disadvantages and improve its properties. Bioceramics now have a wide array of applications both in endodontics and restorative dentistry. An up-to-date knowledge of these new bioactive materials is essential to ensure the selection of the most suitable material in different clinical situations. With further research and modifications, bioceramics have the potential to become the preferred materials for the various endodontic procedures.

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GENIOPLASTY: A HISTORICAL REVIEW

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Abstract
Approximately 20% of the population is suffering from craniofacial defects which may demonstrate myriad degrees of functional and aesthetic compromise. The chin is the most eminent osseous portion of the face and therefore one of the most significant structures that affect the harmony of facial esthetics. Chin malposition can affect the size, shape, position, or proportion of the anatomical landmarks in the lower third of the face, resulting in soft tissue deformities that can disturb the balance between the lower third and the rest of the face and can have a negative effect on facial esthetics. Among the various orthognathic surgical procedures, genioplasty is one of the most widely performed surgical procedures used for correcting chin deformities. The term genioplasty is used to describe miscellaneous facial profile concerns starting from orthognathic surgery in conjunction to a facial symmetrical balancing procedure supplementary with soft tissue contours and chin augmentation for those undergoing voluntary craniofacial surgery. This article reviews and addresses the factors to consider while selecting a patient for genioplasty, the surgical options available for treating chin deformities and restoring congruity to the lower face, and possible complications and ways to reduce them. As these subjects have been extensively discussed in the literature, this will serve as a description of existing techniques.
Key Words: Genioplasty, Chin surgery.

INTRODUCTION

The four "esthetic outposts" of the human face are the chin (Latin, mentum) along with the nose and two malar eminences. The soft facial tissues drape over the main facial skeleton architectural promontories, including the malar-midface area, nose, and chin. A well-aligned, symmetrical and perfectly projected chin provides the face with as much (if not more)' esthetic value' and youthfulness as a perfect nose or high cheek bones. Genioplasty is a useful surgical procedure that enables the anatomy of the chin to be changed in all three-dimensional directions. In the correction of dentofacial deformity, genioplasty has become an important method for achieving or restoring global facial balance, facilitating improvement in the profile, balance in the labiomental musculature, and even the nasolabial area of the face. Genioplasty is typically part of malocclusion treatment, which involves orthodontic-surgical-orthognathic combination therapies. Genioplasty can be executed as an adjunctive to various surgical techniques like rhinoplasty or facelift so as to enhance the total esthetic outcome of the prime surgery. Finally, in Treacher-Collins syndrome or OSA patients, this technique is often used in reconstructive or craniofacial surgery and is an efficient means of advancing genioglossus muscle attachment and improving posterior airway space. The methods for patient assessment, variations in surgical access, osteotomy design, fixation method and advantages of the genioplasty techniques have been discussed.[1,2,3,4]

Historical background

"The Study of the Human Face was published by Woolnoth in 1865, in which he described the three facial profiles as smooth, convex and concave. He further suggests that the straight face is considered the most attractive, the young convex and the older looking as concave profile.The use of nasal cartilage as a means for chin augmentation was described in 1934 by Aufricht. In 1942, with Dr. Obwegeser and Trauner, Hofer observed and then published the first paper explaining an extraoral approach to sliding osseous genioplasty. Inlay bone grafts, bovine cartilage grafts, dermis grafts and certain acrylic implants were introduced for genioplasty in the 1950s. In 1957, the first paper on intraoral sliding osseous genioplasty, which continues to be used worldwide today, was written by Trauner and Obwegeser. The versatility of sliding genioplasty was defined in the 1960s by Converse and Wood-Smith, as well as Hinds and Kent. Postoperative follow-up, as predicted for a relatively new technique was quite longer, it started to display some problems that surgeons wanted to improve. In the 1970s, different methods to fix "witch's chin" and deep submental folds were all acknowledged by Gonzales-Ulloa, Loeb and Field. Hydroxyapatite was introduced in the 1980s for use as an inlay or onlay graft or to raise the lower face height of the osteotomized chin. In 1986, Riley and Powell first described the adaptation of genioplasty to achieve functional reconstruction of the upper airway via

genioglossus advancement. Further improvements to the techniques were proposed by Lee and Woodson as well as Hendler et al. Zide and his colleagues wrote a series of articles in the late 1990s to 2007 covering various contemporary aspects of genioplasty assessment, methods, complications and refinements that serve as an excellent basis for surgeons performing this procedure."[5,6,7]

Anatomical considerations

Osteology

There is an outer and internal surface of the chin. The ridge on the anterior midline on the external surface is formed in utero by fusion of the mandible. This ridge separates and covers the mental protuberance inferiorly. Slightly raised mental tubercles develop on each side of the protuberance. The IAN (inferior alveolar nerve) exits the mental foramen on either side, proximal to the tubercles and inferior to the second premolar.[8]

Myology

The seven muscles are attached to the chin. Mentalis, DLI (depressor labii inferioris), DAO (depressor anguli oris) partially and platysma comprise the muscles of the anterior surface. The movement of lower lip is carried out by these muscles. The geniohyoid, genioglossus and anterior belly of digastric muscle emerge from the chin's posterior surface. The downward pulling of infrahyoid muscles during speech and swallowing are resisted by these muscles.

Vascularity

The major blood vessels supplying the mandible are branches of the maxillary artery, i.e, from the inferior alveolar artery. Supplemental blood supply was provided from vessels which transverses into the mandible through various accessory foramina specifically at the sites of muscle attachment. There is formation of rich anastomotic network between the additional perforating vessels from the sublingual and submental arteries through the lingual gingiva and muscle insertions .[10]

Innervation

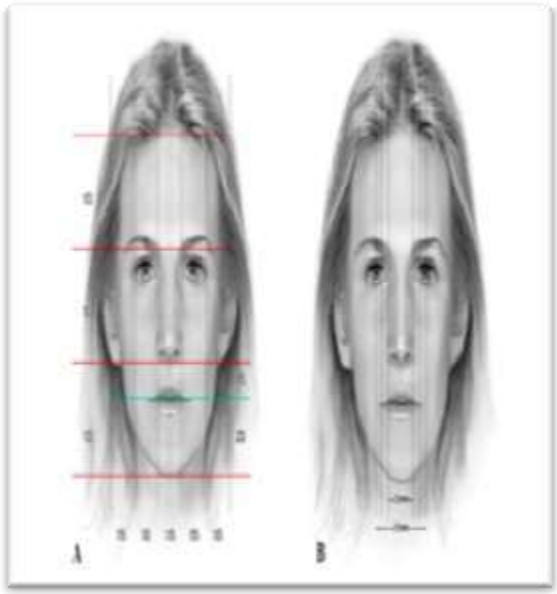
The IAN (inferior alveolar nerve) is located in the mandibular canal, and it may come in contact with the dental roots or just above inferior border of mandible. A branch emerges out from the mental foramen that forms the mental nerve that provides the entire sensation to region of lower lip and chin. The terminal branches of the IAN, i.e, incisor nerve innervates the incisors & canines, travels along the mandible, in front of the mental foramen, and therefore can easily be compromised by osteotomy. In addition, the canal can loop below the mental foramen level and osteotomy should be performed 5-6 mm underneath the foramen in order to prevent direct neurosensory disturbances in the IAN. While the IAN is the main source of innervation, multiple small perforating nerves entering through the accessory foramina provide additional sensory input. A twig from the mylohyoid nerve that comes near the lower border of the jaw in the mental area may innervate the incisors, lower chin or inferior border of the mandible. The genial tubercles are perforated by a branch from the lingual nerve. The incisor plexus formed by the incisor nerve and additional branches inside the genial portion of the mandible. This is eventually compromised to some degree during osseous genioplasty, which may cause post-operatively neurosensory disturbances.[11]

Evaluation

Teeth should be placed in occlusion and the lips in contact with each other (at rest) while conduction evaluation of face.

Frontal analysis

The mandible, from angle to chin, should have a smooth and well-defined lower border along with a certain demarcation of the face from the neck area. The size, form and shape of the mentum should be in accordance with the patient gender and individual facial type.[12]



Transverse dimensions: People with "leptoprosopic" (narrow & long) facial forms typically have pointed chins, transversely retruded chins that, on the other hand, appear separate from the mandible, "dolicoprosopic" (large & wide) faces usually have strong broad chins.[13,14]

Symmetry: The symmetry of the mentum is determined in comparison to the mandible's dental and facial midline.

Profile analysis

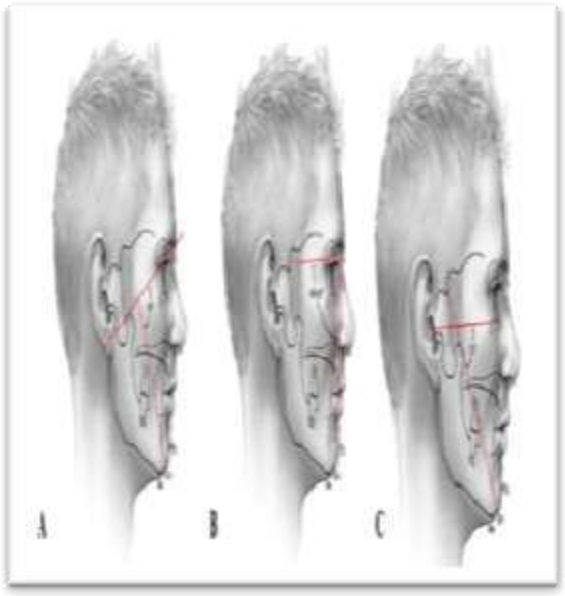
The anteroposterior site of the lower lip, the labio-mental fold height and width, and the chin button shape are the key factors accountable for the determining the chin contour or shape. The balanced amalgamation of the all these structures along with the cervicomental area, will help in attaining an esthetically pleasing and an attractive

chin. When the profile evaluation is performed, the head should be placed in natural posture.[15]

Labiomental fold: The LF (labiomental fold) forms an angle in between the tangent of the line to the chin's superior convexity and the lower lip which is around ±130. This angle is normally obtuse in cases of Class III and acute in cases of Class II.

Lip-chin-submental angle: This angle is created by the inferior and submental tangent of the labrale inferius and pogonion (lip-chin line) and around ±121° for females and ±126° for males. The angle in deficient chins is obtuse and acute in excessive anteroposterior chins. The lip-chin-submental angle will increase due to excessive submental fat, lower lip procumbence, and excessive submental bulk.

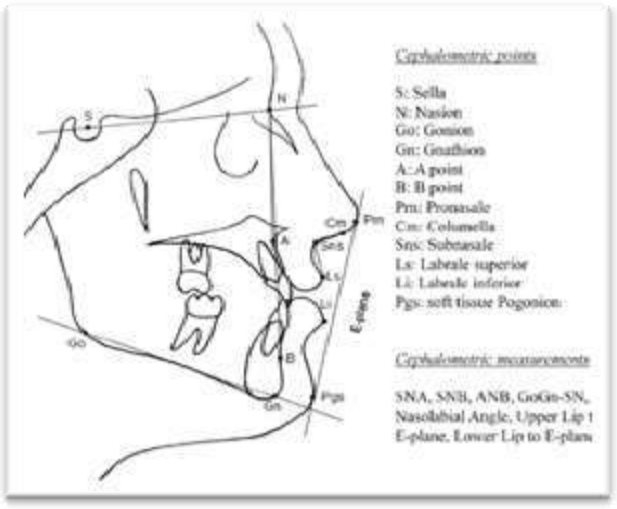
Chin-neck length: This dimension is measured from the "submental point of the neck to the menton (Me) of soft tissue" and measured around 42 ± 4. This calculation is typically increased in cases of Class III and reduced in cases of Class II.[16]



Chin throat angle (cervico-mental angle): "Submental tangent & neck tangent" (±121° for females and ±126°for males) form a chin-neck angle. Macrogenic individuals will have an acute angle, whereas microgenic will have an obtuse angle.[17]

Radiographic evaluation

Lateral cephalometric analysis: Relationships between the craniofacial complex's different hard and soft tissue structures are assessed through lateral cephalometric radiograph study. It is a valuable guide for diagnosis and rehabilitation preparation, forecasting effects of care and assessing improvements in soft tissue & hard tissue subsequent to therapy.



Facial angle: The FH plane & a line drawn from Pogonion and Nasale form this angle (mean 82 to 95 degrees).[18]

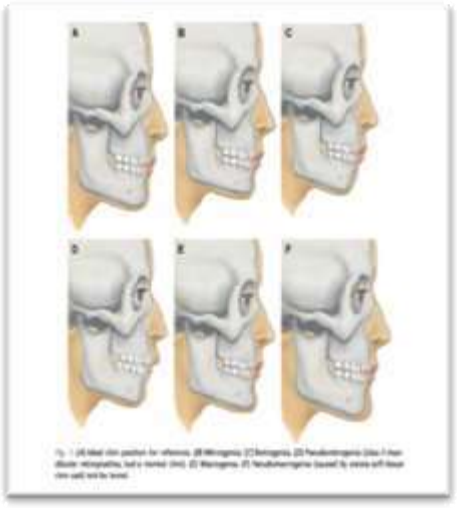
Facial contour angle: A line that connects Sn and Pogonion (Pog) (lower facial plane - LFP) and lines drawn from upper facial plane - UFP (G¥ to Sn). The mean angle is from -12 to -14 degrees for females and from -11 to -13 degrees for males.

E-line: The aesthetic plane is drawn from the "Pronasale (tip of the nose) to Pogonion (Pog)." The lower lip must be 2 mm behind it, while 4 mm behind the line. An almost symmetrical Cupid's bow should form the profile behind the esthetic plane.[19]

Postero-anterior cephalometric analysis: This radiograph can help to differentiate between the chin, dentition, maxilla, and mandible asymmetry. Occlusal cants and facial asymmetry can be appreciated on these radiographs.

Chin Classification[20,21,22,23]

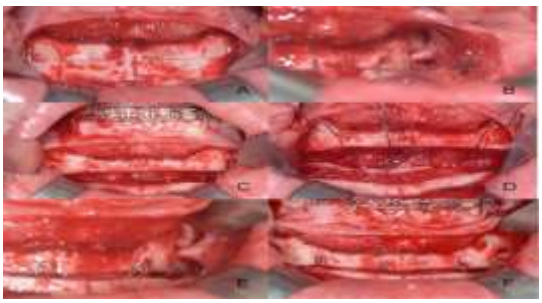
Class	
1	"Macrogenia: horizontal, vertical, combined"
2	"Microgenia: horizontal, vertical, combined"
3	"Combined: horizontal macro/ vertical microgenia, horizontal microgenia/ vertical macrogenia"
4	"Asymmetric: a) short, b) normal, c) long anterior facial height"
5	"Witch's Chin: soft tissue ptosis"
6	"Pseudomacrogenia: normal bony volume with excess soft tissue volume"
7	"Pseudomicrogenia: normal bone volume with retrogenia secondary to excessive maxillary growth and clockwise rotation of mandible"
8	"Iatrogenic malposition"



Surgical technique

1. Sliding genioplasty
   - Advancement
   - Setback
   - Reduction
   - Transverse
   - Interpositional
   - Jumping
   - Double sliding
   - Tandem
   - Centering
   - Stepped
   - M-shaped
   - Extended
2. Sagittal genioplasty
3. Sagittal curving osteotomy
4. Splitting advancement genioplasty
5. Chin shield osteotomy
6. Distraction genioplasty
7. Horizontal-T genioplasty
8. Zig zag genioplasty
9. Propeller genioplasty
10. Genioplasty for genioglossus advancement
    - Inferior border osteotomy
    - Rectangular osteotomy
    - Modified 2-piece osteotomy
    - Rotational genioplasty
11. Balcony genioplasty
12. Alloplastic genioplasty

An intraoral incision placed for osseous genioplasty with the help of various instruments including the scalpel, radiowaves, electrocautery or laser. The incision is placed along the labial surface on the contrary of the vestibular depth or near the dentition. The lateral aspects of the incision requires special care so that it should not transect the terminal branches of the mental nerves. In order to fully expose the anterior mandible, careful dissection of mentalis muscles done and a full thickness subperiosteal flap is raised. The mental foramina & neurovascular structures are recognised and exposed on both sides. The midline and para-midline areas are outlined with a pencil until sufficient exposure is reached and markings are made with piezosurgical saw or sagittal saw to leave a permanent guide for the operation. Importantly, in order not to damage the mental nerves, the osteotomy should remain at least 4.5 mm under the mental foramen and preferably nearer to 6 mm underneath the foramen. The surgical aspects of labeling, exposure of surgical site, nerve detection and fixation are demonstrated. The osteotomy is performed with the help of reciprocating, sagittal oscillating, or piezosurgical instruments. Variations of osteotomy angulation are possible and tailored depending on the desired consequences of the operation. In order to provide symmetry, try to hold the saw in one plane and allow a uniform repositioning base. Once the osteotomized section is broken down, the lingual pedicle and soft tissues in the floor of mouth must be carefully examined.[24]



Sliding genioplasty

The benefit of resolving a group of chin anomalies, from underprojection, overprojection and vertical height differences to transverse asymmetries, is provided by sliding genioplasty. In order to correct chin retrusion, it provides a feasible alternative to alloplastic mentoplasty. The part of the osteotomized segment can be slided anteriorly or posteriorly and results considerable changes in the vertical dimension of the lower third of the face.[25]

Advancement genioplasty

It is used when chin lacks projection and is elongated vertically. It is indicated for correction of severe micrognathia, mandibular prognathism, asymmetry and facial imbalance in short face patients.[26]

Stepladder/two-tiered genioplasty

It is performed for sagittal advancement with insignificant changes in the height of the lower facial third. The inferior segment is displaced sagitally over an already advanced proximal segment by making two osteotomies.[27]

Graft genioplasty or interpositional genioplasty or vertical lengthening

The improvement is accomplished by placing bone graft in between the osteotomized segments to forwardly place the chin and raise the lower height of the face.[28]

Reduction genioplasty

Parts of bone are removed in the cases of reduction genioplasty. Two horizontal osteotomy cuts are made which are parallel to each other and to the occlusal plane and the section in between the osteotomies is resected after the caudal cut is made. The height of the lower third of face is significantly decreased by this operation. Patient should be warned about the possibility of certain level of soft tissue ptosis and requirement of adjunctive procedure should be advised.[29]

Oblique sagittal split sliding genioplasty

This procedure has numerous benefits over formerly defined methods. The chin is moved along the oblique sagittal slopes, which increases contact between the bone and also confirms less defects or disproportion in the final outcomes. The oblique angle of the sagittal cut gives the segment in the superoinferior plane greater versatility of motion, allowing the vertical angles to be more controlled. The vertical osteotomy cut is placed 5 mm apart from the foramen and is in the oblique sagittal plane to avoid damage to the nerves. This is harmless and flexible technique, and may be conducted to manage countless deformities of the chin involving vertical, sagittal, or transverse abnormalities.[30]

Distraction genioplasty

Increased bone formation occurred not only between the two osteotomy surfaces, but also adjacent to the distraction region, resulting in increased coverage of the lower incisor roots. Distraction osteogenesis was done to correct mandibular retrusion. The distraction leads to formation of bone in between the two osteotomized fragments and bone surfaces around the osteotomized sites. Osteogenesis appears to occur in the region where, during active distraction, the periosteum is extended away from the bone surface, where it forms a kind of tent rounding out the phase between the surfaces of the osteotomized segments. It is also advocated for providing extreme mandibular retrusion often combined with inadequate lower incisor buccal bone coverage and it may therefore make sense to do genioplasty distraction before orthodontic care to obtain better conditions for lower incisor orthodontic movements.[31]

Zigzag Genioplasty

The superior-medial displacement of bone fragments along the slopes of an inclined plane is accomplished in the zigzag genioplasty. The degree of inclination for these slopes will be assessed prior to surgery with the help of OPG which is traced with respect to the vertical and transverse movements, height and width of mandibular symphysis, the dimensions of residual bone segments after ostectomy procedure, the location of anterior lower teeth apices, the site of mental foramina, and symmetrical or asymmetrical reduction. Zigzag genioplasty results in decreasing the vertical and transverse measurements of the chin and its symmetry or asymmetry. The technique also causes the mental sagittal projection to be decreased and has been used to decrease the height of the mandibular body simultaneously. A simple geometric equation allows the chin to be mobilized according to the needs of each patient in the vertical, horizontal, and sagittal directions. This design maintains the attachments of suprahyoid muscles and the most essential anatomical part of the symphysis region; an esthetic and natural facial appearance is created by narrowing the broad chin by this technique. It aids in safeguarding the bone present in the symphysis area, diminished chances of symmetric transposition of the chin, slight change in location of mentolabial fold, the likelihood of mutual reduction of the height of mandibular body & corrections in the asymmetric chin, slight neurosensory disturbances, consistent and steady surgical technique, comparatively lower risk of problems, minimal chances of injury to apices of teeth, and discrepancies in preferring the techniques of the osteotomy.[32]

Tenon-mortise genioplasty

Genioglossus advancement was accomplished by executing a tenon mortise type of genioplasty. The purpose of this technique is to achieve volumetric expansion of the hypopharyngeal space through genioglossus muscle advancement. The minimum advancement which was attained with this type of procedure was 10 mm. The lateral fixation of the fragments was performed to eliminate the possibility of fracture. For patients suffering from mild to moderate obstructive sleep apnea, this form of mortised genioplasty for long-term genioglossus advancement with UPPP serves as an effective method. The treatment for Uvulopalatopharyngoplasty (UPPP) was performed when there was anatomical obstruction at the soft palate. The combination of surgical procedures provide greater success rates than UPPP alone if anatomical obstructions occur at the base of the tongue as well as the level of the soft palate.

Soft tissue changes after genioplasty

The resulting soft tissue adjustment can differ according to vector of the movement. The ratio of soft tissue progression to the bone was unsurprisingly estimated to be **0.9:1** with progressive genioplasty. Additional advantages include increased length of submental region and cervicomental angle, enhanced lower lip association with eversion to the lower incisors, and total development of the genial-tongue-hyoid musculature which can have a practical impact in people with habit of snoring. The chin's soft tissues adopt vertical lengthening with a **1:1** ratio of bony movement. However, the reduction of osteotomies has a less consistent impact on

the soft tissues due to the exuberance of the existing soft tissue. The horizontal reduction causes transition in the soft tissue that meets the **0.6:1** ratio, while the ratio is **0.25:1** for vertical reduction. The clinical examination when the chin is repositioned during the operation, and not the quantitative analysis available, should assess the final cosmetic appearance of the soft tissue, although these ratios are beneficial.[33]

Complications of Genioplasty[34,35,36]

1. Soft tissue
- Hematoma
- Scar
- Buccal overgranulation
- Wound dehiscence
- Cellulitis
- Abscess (early/late)
- Draining fistula
- Capsular contracture
- Skin bunching/dimpling
- Skin necrosis

2. Muscle
- Chin ptosis
- Mentalis muscle dysfunction
- Lower lip retraction

3. Nerve
- Chin hypoesthesia/dysaesthesia

4. Bone / tooth
- Root damage
- Mandibular bone resorption

5. Technical
- Implant malposition
- Underaugmentation / overaugmentation

Conclusion

Extensive historical evidence relating to facial assessment is revealed in the literature on the chin and genioplasty procedures. The significance of the mentum and its position in providing esthetics, harmony and balance of the face are emphasized. The abnormalities in the mentum causes distress perception of one's personality. The comprehensive knowledge and understanding of regional anatomy permits the surgeon to safely execute operating procedures with good likely results. There are various choices for correcting the jaw defects, including fillers, grafts, orthognathic surgery, or mixture of these methods. The appropriate genioplasty procedures can be conducted by reviewing the evidence-based analysis documented in the literature. Fortunately, complications are rare and easy to treat surgically in general. Whilst new technologies can become accessible in the future era, but the existing are options already reliable in providing satisfactorily outcomes. The usage of custom made implants has a substantial role in the syndromic patients as they permit technique to correct unusual anatomical issues with minimal chances of morbidity. The advancements in virtual surgical planning provide surgeons the capability to perform modification in simple or complicated chin abnormalities. The surgeon is able to execute minor but essential improvements or drastic changes in the whole shape of the lower third of the face through genioplasty procedures.

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Review Article

ACTUAL OR VIRTUAL DENTOFACIAL PAIN; A REVIEW ARTICLE

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Abstract: Dentofacial pain is big burden over the society which can lead to increase in the morbidity and pshycological stress to the patient. Usually pain is the basic concern of the dental surgeon and the patients. The cause of acute dental pain can be odontogenic or Non Odontogenic. The other reason for dentofacial pain can be anxiety, tension and depression. According to the psychi:atrist Depression may be sole cause of many signs and symptoms from the nail to the hair of our head. It was earlier known as psychosomatic pain. Dentofacial pain has different origin and etiology which can be challenging sometimes. This article emphazises on the general awareness to dental surgeons and focuses on the management of orofacial pain.
KeyWords: Pain,Psychosomatic,Pain assessment and Oral behaviour

INTRODUCTION

Dental surgeon in their daily practice frequently face with various types of pain involving oral, facial and dental region. According to International Association of pain, Pain is defined as a distressing feeling due to various stimuli[1]. Dentofacial pain is defined as tenderness in face, mouth, jaws and neck. The treatment plan of the pain is basically based upon the diagnosis, although recent advancement in the technology had made the treatment easier to some extent [2]. Here an effort is made to give an idea of vague facial pain or virtual dentofacial pain which sometimes can arise from the psychogenic cause.

Assessment and Diagnosis of Dentofacial Pain

Generally, It is very difficult for dentist and patient to identify the origin of pain. It is even more confusing for the patient to rather consult the physician or dentist for the pain management. The most important diagnosis of dentofacial pain is the Detailed History about the pain, proper diagnosis. The objective of diagnosis to correctly identify the location of pain, history of patient and clinical examination. The assessment of pain can be done by various investigations, questionnaires.

The intensity of pain can be identified by common techniques such as:

- Numerical Rating Scale
- Visual Analogue Scale
- Mc Gill Pain Questionnaire
- Behaviour Rating Scale
-

Cyst,bony defects,Temporomandibular disorders can be diagnosed by Dental panoramic tomographs Recent technology has invented Computed Tomography in the detection of defects.

DISCUSSION

Merskey(1968) defined pain to be viewed as an unpleasant experience primarily associated with tissue damage which differs from psychogenic pain when damage is not apparent.

Actual dentofacial pain may be inflammatory, non-inflammatory or neurogenic. It is very easy to identify the type of pain by the dental surgeons. Here the patient complaints the pain involving any oral, facial or dental structures. But sometimes patient's complaints of pain in that region which has no specific significance partening to these structures. Usually the patients suffer from anxiety, tension, depression. Actually the patients suffering from these ailments are not aware of the fact that they have been suffering from all these diseases.

A detail family history, personal history; past medical history and recent change of behaviour can be considered for identifying the disease. Patients usually gives bizarre types of oral signs and symptoms such as something liquid like material is coming out from the gums-not the ptyalism, some thread like material is rolling over the palate and sometimes they also complaint about the painful area over the gums of the sound socket extracted long time ago. After taking helps of various diagnostic aids like X rays; USG, CT scan & laboratory test. Now, it is the usual tendency of the visiting dental surgeon to prescribe him/her one antibiotic,NSAID's, H2 blocker, desensitizing paste and antiseptic mouthwash, any of them which give no relief to the patient. Now the patient goes to another dental surgeon with a hope to get relief, but these again go in vain due to lack of proper orientation. He goes then another dental surgeon with the same hope but this time also give no result. As a matter of fact, the patient gets a bunch of prescriptions with deep soup. And falls in a treatment turmoil. It is a bare fact.

Here the author feels that if we (dental surgeon) think about these matter deeply and change over orientation toward the oral behaviour of the patient.In common with dentofacial pain anxiety is perceived as an uncomfortable sensation and leads to behavioural changes.

The literal meaning of 'behavior'is, manner or how somebody reacts with somebody or something in a particular situation. Hence oral behaviour can be expressed in what we do in chewing, eating, giving facial expressions talking and so many functions of oral structures. Change of oral behaviour means chewing tobacco and parking the vestibule, chewing causing attrition, faulty brushing causes abrasions, non-maintenance of proper oral hygiene and not taking balanced diet. For the last three decades the clinical demonstrations and experimental studies demonstrate that pain is a complex psychogenic phenomenon related to anxiety ,tension and depression which is the outcome of our fast life. The literal meaning of 'virtual' pain is almost nearly as described but not completely accordingly to the strict definition. Therefore disorders which stimulate virtual pain may be described as:

1)Somatization disorder

2)Somatoform disorder

In somatization disorder, patient experience multiple unexperienced somatic symptoms including pain in the orofacial structure along with diarrhea, vomiting, blindness, deafness, weakness or coordination problem with anxiety, depression and personality disorder.

Somatoform disorder includes no identifiable lesion or pathologic condition except oral symptoms like burning tongue, painful tongue, numbness of the soft tissue and tingling sensation of the oral tissue and pain in the facial region with emotional cause.

The primary lesion of the dental surgeon in their disorder is not to treat the patient on the basis of patient's symptoms unless a dental cause can be found. In these context its urgent to mention that many of the patients have had unnecessary extraction, root canal treatment and other procedures performed in an attempt to correct somatoform symptoms. Even the dental surgeon dismisses the case marking the patient as psychosomatic .The diagnosis of these disorders should be achieved through a search over a period of time. It is also a matter of fact that a patient gets relief after wearing a denture in complaints of pain in that edentulous area.

MANAGEMENT:

It is the primary and most important part of the dental surgeon to exclude any oral and dentofacial significance of the complaints by doing critical clinical examination and taking help of diagnostic aids. If any of these are negative the dental surgeon should give a peep into the oral behaviour of the patient.

Patient should be assured first but should not be given any gurranty with the treatment that would be provide next. The dental surgeon should also request the patient not to discard him at the outside. He should be given further visit for exclusion, consideration and any other diagnostic approaches to be continued. The dental surgeon should now think about the virtual dentofacial pain.

The patient may be treated with the use of tricyclic anti depressant (TCA) serotonin norepinephrine reuptake inhibitor(SNRI),Monoamine oxidase inhibitor(MAOI), Benzodiazepines, sedative and hypnotics. In our opinion dothipin or dosulepin 25mg daily at bed time along with clonazepam 0.25mgtablet daily after lunch for 6 weeks is enough. Sometimes it may be necessary to add carbamazepine 200mgBD/TID with Methylcobalamin OD.

This medical treatment usually give after 6 weeks,accordingly ,the patients should be follwed up.If these give no results after 6weeks little antipsychotic like olanzepine 5mg and fluoxetine 20mg and may be replaced for good result.

In differential diagnosis the pain should be differentiated from:-

1)Traumatic Sinusitis

2)Myofacial pain dysfunctional syndrome(MPDS)

3)Fratured Jaw

4) Rheumatoid Artheritis

5)Infective Artheritis

6)Rarely Eagle's Syndrome.

All the above lesions usually give sign & symptoms in relation to actual pain and have definite diagnostic and treatment approaches.

CONCLUSION

Patients sufferings from virtual or psychogenic pain should never be sent to the psychiatrist at the very beginning.In corporate sector these type of patient are referred to the psychiatrist at the very beginning without any follow up next.But in urban & sub urban practices if we refer to the case to the psychiatrist the patient with the prescription will abuse the dental surgeon with the idea that the dental surgeon himself is a mad doctor for which he has referred him to the for mad while leaving the clinic.It is really calling spade a spade but it's nothing except lack of education.

Here lies our clinical acumen and knowledge due to current trends 'refer to the psychiatrist' should be written on the prescription along with the treatment given above tobe on safe side.

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