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Use and Efficacy of 810nm Diode LASER in Oral Aphthous Ulcers

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Abstract

Background and Objectives: To evaluate the safety and efficacy of an 810-nm diode laser for treatment of oral aphthous ulcers.

Methods: Treatment with the 810-nm diode laser was applied to hundred patients of oral aphthous ulcers.

Results: The results of the study depended mainly on the clinical observation during the procedure and in the follow up period. The results showed that there was quicker pain relief with shorter and normal healing process with high acceptance by the patients.

Conclusion: Patient acceptance and satisfaction, without compromising health and function, have been found to be of a high degree in this present study. Thus, we can say that the use of the 810-nm diode laser may indeed be the best choice in oral aphthous ulcers.

Keywords: 810 nm diode laser, oral medicine, lasers in dentistry, aphthous ulcers.

INTRODUCTION

Dentistry has changed tremendously over the last few decades for the benefit of both the clinician and the patient. Newer materials and technologies have

improved the efficiency and predictability of treatment. LASERS are one of these new technologies which have revolutionized the fields of medicine and dentistry.

The concept of lasers dates back to 1917 with Einstein's theory of stimulated emission. The first laser was introduced into the fields of medicine and dentistry during the 1960s. Since then, this science has progressed rapidly¹.

Unlike in many fields of medicine and surgery, where laser treatment represents a sole source of remedy, in dentistry the use of laser is considered adjunctive in delivering a stage of tissue management conducive to achieving a completed hard or soft tissue procedure.²

Laser light is monochromatic and is of one specific wavelength. Laser light is coherent, organized, unidirectional, strong and concentrated. It is not like a typical flashlight, which releases light in many directions.^{2, 3}

Although the lasers offer many advantages over other modalities of treatment, probably the greatest impact it has made is because of its ability to be used for both hard and soft tissues, often without the need for anesthesia. When used efficaciously and ethically lasers are an exceptional modality of treatment for many conditions that dentists or dental specialists treat on a daily basis.⁴

Dentistry has entered an exciting era of high technology with lasers offering the dentist not only a window, but a door into this high-tech, rewarding arena.

The purpose of this study is to determine the use, efficacy and safety of the 810-nm diode laser for treatment of oral aphthous ulcers and to compare them with other studies of conventional modalities so as to answer the question of whether the 810-nm diode laser is the best choice.

The Diode laser is a semiconductor that uses solid-state elements, such as gallium, arsenide, aluminium, and indium, to change electrical energy into light energy.

The light energy from the diode is greatly absorbed by the soft tissue and poorly absorbed by the teeth and bones.⁵

The semiconductor diode lasers are available in four different wavelengths, as follows:

1) 810 to 830 nm, 2) 940nm, 3) 980nm, 4) 1064nm⁶
Diode lasers can be used for a multitude of dental procedures which are predominantly **soft tissue procedures** and include soft tissue surgery, periodontal pocket therapy, peri-implantitis but can

also be used for certain applications involving hard tissue (teeth), i.e. endodontics - root canal disinfection and laser-assisted tooth whitening. The most important characteristic is the wavelength of the diode laser used as the wavelength determines how the laser light will interact with the target tissue (absorption in the appropriate tissue chromophores, penetration depth into the tissue etc.). To date, research has shown that NIR (near infrared) laser light around **810 nm to 980 nm** with power range **100mW to 10 W** to be one of the most versatile wavelength ranges in diode lasers available to the dentist with regard to the number of different treatments it can be used for.⁵

Recurrent aphthous ulcers (canker sores, or aphthous stomatitis) is the presence of small, painful sores (ulcers) inside the mouth that typically begin in childhood and recur frequently. Mouth injury, stress, and some foods may trigger an attack.

AIMS & OBJECTIVES OF THE STUDY

To know the use, efficacy, limitations and safety of 810nm Diode Laser on aphthous ulcers and to incorporate Lasers into routine Oral Medicine practice.

MATERIALS AND METHODS

The study was carried out in the Department of Oral Medicine and Radiology of Mahatma Gandhi Dental College, Jaipur on 100 patients of oral aphthous ulcers. All OPD patients who fulfilled my inclusion and exclusion criteria were included in the study sample.

Before the start of the study, an approval from the Ethical Committee of MGUMST was obtained. An informed written consent was obtained from all participating adults and from parents or legal guardians of minors or incapacitated adults

Inclusion Criteria

- Patients diagnosed with oral aphthous ulcers

Exclusion Criteria

- Pregnancy and lactation
- Patients with malignant diseases
- Patients currently under treatment with any topical or systemic medication or corticosteroids for oral lesions

Patients with known cause of immunodeficiency like HIV

Treatment was carried out using 810nm Zolar photon Diode Laser system at laser output power range of 100mw to 3W, the pulse rate of 0.1 ms to 9.9s, and the frequency of 1Hz- 5000 Hz. (Figure 1).

All the patients were evaluated on visual analog scale (VAS) on the basis of pain, sensitivity, and comfort during and after the procedure in which 0 was considered as no pain and 10 determined the worst pain.

Post-operative complications assessment

Participants were asked to grade the VAS of the severity of their postoperative complications (such as the presence of pain, oedema, and functional disorders) in numbers from 1 to 10 in the first, second and third visits, according to the following:

1-2 no postoperative complications;

3-5 mild postoperative complications;

5-7 moderate postoperative complications;

8-10 severe postoperative complications.

The patients were reviewed for follow up periods from day 1 to day 7. Clinical photographs were taken before treatment and during follow up periods.

PROCEDURE

100 patients with clinically diagnosed oral aphthous ulcers of different sizes and locations were treated with a diode laser, with a power output of 3W, in pulsed mode with a cycle of 1 minute in non-contact mode. The lesions were treated with a spot size of 2mm. 2 cycles were given for each ulcer. Pain relief was evaluated on the visual analog scale on the same day and third and seventh day respectively. Healing of the lesions was also evaluated on the first, third and seventh post treatment days.

RESULTS

PAIN RELIEF

	<50%	50%	60%	70%	80%	90%	100%
SAME DAY		20	12	20	3	39	6
3 DAYS				14	10	10	60
7 DAYS						4	30

Table 1: Pain relief in aphthous ulcers (in percentage)

A total of 100 patients were observed for the parameter of Pain Relief. From the above table we can infer that approx. 6% patients experienced complete relief on the same day while 100% patients experienced at least 50% relief on the same day. 60% patients experienced complete pain relief by the end of 3 days while another 30% experienced complete relief by the end of 7 days. Only 4% patients could not attain 100% relief at the end of 7 days and their pain relief was around 90%.

HEALING

100% HEALING	N
1 DAY	6
3 DAYS	60
7 DAYS	30
>7 DAYS	4
TOTAL	100

Table 2: Healing of the ulcers

From the above frequency table, we can observe that out of 100 patients, 6% patients healed completely on the first day of treatment. 60% patients noticed complete healing by 3 days while another 30% patients healed completely by 7 days. 4% patients took more than 7 days to experience complete healing.

DISCUSSION

The term LASER was coined by Gordon Gould at a conference in 1959. LASER is an acronym for LIGHT AMPLIFICATION BY STIMULATED EMISSION OF RADIATION.¹

The use of lasers in a variety of surgical procedures has been well documented. Diode lasers present a solid semiconductor as an active medium, by associating aluminium, gallium, and arsenide (with wavelengths varying between 800 and 980nm) in the visible and invisible range of near infrared waves. As its wavelength is poorly absorbed by the hard dental tissue, the diode laser is safe and well indicated for soft oral tissue surgeries in regions near the dental structures and for cutting, vaporization, curettage, blood coagulation, and hemostasis in the oral region.

In our study, an 810nm diode laser was used for treating aphthous ulcers ; no major complications occurred in the surrounding soft tissue or hard tissue. We adopted the 810nm diode laser for our patients due to its availability, the convenience of its application, the ability for large areas to be treated in a single application, and the possibility of precise control of laser energies in all areas of the mouth.

In my study of Aphthous Ulcers, it was noted that out of 100 patients, (**Table 1**) 68% of the patients had very good pain relief on the very first day with a minimum of 70% pain reduction. And, by the end of 3 days, 66% patients had 100 % pain relief while another 30% experienced complete relief by the end of 7 days. Only 4% patients could not attain 100% relief at the end of 7 days and achieved 90% pain relief.

Also, (**Table 2**) 6% patients showed complete healing on the day of treatment as no irregularity of mucosal surface was felt by the patient. And more than half, that is 60% patients showed complete healing at the end of 3 days, and 96% lesions healed in a time span of 7 days. Only 4% patients took more than 7 days to achieve complete regression due to the large size and abnormal location of the ulcer.

In case of RAS, we noted that the recurrence of the ulcers decreased in the same site probably due to sterilization of the site and due to sealing of nerve endings by lasers.

Bladowski et al also found similar results and stated that the diode laser used at low levels of energy (200 mw) cut the healing time in half when compared to a pharmaceutical method (Solcoseryl ointment).⁷

De Souza et al in a similar study showed similar results and revealed that 75% of the patients reported a reduction in pain in the same session after laser treatment, and total regression of the lesion occurred after 4 days. Total regression in the corticoid group was from 5 to 7 days⁸

In a similar study on aphthous ulcers treated by 980 nm diode laser, all the patients were satisfied and experienced pain relief directly after irradiation and only 2 patients reported back with recurrence at different locations.⁹

In our study, we evaluated the effects of the 810-nm diode laser in the treatment of 100 patients with aphthous ulcers and conditions and found out that the advantages of the 810 diode lasers as a treatment modality were evident. Pain relief in acute conditions was found to be excellent along with fastened healing. Satisfactory healing was observed in all the cases. All in all, the 810-nm diode laser proved out to be an excellent treatment modality.

CONCLUSION

In conclusion, despite the numerous therapeutic choices available for the management of oral aphthous ulcers, there is no precise treatment available. The effectiveness of its management depends on the decreasing the time of relieving the sign and symptoms of the ulcers such as pain and inflammation. Our diode laser 810 nm is an applicable effective alternative modality in the reduction of pain, ulcer size and healing time of the oral aphthous ulcers.

However, the study sample size was limited so we need to do similar studies on a larger sample size to verify the outcomes.

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Reattachment of Fractured Tooth Segment in Minimally Invasive Way - A Case Report

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Abstract

Dental trauma frequently results in coronal fractures of the front teeth. Root canal therapy followed by reattaching the fractured segment with fiber post reinforcement is a viable alternative in cases of complex fractures where the fractured segment is present and there is close approximation of the segment to the intact tooth.

Reattaching a fractured piece is a quicker, less involved process that offers immediate relief, better aesthetics, and function restoration. Because it is inexpensive, aesthetic, and preserves dental structure, reattaching a tooth fragment is a better option than using traditional techniques. For a positive prognosis, patient cooperation and awareness of the treatment's limitations are important.

Keywords: Case Report, Fractured tooth, Reattachment, Fiber post, Composite

INTRODUCTION

The anterior teeth are relatively vulnerable to trauma. According to reports, 37% of trauma cases include the upper central incisors.¹ Traumatic injuries most frequently affect the upper and lower lateral incisors, as well as the upper canines, after maxillary incisors.²⁻⁴

Dental trauma that affects both primary and permanent teeth frequently takes the form of anterior tooth coronal fractures. It significantly affects a patient's social and psychological well-being.⁵

Tooth fragment bonding has become more and more popular because of its numerous advantages, including anatomical qualities, color, and surface appearance. It can deliver enduring aesthetics and a positive psychological reaction.⁶ The following are some factors that affect how coronal tooth fractures are treated:⁷⁻⁹ The size of the fracture (biological width, endodontic involvement, alveolar bone fracture).

- The tooth's fracture pattern and ability to be repaired (associated root fracture).
- Traumatic secondary injuries (soft tissue status).
- The existence or absence of a broken tooth piece and its suitability for usage (fit between fragment and the remaining tooth structure).
- Occlusion, appearance, economic state, and prognosis.

CLINICAL ASSESSMENT

Periodontal Assessment

Clinical examination for pulpal exposure, vitality tests and periapical radiographs should be performed. Under local anesthesia, gentle probing around the periodontal tissues of the broken tooth will help assess the degree of the fracture as well as the presence of a vertical root fracture.¹⁰ If the fracture line is supragingival the procedure for reattachment will be straightforward. However, when the fracture site is subgingival or intraosseous, surgical or orthodontic extrusion of the apical portion for restoration

Endodontic Assessment

In addition to be used to evaluate the pulp's health and the stage of apex maturation.

Coronal Assessment

After testing the restoration in the mouth, it could be required to join the pieces using resin composite if there are several fragments present.

Occlusal Assessment

Assess whether the occlusion is traumatic or not. Disoccluding the teeth is indicated in cases of traumatic occlusion.

The objective of this case report is to show a conservative technique for the treatment of coronal tooth fractures using an original tooth fragment and a glass-fiber-reinforced composite post to produce a functional and aesthetically attractive outcome.

CASE DESCRIPTIONS

A male patient, age 28, who had been in an accident 3 days prior, presented with excruciating pain and a shattered front tooth. The detached tooth piece that had fragmented due to trauma was also presented by the patient.²² The teeth underwent clinical evaluation and were found to have a class III fracture. (Fig. 2) The surrounding teeth did not exhibit any other fractures or injuries, and a radiograph revealed complete root formation, a closed apex, and no periapical radiolucency. (Fig. 1) The creation of a treatment strategy that included urgent endodontic therapy for tooth 22 and reattachment of the fractured crown segment. Access is made using a local anaesthetic of 2% lidocaine and 1:80,000 adrenaline. Working length was established. With the help of the ProTaper Universal Rotary File System, cleaning and shaping was done (Dentsply). During the preparation, an irrigant consisting of 5.25% sodium hypochlorite and normal saline was employed. Sectional obturation done with gutta-percha and Endo seal after being dried with paper points. (Fig. 3) Post space was prepared using piezo reamers. The fiber post 1.4 mm diameter (BMD) was tried in the canal and adjusted to the desired length (Fig. 4) After cleaning the tooth fragment with sodium hypochlorite solution, it was thoroughly rinsed with water. The coronal fractured tooth fragment was then given a hole so that it could be placed over the coronal portion of the fiber post. Using a cotton pellet, extra water was wiped away. Both were subjected to a 15-second etching process using a 37% phosphoric acid etchant (Eco-Etch Ivoclar vivadent) on the enamel and dentin. Then, using a

fully saturated applicator, 2-3 coats of the bonding agent (3M ESPE Adper Single Bond Plus) were applied in quick succession to the dentin and enamel that had been etched. After applying the bonding agent for 15 seconds while gently agitating it and evaporating solvents with gentle air thinning for 5 seconds, the light curing process was then applied for 10 seconds, Dual-cure resin cement (Fusion ultra D/C Prevestdenpro) was used to lute the prefabricated glass fiber post in the canal. (Fig.5)

Flowable composite resin (Prime Dental Restorative Flow Viscous) was used to restore the fragment to the tooth with fiber post. The original fragment was accurately placed and photo polymerised for 40 second (Fig.6) removed excess composite and polished with composite polishing kit (Shofu) final restoration shown in (Fig.7) follow up taken for 1 year to check the restorative margin discoloration and mobility.(Fig.9)



Fig. 1- Preoperative radiograph



Fig. 2 Preoperative clinical

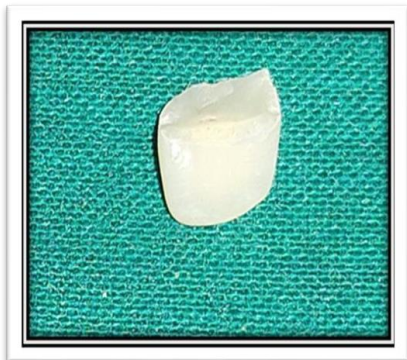


Fig. 3 - Fractured tooth segment



Fig. 4 - Sectional Obturation



Fig. 5 - A dual cure luting system and a glass-fiber post reinforced composite post placed after post space preparation.



Fig. 6 Fiber post curing



Fig. 7 Postoperative image with reattached tooth fragment in 21



Fig. 8 Postoperative clinical



Fig. 9 Postoperative radiograph



Fig. 10 Postoperative clinical after 12 month follow up

DISCUSSION

It is now possible to achieve excellent results with the reattachment of a broken tooth fragment provided that the biological factors, materials, and techniques are logically assessed and managed. This new perspective on the reconstruction of fractured teeth is made possible by the development of adhesive material. When a fracture segment is present, reattachment need to be the first choice of treatment.

The issues of uneven wear of restorative material, mismatched hues, and difficulties in reproducing shape and texture that are related to other procedures are obviously eliminated by the use of natural tooth substance. Evaluation of the periodontal, endodontic, coronal, and occlusal state might lead to the formulation of a treatment strategy.¹⁰

The highest fracture resistance was attained by chemically cured composite, followed by light cured resin, and the lowest by just dentin bonding agent.⁸

According to Cavalleri and Zerman reattached crown fragments appear to have a better long-term prognosis than composite resin restorations.¹¹ If the extra-oral time of the fractured fragment increases, dehydration of the fragment can occur. Therefore, it is advised that the fragment be stored in a medium such physiologic saline to avoid this condition. The majority of resin cements and resin-based composite core materials can be joined with fiber-reinforced posts through fabrication.^{12-13.}

The location of the fracture, the size of the fracture remnants, the patient's periodontal health, pulp involvement, the maturity of root formation, biological width invasion, occlusion, and time are all factors that might affect the scope and viability of such restorations. Post-placement serves to hold the coronal section via a friction bond and aid in preventing dislodgment non-axial forces in addition to bonding.¹³⁻¹⁵

The process for reattachment will be simple if the fracture line is supragingival. However, orthodontic extrusion with a post retained crown may be

required if the fracture location is subgingival or intraosseous. As an alternative, bonding shattered components may be accomplished with the use of surgical procedures such as electrosurgery, elevation of tissue flaps, clinical crown lengthening surgery with alveolar bone removal, and gingival overgrowth removal. It has been recommended that minimal osteotomy and osteoplasty be used anytime the fracture site invades the biologic width.¹⁶ Coronal tooth fractures have a variety of treatment options depending on the situation, such as quick reattachment.¹⁷ Fracture reattachment, crown and root recontouring, and surgical exposure¹⁸ using splints¹⁹, and without radicular anchorage²⁰, each having its advantages and disadvantages. The only choice when a tooth cannot be saved at all is extraction, which results in the loss of nearby bone and precludes the use of implants in the future.²¹

Advantages Disadvantages of reattachment are shown below.²²

Advantages of reattachment

- Conservatism.
- Wear similar to adjacent/opposed teeth.
- Color match to the remaining crown portion.
- Preservation of incisal translucency/good aesthetics.
- Maintenance of original tooth contours.
- More durable restoration than a Class IV resin restoration alone.
- Preservation of 'identical' occlusal contacts.
- Color stability of the enamel.
- Positive emotional and social response from patients.

Disadvantages of reattachment

- Less than ideal aesthetics if the tooth fragment is allowed to dehydrate.
- Color changes of the bonded fragment.
- Necessity for continuous monitoring.
- Unknown longevity.
- 'Predicted' eventual separation of the repair due to progressive breakdown of the bonded junction.

CONCLUSION

The case described in this research demonstrate that reattaching a tooth fragment is a practical and conservative treatment option for fractured incisors using current materials and the right clinical procedure. This study is intended to add to the information that supports the viability of reattaching the fractured fragment of the anterior tooth when it is strengthened by appropriate restorations. In order to strengthen the evidence supporting this treatment option, future investigations may need to concentrate on reporting longer follow up.

DECLARATION OF PATIENT CONSENT

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published, and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

CONFLICTS OF INTEREST

There are no conflicts of interest.

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Comparison of Positional Accuracy of Multiple Implants Using Pattern Resin, Flowable Composite, Acrylic Resin and Protemp 4 as Splinting Material: An In Vitro Study

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Abstract

Introduction: The purpose of this study was to evaluate and compare the positional accuracy of multiple implants using different splinting materials. Samples were scanned and analysed for discrepancy.

Materials and Method Maxillary model was made with acrylic resin with four parallel analogues placed. Model was scanned with guide pins attached to them as a control. Model was splinted with different materials, impression was made and casts were poured. 20 samples were made (n=5) using four splinting materials i.e. pattern resin, flowable composite, acrylic resin and protemp 4 named as group 1, 2, 3, 4 respectively.

Results: A post-hoc analysis by tukey's test revealed a statistically significant relationship between Group 1 and Group 2, Group 1 vs Group 2, Group1 vs Group 4, Group 2 vs Group 3 and Group 2 vs Group 4. The significance levels of these four comparisons were the major contributors towards the statistical significance noticed with respect to the ANOVA test.

Conclusion: The splinting methods have affected the accuracy of definitive casts. The flowable composite splinted cast produced the most accurate casts followed by protemp 4, autopolymerizing acrylic resin and pattern resin splinted casts.

Keywords: Implant, splinting material, pattern resin, flowable composite, acrylic resin, protemp 4.

INTRODUCTION

Osseointegrated dental implant has been proven successful in the treatment of complete and partial edentulism. Oral rehabilitation with implants is multifactorial with aesthetics and passive fit being the prime concern. With predictable integration of implants, the emphasis is shifted towards precise prosthesis. The connection of prosthesis to osseointegrated implants produces a unified structure in which the prosthesis, implant and the bone act as a unit. Any misalignment of the prosthesis may jeopardize the implants, bone matrix and or the prosthesis.¹

Inaccurate superstructure results in mechanical and biological consequences that disrupt the function of dental implants. Mechanical complications include loosening, bending and fracture of the prosthetic or implant components. Biological complications from loading above the physiologic tolerance level often result in the breakdown of an osseointegrated interface between the implant and the surrounding bone.^{2,3}

An accurate master cast is a pre requisite for the avoidance of any future misalignment with respect to fabrication of passive prosthesis. Accuracy of the master cast is critical and dependent on the clinical and laboratory variables intrinsic to restorative treatment, such as the type of impression material and technique. The success of implant prosthesis therefore depends directly on the accuracy of impression, in order to obtain the original position of the implants in the master cast.⁴

The first and foremost is the complexity surrounding the attainment of passive fit of the implant

prosthesis, which is directly related to the accurate three dimensional transfer of the implant positions to the working cast. Other challenging factors are impression technique, impression materials, splinting materials, splinting techniques, implant angulations and implant depth. The primary goal of an implant impression is to obtain an accurate working cast to improve the chances of production of passively fitting implant prosthesis.⁴

Connecting all the impression copings together with rigid material is the underlying principle of splinting to prevent the movement of impression coping.¹⁰ The splinting technique has gained popularity with consistent results of higher accuracy as compared to non-splinting technique.

Hence, the purpose of this study is to evaluate and compare the positional accuracy of implants using different splinting materials.

METHOD

An acrylic resin model was fabricated with heat cure acrylic using a prefabricated rubber mold. Using pilot drill with surveyor, four parallel holes were drilled at A, B, C, D positions. Four 4mm diameter implant analogs with internal hex were placed in the acrylic model. The implant analogues were fixed at these sites and will be numbered as 1, 2, 3, and 4. Open tray impression copings were then attached to the implant analogs. The impression copings were secured with 10-mm flat head guide pins will be used to secure the impression copings on to the implants using a hex drive by applying a torque of 15 N. Cm.



Splinting materials used were Pattern resin, Flowable composite, Autopolymerizing acrylic resin and, Protemp4.

Onto the open tray impression copings, dental floss was looped around tight on each of the copings and firmly secured. Autopolymerizing acrylic resin was adapted around on the dental floss and the copings were allowed to set. This splints were then sectioned using a diamond disk in the center of each section so that a 0.2 mm standardized space was created between each of the splinted sections. The sectioned pieces were reconnected just before the impression procedure with an incremental application autopolymerizing acrylic resin and attached to the splints. In the preformed tray windows were cut corresponding to the position of implant analogs. Putty consistency polyvinylsiloxane impression material was loaded onto the tray, and seated over the resin model. The impression tray was loaded with light body impression material and a wash impression was made. This position was maintained throughout the polymerization time. The impression

copings were then loosened with a hex driver and the tray was separated from the die, with the impression copings along with guide pin remaining locked in the impression. The implant analog were then connected to the hex at the bottom of the impression coping and the guide pins were tightened with the hex driver and cast was poured. Total 20 samples (n=5) were made using four different splinting materials.

In the same manner impression will be obtained by using remaining 3 splinting materials.

An ADA Type IV die stone was used to pour the cast. The casts were retrieved from the impressions after 24 h. All the casts were stored at room temperature for a minimum of 24 h before taking measurements. The implant model was scanner using a blue light scanner. The positional accuracy was measured digitally. The obtained data was analyzed by using appropriate biostatic tests. Data was evaluated with a significance level of $p < 0.05$.



Fig. 12: Impression coping splinted with acrylic resin



Fig. 13: Impression coping splinted with protemp



Fig. 14: Impression coping splinted with pattern resin



Fig. 15: Impression coping splinted with flowable composite



Fig. 20: Impression made



Fig. 25: Model with parallel pin being scanned



Fig. 26: Specimen with parallel pin being scanned



Fig. 27: Image obtained of scanned model

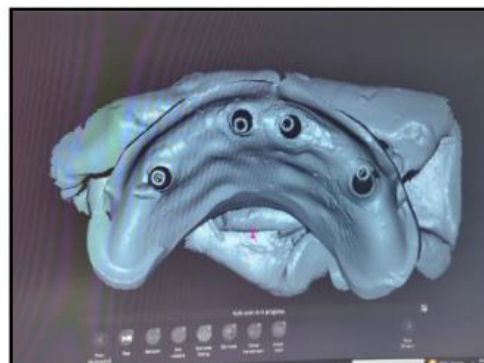


Fig. 28: Image obtained of scanned specimen

RESULTS

One way ANOVA test was done to check the significance between the four groups and the master model. Post hoc Tukey's test was done for comparison between the four different methods of splinting to identify the significant pairs. The significance level was kept at $p \leq 0.05$.

Software analysis for statistics was done using IBM SPSS V.25.0

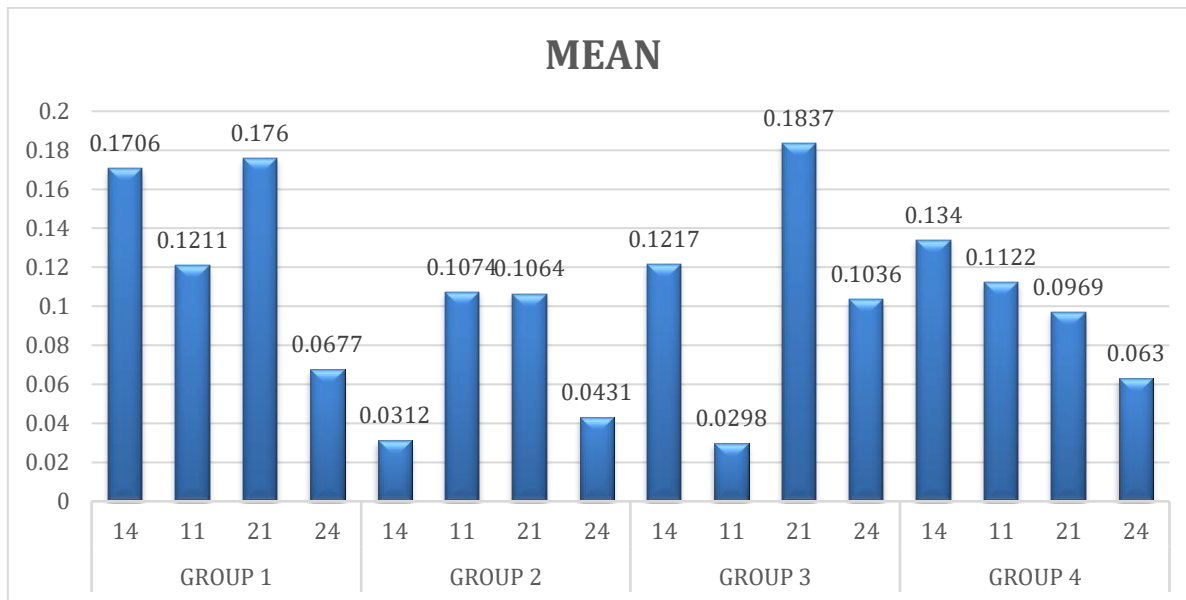


CHART 5: Mean value for all tooth of each group

Chart 5 represent the mean for the change in position in x and y axis for each tooth region when the model was splinted with all the four Groups i.e. Group 1 (Pattern resin), Group 2 (Flowable composite), Group 3 (Autopolymerizing acrylic resin) and Group 4 (Protemp).

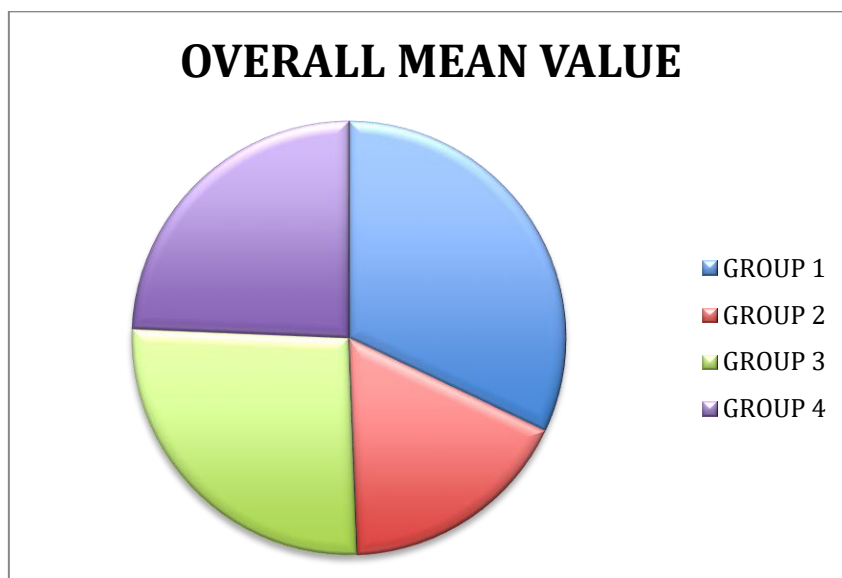


CHART 6: Overall mean of all groups

The overall mean value for Group 1 (Pattern resin) was 0.133mm.

The overall mean value for Group 2 (Flowable composite) was 0.072mm.

The overall mean value for Group 3 (Autopolymerizing acrylic resin) was 0.109mm.

The overall mean value for Group 4 (Protemp) was 0.101mm.

**OVERALL COMPARISON BETWEEN FOUR GROUPS USING ONE-WAY ANOVA
FOLLOWED BY POST-HOC TUKEY TEST**

	Mean square	F-value		p- value
Group 1 Group 2 Group 3 Group 4	0.026	11.190		0.000*
1st group	2nd group	Mean difference	Std. error	p- value
Group 1	Group 2	0.061	0.010	0.000*
	Group 3	0.024	0.010	0.117
	Group 4	0.032	0.010	0.017*
Group 2	Group 3	0.037	0.010	0.003*
	Group 4	0.029	0.010	0.035*
Group 3	Group 4	0.008	0.010	0.873

*p<0.05= statistically significant

The overall comparison between the four groups was conducted using One-Way ANOVA statistical test. The mean difference between the four groups was found to be statistically significant. A post-hoc analysis of the result to compare two individual groups in order to ascertain the contributors of significance of ANOVA was done using Tukey's test. It revealed a statistically significant relationship between Group 1 and Group 2, Group 1 vs Group 2, Group 1 vs Group 4, Group 2 vs Group 3 and Group 2 vs Group 4. The significance levels of these four comparisons were the major contributors towards the statistical significance noticed with respect to the ANOVA test.

DISCUSSION

Since dental implants are routinely used to have a long term successful result with implant prosthesis, a precise and passive fit of the implant superstructure to an implant abutment is recommended. The making of accurate impressions and obtaining a definitive cast is critical to achieve passively fitting implant retained prosthesis.³⁵

An inaccurate impression may result in improper fit of prosthesis which may lead to biological as well as mechanical complication leading to failure of implant. Mechanical complication may include screw loosening, screw fracture, and occlusal inaccuracy;³⁸⁻⁴³ biologically marginal discrepancy from misfit may cause unfavorable soft and/ or hard tissue reactions due to increased plaque accumulation.⁴⁴⁻⁴⁶ Even though obtaining absolute

passive fit is practically impossible, minimizing the misfit to prevent the complications is a generally acceptable goal of prosthodontic implant procedures.⁴⁷

To create an accurate definitive cast, it is critically important to obtain an intraoral impression that accurately captures the 3-dimensional (3-D) spatial orientation of a patient's implants. Factors affecting the accuracy of such impressions include: splinting or not splinting impression copings; different splinting materials; implant angulation; the number of implants; polymerization shrinkage of the impression material; the setting expansion of stone; and the design and rigidity of the impression tray. Among all these, splinting or not splinting the impression copings is among the most significant.⁵⁶ Studies evaluating the relationship between different types of splinting materials and their accuracy have yielded conflicting results. Rhyu et al. used VPS bite registration material for splinting. It was seen that impressions with VPS bite registration material splinted square impression copings were more accurate than those splinted with acrylic resins. Assif et al. used impression plaster, autopolymerizing acrylic resin, and dual-cured acrylic resin as a splinting material and concluded that splinting with autopolymerizing polymethylmethacrylate was more accurate. Pattern resin is also one of the most popular splinting materials. Besides pattern resin, impression plaster, dental floss, polyether-based bite registration

material, dual-cure acrylic resin, orthodontic wire, prefabricated acrylic resin bars, light-curing composite resin, and carbon steel pins have been used to splint the impression copings. Autopolymerizing acrylic resin yielded better results, probably because of increased stiffness and greater stability. Temporization material bisphenol A-glycidyl methacrylate also showed better results compared to nonsplinted impressions.³⁴

In this vitro study, total 20 stone casts were made constituting 5 casts made with each splinting material. Four groups were made of each splinting materials, Group 1- Pattern resin, Group 2 - Flowable composite, Group 3 - Autopolymerizing acrylic resin and Group 4 - Protemp 4.

The study revealed that Group 2 showed superior positional accuracy followed by Protemp4, Autopolymerizing acrylic resin and Pattern resin.

The splinted impression technique has been shown to be a primary factor in increasing the fitting precision of the restorative complex.⁵⁷ Branemark⁵⁸ et al originally described the splint technique and emphasized the importance of splinting transfer copings intraorally with acrylic resin over the floss scaffold before making an impression. The acrylic resin splinting effectively resists translation and rotation of the transfer copings within an impression when the impression is detached from the implants followed by placement of the implant analogs.

Splinting material should thus be selected based upon their property to resist any dimensional changes. Some authors section the splint material connection to minimize the shrinkage. Some authors connected all copings with splint material and waited for complete polymerization of the material.⁵⁹ According to Lee et al, in edentulous

situations involving 4 or more implants, most in vitro studies advocated splinted impression techniques. A majority of studies published after 2003 advocate the use of splinting to improve impression fidelity.⁴⁵ In recent years, metal splinting and composite-based bis acrylics have gained popularity as a splinting material in lieu of the conventionally used materials.

Selection of a specific splinting materials depends on the clinical situation present. The findings of this study will contribute to the evidence of material-related aspects of implant prosthesis fabrication for best clinical practices of implant prosthodontic rehabilitation. Future studies should be conducted to compare the materials under simulated clinical conditions; both intra study environmental differences and operator variability will provide information to translate laboratory findings to the dental office setting.

CONCLUSION

Within the limitations of this in vitro study, the following conclusions were drawn: 1. The combined effect of impression material, impression technique, implant angulations and splinting materials had effect on the accuracy of the duplicate casts compared to the definitive casts ($p = 0.001$). 2. Casts retrieved from flowable composite splinting were statistically more accurate than casts obtained from protemp 4, autopolymerizing resin and pattern resin splinting.

Hence, it can be concluded that the splinting methods have affected the accuracy of definitive casts. The flowable composite splinted cast produced the most accurate casts followed by protemp 4, autopolymerizing acrylic resin and pattern resin splinted casts.

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A Comparative Study to Assess the Effect of Oral Alprazolam as Premedication on Vital Parameters of Patients During Tooth Extraction - A Retrospective Observational Study

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Abstract

Background: One of the most common dental procedures associated with preoperative anxiety is the removal of a tooth¹.with the fast pace at which surgical procedures of the head and neck are evolving, holistic procedures have come into light in order to provide patients with a comfortable surgical experience.

Patients and Methods: A total of 80 patients were taken for this study wherein 40 patients were given 0.5mg tab. Alprazolam and 40 patients underwent extraction without any premedication.

Results: On the pre-operative day, mean systolic blood pressure in study group was 116.475 ± 7.646 in control group was 119.325 ± 5.171 .on the intra -operative day, mean systolic blood pressure in study group was 122.150 ± 6.788 in control group was 127.750 ± 3.543 . On the post-operative day, mean systolic blood pressure in study group was 120.750 ± 7.337 in control group was 125.650 ± 3.759 . On the pre-operative, mean pulse rate in study group was

¹ Lago-Méndez L, Diniz-Freitas M, Senra-Rivera C, Seoane-Pesqueira G, Gándara-Rey JM, Garcia-Garcia A. Dental anxiety before removal of a third molar and association with general trait anxiety. J Oral Maxillofac Surg. 2006;64:1404–8.

76.500±7.535 in control group was 79.650±5.021, On the intra-operative, mean pulse rate in study group was 82.950±7.031 in control group was 89.550±4.517. On the post-operative, mean pulse rate in study group was 80.350±6.435 in control group was 85.600±4.903. On the pre-operative, mean oxygen saturation (in %) in study group was 96.100±2.550 in control group was 95.825±2.252. On the intra-operative, mean oxygen saturation (in %) in study group was 95.375±2.393 in control group was 94.925±2.005. On the post-operative, mean oxygen saturation (in %) in study group was 94.325±2.474 in control group was 93.950±1.974

Conclusions: Premedication with oral benzodiazepines such as oral alprazolam can be utilized for patients with apprehension towards dental treatment and needle phobia.

Keywords: Dental Extraction, pre-medication, benzodiazepines, local anesthesia

INTRODUCTION

Surgical procedures of the oral cavity and the head and neck are evolving at a very fast pace. Improved techniques coupled with holistic understanding of regional anatomy backed by improvements in local anesthesia (LA) have almost brought us to the brink at which, we can state that oral procedures are relatively safe with least risk of complications. However, there has been a weak cornerstone of these otherwise comfortable procedures. The weak cornerstones we are referring to are fear and anxiety. Although it is debatable that fear and anxiety are relative factors, it is beyond doubt that these reflect as changes in vital parameters of the patient which includes blood pressure, pulse rate, and oxygen saturation and in turn act as early warning signs for a number of medical emergencies. Anxiety during dental treatment can cause stress and discomfort in patients and lead to dental treatment avoidance with consequent damage to the oral health of phobic patients. In this context, effective control of anxiety plays a pivotal role in patient compliance to dental treatment. The use of conscious sedation is an important strategy for the behavioural management of patients who suffer from anxiety over dental treatment. Conscious sedation is an approach that uses one or more drugs to produce a state of central nervous system depression while maintaining verbal contact with the patient throughout the procedure. The sedation level should be such that the patient remains conscious and can readily understand and respond to verbal instructions or tactile stimulation.

Indications for the use of conscious sedation include a diagnosis of anxiety and dental phobia, prolonged or traumatic dental procedures and medical conditions potentially aggravated by stress, which can reduce the patient's ability to cooperate. Additionally, the release of endogenous catecholamines can increase the cardiovascular system load in patients with a history of angina, whereas asthmatic patients can present stress-induced acute episodes of breathing difficulty induced by stress. These are among some of the patients' profiles that can benefit from conscious sedation in reducing exacerbation risk. The risk-benefit should be determined according to the severity of the patient's condition. Benzodiazepines are widely used in oral sedation to induce a state of anxiety in dental procedures. These drugs are among the most commonly prescribed and employed for this purpose worldwide. The hypothesis of this study was that conscious oral sedation is effective and safe for use in dental procedures. The gap in knowledge on the use of drugs for oral sedation in dentistry prompted this systematic review to determine the effectiveness and safety of oral sedation drugs in adult patients undergoing dental surgical procedures².

METHODS

Sample size was 80 patients. Forty patients were given a preoperative single dose of oral tablet alprazolam 0.5mg as premedication (study group), whereas the other Forty were treated without any premedication (control group). Blood pressure, and

² Araújo JO, Bergamaschi CC, Lopes LC, Guimarães CC, de Andrade NK, Ramacciato JC, Motta RHL. Effectiveness and safety of oral sedation in adult patients undergoing dental procedures: a systematic review. *BMJ Open*. 2021 Jan 25;11(1):e043363. doi: 10.1136/bmjopen-2020-043363. PMID: 33495257; PMCID: PMC7839856.

pulse rate were monitored and recorded with the help of digital blood pressure monitor. Oxygen saturation was recorded with help of pulse oximeter. Single dose of oral tablet alprazolam 0.5 mg was given 30 min before the procedure to the study group. Baseline vital parameters (blood pressure, pulse rate, and oxygen saturation) were measured and recorded on the first visit. All patients were advised to report 60 min before the scheduled time of extraction. On the day of the extraction procedure, vital parameters were monitored and recorded pre-operatively, during extraction and post operatively. Females and males between 20-60 years of age. Patients with mandibular posterior tooth extraction, Extraction with inferior alveolar nerve and long buccal nerve block (2-3 prick of injection), Extraction with Nearly 2% Lignocaine hydrochloride with 1:80,000 adrenaline solution (Maximum 5ml solution) were included in the study. Patients who were not willing to participate in this study, Patients allergic to benzodiazepines, Medically compromised patients with conditions such as hypertension, diabetes, bronchial asthma and Patients with a history of alcohol abuse as well as those are undergoing psychiatric were excluded from the study.

PROCEDURE

- Each patient from both the groups were explained about tooth extraction procedure.
- Consent was taking from every patient in both the groups.
- Study group patients were administered oral alprazolam 0.5 mg 30 min before the procedure.

Vital parameters were recorded at each of these steps

1. Pre operatively.
2. During procedure of tooth extraction.
3. Immediate post operatively

RESULTS - Statistical Analysis

Data were entered in Microsoft Excel, and statistical analysis was performed using SPSS version 18.0 (Chicago Inc.). Categorical values were expressed in the form of frequencies and percentages, whereas continuous variables were expressed as Mean \pm SD. Association between different study groups at different time interval was assessed using independent student t test and chi square test. p value was kept at < 0.05 to establish statistical significance.

RESULTS - Systolic Blood Pressure (mmhg)

1. On the pre-operative day, mean systolic blood pressure in study group was 116.475 ± 7.646 in control group was 119.325 ± 5.171 . Thus, there was a statistically significant difference ($p = 0.054$) between the two groups.
2. On the intra-operative day, mean systolic blood pressure in study group was 122.150 ± 6.788 in control group was 127.750 ± 3.543 . Thus, there was a statistically significant difference ($p = 0.000$) between the two groups.
3. On the post-operative day, mean systolic blood pressure in study group was 120.750 ± 7.337 in control group was 125.650 ± 3.759 . Thus, there was a statistically significant difference ($p = 0.000$) between the two groups.

PULSE RATE (beats/min)

1. On the pre-operative, mean pulse rate in study group was 76.500 ± 7.535 in control group was 79.650 ± 5.021 . Thus, there was a statistically significant difference ($p = 0.031$) between the two groups.
2. On the intra-operative, mean pulse rate in study group was 82.950 ± 7.031 in control group was 89.550 ± 4.517 . Thus, there was a statistically significant difference ($p = 0.000$) between the two groups.
3. On the post-operative, mean pulse rate in study group was 80.350 ± 6.435 in control group was 85.600 ± 4.903 . Thus, there was a statistically significant difference ($p = 0.000$) between the two groups.

OXYGEN SATURATION (IN %)

1. On the pre-operative, mean oxygen saturation (in %) in study group was 96.100 ± 2.550 in control group was 95.825 ± 2.252 . There was a statistically non-significant difference ($p = 0.611$) between the two groups.
2. On the intra-operative, mean oxygen saturation (in %) in study group was 95.375 ± 2.393 in control group was 94.925 ± 2.005 . Thus, there was a statistically non-significant difference ($p = 0.365$) between the two groups .
3. On the post-operative, mean oxygen saturation (in %) in study group was 94.325 ± 2.474 in control group was 93.950 ± 1.974 . Thus, there was a statistically non-significant difference ($p = 0.456$) between the two groups (figure-1,2,3)

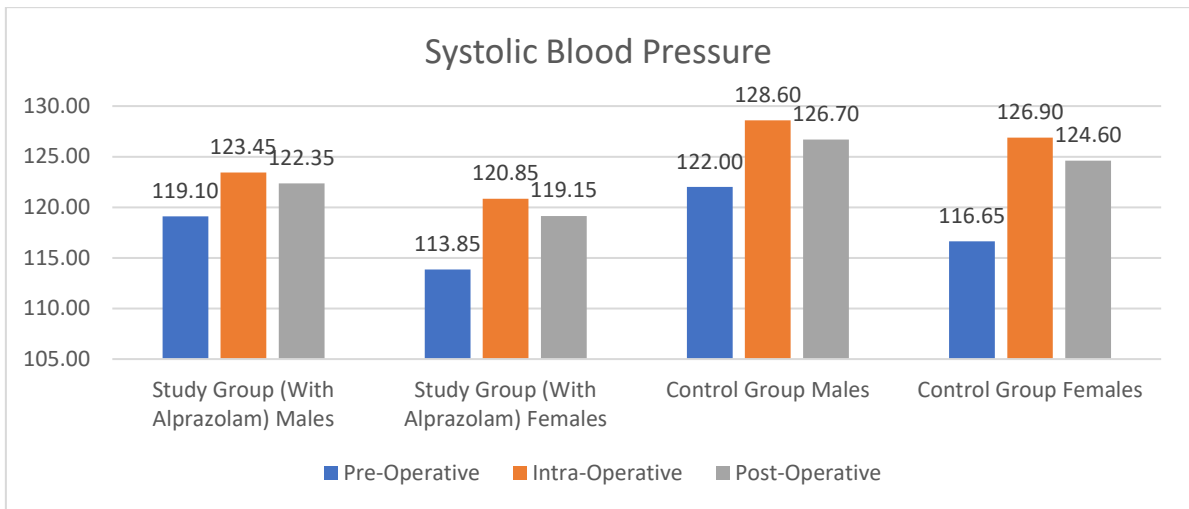


Figure-1

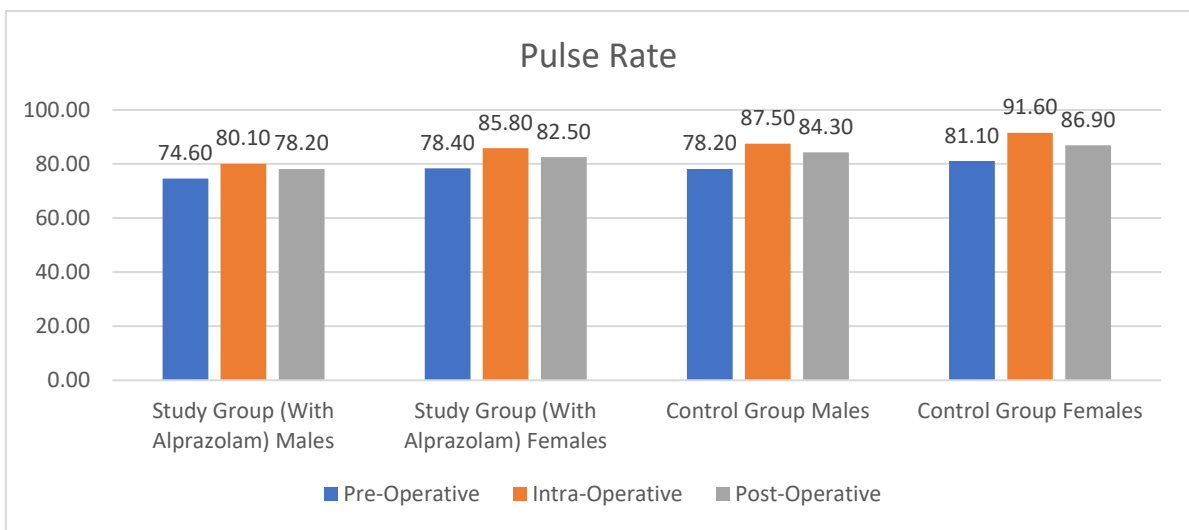


Figure-2

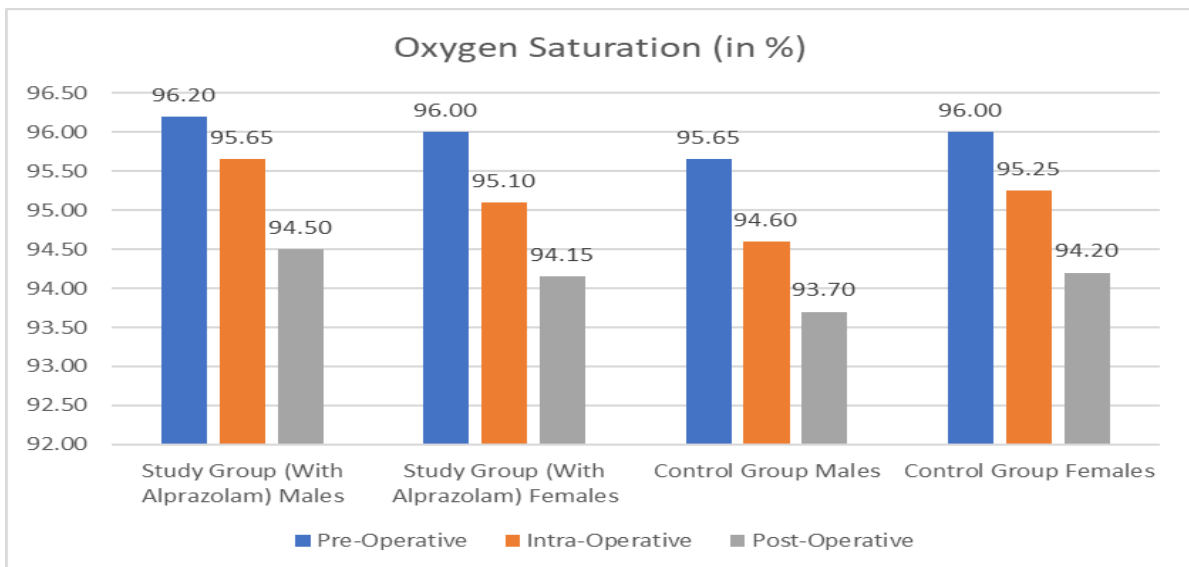


Figure-3

DISCUSSION

The aim of this study was to assess the effect of an anti-anxiety drug on patients undergoing surgical removal of mandibular posterior tooth extraction. The control of fear, anxiety, and pain is an essential part of dental practice. In spite of technological advances in dentistry, fear and anxiety continue to plague the common man. Anxiety is not a unifactorial entity. It is an emotional state, which has a direct pertinence on the physiological and psychological makeup of an individual. Missing the appointments and uncooperative attitude toward the treatment are some of the sequelae of this problem, thus, adding to the misery and making the patient suffer further from the existing pathological conditions. In this comparative study, the effect of an anxiolytic agent - tablet alprazolam 0.5 mg, on vital parameters such as SBP, pulse rate, and oxygen saturation were studied in various phases of a surgical procedure. Meechan and Seymour in 1993 suggested various sequelae that arise after third molar surgery and their use for assessing the efficacy of a variety of therapeutic measure. The surgical procedure provides an opportunity to investigate onset, depth, duration, and possible systemic effects of local anesthetic solutions. Furthermore, the anxiety which often accompanies such surgery lends itself to the appraisal of different anxiolytic agents and sedation techniques. The immediate postoperative sequelae of pain, buccal swelling, and trismus provide a useful clinical model for evaluating the efficacy of analgesics and anti-inflammatory drugs³. Transient loss of consciousness or vasovagal syncope is a well-known phenomenon in dental/maxillofacial surgery⁴. Hypoxia commonly arises in dental

patients during and after surgery. This dangerous condition requires the clinician to monitor patients' vital signs - specifically pulse rate and blood oxygen content - for any signal of trouble. A technique called pulse oximetry offers a noninvasive, immediate, and continuously available means of accomplishing this^{5,6}. In this study, patients who fulfill the inclusion criteria were taken up for the study and randomly divided into control group and study group. We observed that preoperative vital parameters of patients on the day of extraction of tooth were slightly increased as compared to their baseline measurement. In the study group patients, vital parameters exhibited minimal fluctuation all through the surgical steps unlike in the control group where there was fluctuation at LA, incision, bone guttering, and tooth elevation steps. Thus, use of preoperative tablet alprazolam 0.5 mg orally for reduction of patients' anxiety, increases patient cooperation and operator efficiency. Oral premedication with benzodiazepines or other anti-anxiety agents is considered for patients who are needle phobic with documented psychological and physiological complications⁷. Furthermore, constant monitoring of vital parameters helps us to prevent unwanted emergency which includes syncope.

CONCLUSION

In the current study it was concluded that prescription of oral benzodiazepines can be utilized as a premedication to reduce the stress of the patient as well have a profound effect on the quality of the treatment and the stress surrounding a surgical procedure.

Further studies are recommended with large sample size to confirm these findings.

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Non-Surgical Management of Extraoral Sinus - A Case Report

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Abstract

Endodontic infections when left untreated may lead to serious consequences. Sinus tract results from chronic abscess. The drainage of infective material may lead to no or less swelling along with short episodes of pain which goes off on systemic antibiotic therapy. It is best to treat the root cause of infection to get permanent relief. This case exhibits non-surgical treatment of extraoral sinus tract. Proper endodontic treatment and judicious use of intracanal medicament may result in marvelous healing of infected sinus tracts which will lead to healing of extraoral sinus tract.

Keywords - Non surgical, sinus tract, endodontic treatment.

INTRODUCTION

Chronic inflammatory pulp irritation is the most common causative condition of draining or non-draining sinus tracts, which are mostly of tooth-related origin¹.

Most cases of severe endodontic infection show an intraoral sinus tract, but those with an extraoral sinus tract are really rare. An extraoral sinus tract of tooth origin is often diagnosed much later, as the patient suspects it to be a skin lesion and not of odontogenic origin².

Such cases, when misdiagnosed initially by a general practitioner or physician, often take weeks

or months to be referred to a dental specialist or general dental practitioner^{2,3}.

The sinus tract is a sequel to a diseased condition where the site of drainage can be external or internal, depending on certain circumstances such as 1,2:

1. Tooth affected,
2. Apex position to muscular attachments,
3. Bacterial virulence,
4. Lower host resistance
5. path of least resistance along structures

Cutaneous sinus tracts are most commonly located on the chin, the cheek, or in the submandibular area and rarely in the nasal region, occurring more frequently from infected mandibular teeth than from infected maxillary teeth⁴.

A chronic periapical abscess is basically a low-grade but long-standing infection of the peri radicular alveolar bone, where the involved tooth may remain asymptomatic due to the presence of the sinus tract, which does not lead to swelling or pain from pressure buildup and provides continued drainage of the peri radicular lesion⁵.

It has been seen that using systemic antibiotic therapy will result in temporary relief. The drainage and apparent healing may last for a few weeks, after which the sinus tract will be active again.

Definitive treatment is simple and effective, comprising either tooth extraction or the removal of infected pulp tissue with root canal therapy, resulting in minimal scarring of the skin.

The following case is a nonsurgical management of an extraoral sinus tract of odontogenic origin with endodontic therapy.

CASE HISTORY

A female patient of 65 years reported to the dental outpatient department with the chief complaint of pain in the right lower back tooth region for a few

months and extra oral swelling in the right lower cheek.

The patient gave history of pain in the same region that subsided on medication. She then developed a small nodule in the lower border of her right cheek, which grew over the past few weeks. The pain became severe, which had been throbbing in nature for the past five days.

Past medical history: The patient did not have any medical problems but underwent medication for the nodular swelling a month ago.

Past dental history: It was her first dental visit.

Extraoral examination: swelling of 1x1cm, non-fixed swelling, is seen in relation to the lower border of the mandible in the 45–46 region.

Intraoral examination: deep distal caries in 46 with swelling in the buccal vestibule in the 45–46 region.

The treatment plan was first to trace the extraoral sinus tract, followed by root canal treatment with an intra-appointment calcium hydroxide dressing. If necessary, subgingival curettage of the sinus tract

PRE OPERATIVE VIEW



Fig. - Pre operative radiograph, Intra oral view, Extra oral view.

TREATMENT

First L.A. was administered by inferior alveolar nerve block without any local infiltration around 46.

Sinus tract tracing was done using a #25 G.P. point.

Access opening at 46 was done after occlusal reduction.

Soon after canals were negotiated with the #10 k file, pus drainage was evident from the distal canal.

Copious saline irrigation was done, followed by 2.5% NaOCl irrigation, and then calcium hydroxide dressing in glycerin was applied.

The patient was prescribed systemic oral antibiotics for five days and recalled after seven days.

On the next visit, working length was determined using an electronic apex locator.

Working lengths obtained were MB 18.5 mm, ML 18mm, and D 17 mm in 46.

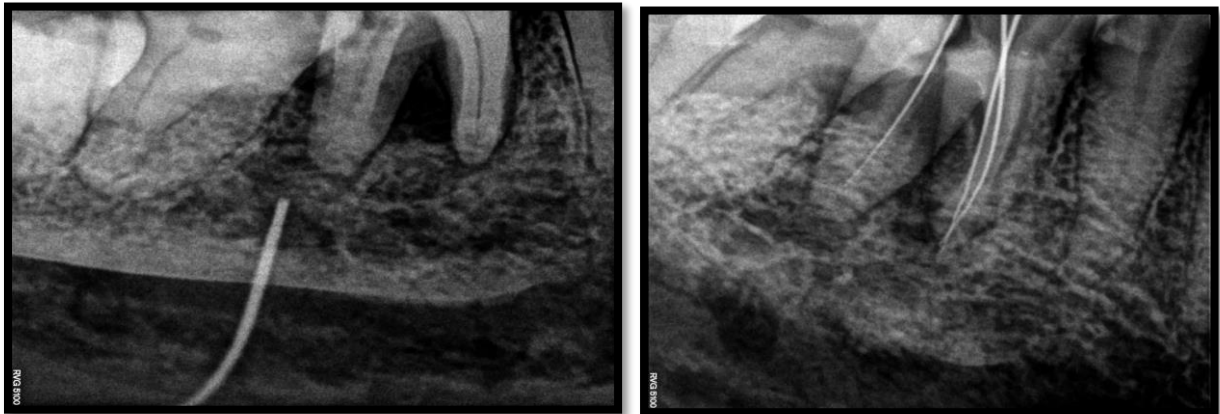


Fig. - Sinus tract tracing, Working length.

BMP was carried out till # 15 k file in 46 up to working length & calcium hydroxide dressing was applied.

On next visit the extra oral swelling decreased in size to half of its previous size. The overall pain also subsided.



Fig. - Reduction in size of extraoral sinus tract

Copious irrigation with saline and 2.5% sodium hypochlorite (NaOCl) was carried out.

The calcium dressing was changed after bmp until F2 hand pro taper in all canals.

On the next visit, after confirming the canals were dry using sterile paper points, the canals were obturated.

Before obturation, final irrigation with saline and 2.5% NaOCl was carried out.

The extraoral sinus tract was completely subsided, with a minimal scar left extra oral.

POST OPERATIVE RADIOGRAPH

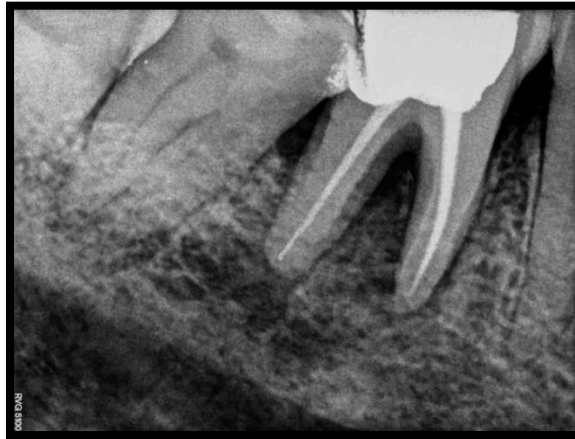


Fig. - Immediately after obturation

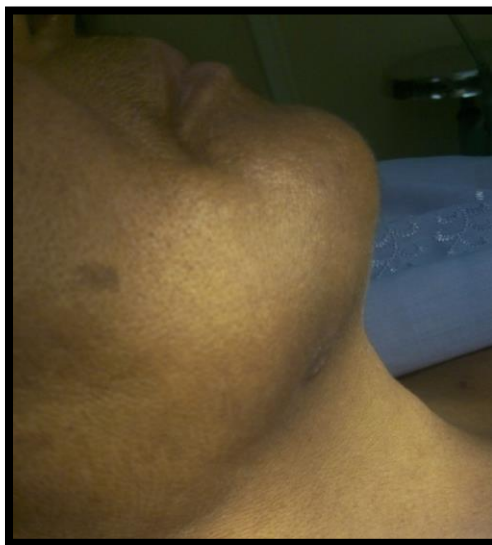


Fig. - Healed extra oral sinus after a month.

DISCUSSION

Endodontic involvement was suspected as the lesion was draining on the facial skin, which led to the diagnosis of the lesion being of intra-tooth origin¹.

Infected cyst, suppurative apical periodontitis, pyogenic granuloma, congenital fistula, deep mycotic infection, salivary gland fistula, and osteomyelitis were all included in the differential diagnosis².

Intracanal antibiotic therapy was instituted during the treatment period.

The results were favorable, and the extraoral sinus tracts healed without any surgical treatment. Only non-healing cases should be considered for surgery. The gutta-percha tracing technique by Tai et al. can be used to determine whether the present sinus tract

originated from a lesion at the apical part of a tooth or from a periodontal lesion⁴.

In a case by Mittal N et al., it was suggested that during palpation of the area, milking the sinus tract should be attempted in such cases⁵.

Many reported cases of cutaneous sinus tract involvement have shown maxillary tooth involvement to be 20%, with most related to mandibular tooth involvement being 80% involved. A skin-involved sinus tract may develop late, up to 30 years old, or early, by a few weeks⁶.

Mental and submental regions, followed by the cheek, canine space, nasolabial fold, nose, upper lip, and inner canthus of the eye, are the most common areas of involvement for such cutaneous lesions⁵.

In this case, calcium hydroxide was used as an intravenous medicament, which demonstrated a

commendable result. The antimicrobial property of calcium hydroxide comes from the release of hydroxyl ions, which provide a highly alkaline environment (approximately 12.5).

Calcium hydroxide in solution creates a highly alkaline environment in which endodontic microorganisms are unable to survive^{2,3}.

Most authors believe that on removal of the primary cause, a cutaneous lesion heals without any intervention within 5 to 14 days, but dimpling and hyperpigmentation of the area occur, which fade over time. and only a surgical revision of a bigger scar might be needed to provide a better cosmetic result in the future⁶.

Practitioners should be aware of the fact that cutaneous lesions of the face and neck may be of odontogenic origin and should seek evaluation and

opinion from appropriate specialists, irrespective of whether or not they are associated with dental symptoms.

CONCLUSION

Disease diagnosis should always be governed by the fundamentals of diagnosis, without which a proper treatment outcome cannot be assessed.

Surgical intervention is not always needed for an extra oral sinus. Proper endodontic therapy along with antibiotics is enough to eradicate such a lesion in most cases.

In the present case, a detailed case history and clinical examination proved to be beneficial to the patient, which pinnacles the need for dental professionals to be aware of teeth as a probable cause of cutaneous or skin sinuses of the face and neck region.

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Unleash the Speech-Tongue Untied: A Case Report

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Abstract

A congenital condition known as ankyloglossia, often known as tongue-tie, is characterized by an excessively small lingual frenum that limits the tongue's range of motion. It can cause a range of concerns, such as difficulty with newborn feeding, speech challenges, and many mechanical and social problems since the tongue cannot protrude. Regardless of age, ankyloglossia should be managed while taking into account the risk-benefit analysis. In this article, the surgical treatment of a 20-year-old patient with ankyloglossia, limited tongue mobility, and speech problems is described. Surgery to remove the lingual frenum is followed by speech therapy and tongue-training exercises to effectively restore the tongue. Six months after surgery, the patient experienced uncomplicated recovery and expressed satisfaction with the treatment.

Keywords: Tongue-tie, Ankyloglossia, Adolescent, Rehabilitation, Speech

INTRODUCTION

Ankyloglossia comes from a Greek term that means *skali* (curved) and *glossa* (tongue)^{1,10}. It's a congenital condition, which occurs as a result of fusion between the tongue and the floor of the mouth. At the time of birth, the tongue is attached to the frenum extending to the tip. Gradually, the tongue grows longer and thinner, and therefore the

frenum attachment often recedes to a lower position. The term ankyloglossia was first employed by Wallace in the 1960s to define tongue-tie as "A condition in which the tip of the tongue cannot be protruded beyond the lower incisor teeth because of a short frenulum lingua, often containing scar tissue"².

Partial ankyloglossia refers to congenital shortness of the lingual frenum or frenal attachment extending to the tip of the tongue, binding the tongue to the bottom of the tongue and preventing its extension³. In ankyloglossia, there's a restriction of tongue movement and eversion of lateral borders. Problems related to ankyloglossia are difficulties in breastfeeding among neonates, malocclusion, gingival recession, improper oral hygiene, and speech difficulties in pronunciation of consonants like t, d, n, l, and r. Many methods are proposed to treat ankyloglossia. Traditional frenectomy, Z-plasty, electrocautery, and laser usage are a number of these methods. This article is aimed to present a case report on ankyloglossia, its surgical treatment followed by

tongue training exercise and speech therapy in a 20-year-old male patient and review the available literature.

CASE REPORT

A 20 -year-old male patient reported to the Department of Periodontology & Oral Implantology, RUHS College of Dental Sciences, Jaipur with the chief complaint of difficulty in speech since childhood. His medical and family history was insignificant & belonged to the middle socioeconomic strata. Intraoral examination revealed class II ankyloglossia according to Kotlow's classification (Fig1). Routine Hematological laboratory investigations were found to be normal.



Fig 1 Preoperative

A lingual frenectomy was planned with a scalpel and blade and informed written consent was taken from the patient. The area was anesthetized by the application of 2% topical anesthesia, and bilateral local infiltration in the lingual mucosa adjacent to the lingual frenum and into the tip of the tongue. A traction suture was placed at the tip of the tongue, with which the tongue was firmly retracted(Fig 2).

First, a hemostat was inserted at the depth of the vestibule and clamped into position followed by giving two incisions at the superior and inferior aspects of the hemostat. This way the intervening frenum was removed. Muscle fibers were then removed with the help of a hemostat (Fig 3). The wound edges were then approximated with 4-0 black silk sutures (Fig 4).



Fig 2 Traction suture placed

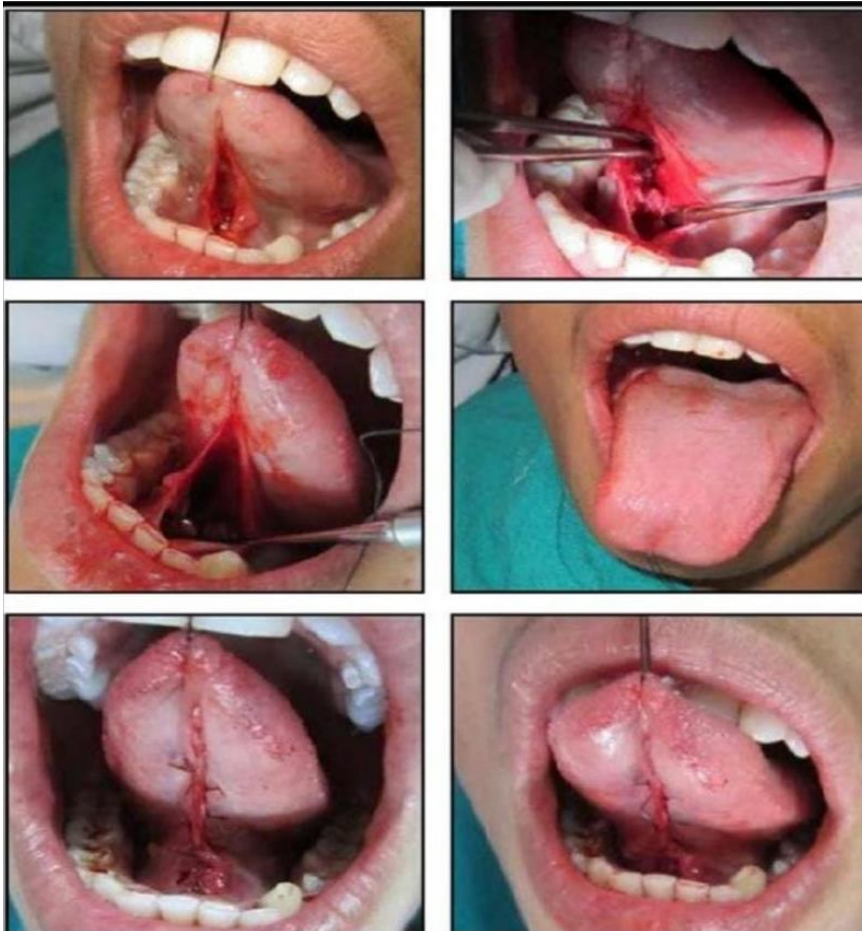


Fig 3 Intraoperative



Fig 4 Depicting Surgical removal of frenum with suture placed

To prevent post-operative discomfort Diclofenac 50mg with 325mg of Paracetamol was prescribed three times a day for 3 days. To prevent infection Amoxicillin with Clavulanic acid 625 mg bd for 5 days was prescribed. The patient was instructed to rinse with 0.2% Chlorhexidine gluconate solution twice daily for 14 days to aid in plaque control.

Sutures were removed after 7 days. Swelling and pain were present on the 1st postoperative day, which subsided with the continuation of medication and. The patient was advised tongue exercises to improve tongue mobility and speech of the patient after 1 week One-month follow-up showed uneventful healing at the surgical site (Fig 5).



Fig 5 Healing with no scar formation after 1 month

There was complete healing along with increased tongue movement after 3- and 6-weeks follow-up. Speech difficulties were improved following speech therapy.

DISCUSSION

Ankyloglossia is a congenital condition with having 5% prevalence¹⁰. A male preponderance is noted with a 2:1 ratio. Diagnosis is an important step before any kind of surgical intervention. Ankyloglossia can cause difficulty in speech, deglutition & mastication & loss of confidence in individuals. Such patients can have trouble with letters that require help from the tongue tip like s, n, t, d, j, sh, ch, th, and dg. Also, forceful tongue thrust against the anterior mandible produces mandibular prognathism due to a lack of free movement of the tongue. Gingival recession can occur on the lingual aspect of lower anterior teeth.

A frequently used classification of ankyloglossia was given by Kotlow. Free tongue is defined as the length of the tongue from the insertion of the lingual frenum into the base of the tongue to the tip of the tongue. The clinically acceptable normal range of free tongue is greater than 16 mm. According to Kotlow's observation, ankyloglossia can be of four types depending on the clinically available free tongue (protrusion of tongue)^{4,8}.

- Class I: Mild ankyloglossia (12-16 mm)
- Class II: Moderate ankyloglossia (8-11 mm)
- Class III: Severe ankyloglossia (3-7 mm)
- Class IV: Complete ankyloglossia (<3 mm).

The anatomy & development of the lingual frenum should also be addressed. The root of the tongue is derived largely from hyoid arch material. Additions to the root are made from the third and perhaps the

fourth branchial arches. As these processes of development continue, the body portion of the tongue gradually becomes free from the sides and the floor of the oral cavity. A median mucosal fold, which may vary in length, is left extending from the floor of the oral cavity to the undersurface of the tongue, not far from the tip. This inferior surface of the tongue is covered by smooth, thin mucosa which is reflected to the lingual or the oral side of the gingival and the floor of the mouth. When the tongue is raised and elevated, a fold of this mucosa, the lingual frenulum, can be noted in the midline. On either side of the midline, a ridge of fimbriated mucosa extends forward and medially toward the tip of the tongue. Between these ridges and embedded in the undersurface of the tongue are lingual nerves, glands, and vessels. Sometimes this attachment of the lingual frenum with the tip of the tongue restricts the movements of the tongue giving rise to the condition referred to as tongue tie. In such conditions, the aberrant lingual frenum consists of genioglossal muscle fibers.

The lingual frenulum is important in various physiologic functions of the tongue. Its length and place of attachment affect the movement of the tip in speech and mastication. Speech is affected when extension or elevation of the tip is limited or when there's an inability to touch the palate with the dorsum of the tongue. Most persons with ankyloglossia, though aware of the condition, can compensate adequately and can pronounce many

sounds properly or nearly so. There are some, however, who are unable to effect this compensation. The most common difficulty is in the production of the "s" sound off the incisal edge of the lower incisor instead of behind the incisive papilla. Other sounds that cause trouble are "t," "d," "l," and "n".

In the edentulous mouth, even a well-compensated ankyloglossia may require surgical correction before the construction of full dentures. The inability to raise the tongue to the roof of the mouth may prevent the development of an adult swallow and encourage the continuation of the infantile swallow, which may lead to an open bite. The lack of a free upward and backward movement of the tongue may result, in an exaggerated thrusting of the tongue against the anterior body of the mandible and produce a mandibular prognathism. Gingival recession on the lingual surfaces may occur. Mandibular prognathism and maxillary hypo development due to the low position and the forward and downward pressure applied.

It is suspected by certain authors (but not substantiated) that tongue-tie may often resolve spontaneously by late childhood⁹, but in our case, the patient was 20-year-old male and tongue-tie was found to be persistent since birth. However, patient

did not seek treatment until he started having social concerns regarding the condition. The patient was unable to articulate /l/, /th/, /d/ and /s/, /n/ and found difficulty to roll "r".

The training exercise were started 1 week after surgery. The following exercises were advised: (1) stretch the tongue up toward the nose, then down toward the chin and repeat, (2) open the mouth widely and touch the big front teeth with the tongue with mouth still open, and (3) close the mouth and poke the tongue into the left and right cheek to make a lump: for 3–5 min bursts, once or twice daily for 3 or 4 weeks postoperatively.^{5,9} Post-operative exercises following tongue-tie surgery were intended to develop new muscle movements which were restricted before surgery and encourage tongue movements related to cleaning of the oral cavity.⁶

CONCLUSION

It may take until late infancy for mechanical (not speech-related) symptoms and social issues resulting from restricted tongue motion to surface. However, for the best and most pleasant results, surgical surgery in adolescents should be followed with tongue training and speech therapy due to the functional limitation of the tongue and social shame caused by tongue-tie.

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Oral Myiasis

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Abstract

Oral Myiasis is a rare disease primarily caused by the invasion of tissue by larvae of certain dipteran flies. Common predisposing factors are poor oral hygiene, halitosis, trauma, physically and mentally challenged conditions. Oral myiasis can lead to rapid tissue destruction and disfigurement and requires immediate treatment. Treatment consists of removal of maggots from the oral cavity using blunt tweezer or hemostat after application of chemical agents. Good sanitation, personal and environmental hygiene and cleanliness are the best methods to prevent oral myiasis. This case report describes the presentation of oral myiasis caused by musca nebulo (common house fly) in a 65 year old female patient, with recently operated maxillofacial trauma. The patient was treated by manual removal larvae by topical application of turpentine oil, followed by surgical debridement of the wound and removal of hardwares.

Keywords: Oral Myiasis, Maxillofacial Trauma, Hardwares, Chemical Agents

INTRODUCTION

Myiasis is derived from a Latin word “Muia,” which means fly and “iasis,” which means disease. The term was coined by Hope in 1840 and defined by Zumpt. It is a pathological condition in which there is an infestation of living mammals with the dipterous larvae, which, at least for a certain period feed on the host’s dead or living tissue and develop as parasites¹. The term myiasis refers to infestation of living tissues of animals or humans by diptera larvae.

Human myiasis is often seen in the tropics and subtropics but is extremely rare in the Northern Hemisphere². Myiasis is a parasitic infestation of live human or vertebrate animal tissues by dipterous larvae of nonbiting flies, which feed on host tissues or fluids. The most common location for infestation in the head and neck is the eye, followed by the nose and the ears because of access, size of the orifice, and decreased sensitivity of the mucosa. The parasites are mobile; therefore, symptoms appear acutely with a foreign body sensation and itching³.

More than 80 different species have been reported to cause this condition in human beings by several authors in different journals. Oral myiasis was first described by Laurence in 1909. It should be considered rare owing to the fact that oral cavity rarely provides a favorable site for infestation and harboring of larvae.

The species of flies that cause myiasis are *Cochiliomyia hominivorax*, known as the screw worm fly, *Dermatobia hominis* or human botfly, *Sarcophagidae* species, *Alouttomyia baeri* and *Anastrepha* species family. Myiasis can be classified clinically as primary (larvae feed on the living tissue) and secondary (larvae feed on dead tissue). Depending on the condition of the involved tissue it is classified into accidental myiasis (larvae ingested along with food), semi specific myiasis (larvae laid on necrotic tissue in wounds) and obligatory myiasis (larvae affecting undamaged skin).

Further classification can be based on the site as cutaneous, external orifice, internal organs

and generalized. The most common anatomic sites for myiasis are the nose, eye, lung, ear, anus, vagina and more rarely, the mouth. Incidence of oral myiasis as compared to that of cutaneous myiasis is less as the oral tissues are not permanently exposed to the external environment⁴.

CASE REPORT

A 65 year old female patient reported to the Department of Oral and Maxillofacial Surgery, NIMS Dental college and Hospital, with a chief complaint of swelling and pain over right side of the face since 1 month. The patient was apparently normal before, after which she developed pain along with the swelling and Itching in the same region. The pain and swelling was gradual in onset causing difficulty in mastication. Past dental and family history was non-contributory. Patient gives history of tuberculosis before 10 years and completed DOTS therapy for the same. Patient gives history of trauma before 2 years and operated for the same.

On extra oral examination, a mild labial fullness was noted. An ill-defined diffuse swelling was noted on the middle third of the right side of face extending superiorly to infraorbital margin, inferiorly an imaginary line from alae of the nose to anterior border of masseter, medially to lateral wall of nose and laterally to anterior border of masseter muscle (Figure 1). The swelling was soft in consistency, non-tender on palpation with local rise in temperature associated with itching. No submandibular, submental or parotid lymph nodes were palpable.

On intra oral examination, patient had a laceration over left buccal vestibule where hardware has been exposed. In addition, patient had a very poor oral hygiene. Further, there were multiple maggots crawling out from the lacerated buccal mucosal wound. Orthopantomogram and Computed tomography scan and MRI (Figure 2) showed Operated case of Mid face fracture with fixation at Frontonasal suture, Right and left zygomatic buttress, and midline of maxilla. After obtaining

a detailed case history, clinical, radiographic and hematological investigations, a diagnosis of Operated case of maxillofacial trauma and oral myiasis was made. The patient was planned for Exploration and excavation of oral myiasis under GA.

Initially, multiple sittings for Exploration of myiasis were performed under Local anesthesia. Exposed Hardwares were also removed. Then Cotton bud impregnated with turpentine oil was applied to the lacerated mucosa for a minimum of 15 20 mins. After applying turpentine oil patient was asked to breathe in and blow out through nose, so that the vapour enters maxillary sinus and the cause irritation to maggots. A few minutes after applying turpentine oil patient started feeling oral myiasis over maxillary sinus and nasolacrimal area. After these maggots were coming out through nose and perforation over right side of the nose and manually removed with the help of blunt tweezer and then sent for entomological examinations (Figure 3). After that patient was put under Tablet Ivermectin 12 mg as loading dose for 3 days along with Intravenous antibiotics. These procedures were repeated for 4 – 5 sittings under Local anesthesia.

Surgical removal of necrotic tissue present (Figure 4) under General anesthesia with oral intubation was planned along with the help of Nasal rhinoscope and Bronchoscope and irrigating the area with saline, H₂O₂ and then with betadine followed by metronidazole (Figure 5).

The patient was put on Tablet Ivermectin 12mg OD for 7 days along with antibiotic cover of Injection Monocef 1g and Injection Metro 400mg IV for 5 days. The patient was advised to maintain proper oral hygiene and rinse the wound with betadine mouthwash, 3 to 4 times daily. Patient was discharged on 5th day after informing about wound care (Figure 6). Follow up appointment was given. Sutures were removed on the 7th day as wound was completely healed and patient was recalled periodically (Figure 7).

DISCUSSION

Myiasis is a common problem in the tropics but occurs rarely in temperate climates⁵. Most cases are found in underdeveloped countries or in patients with poor hygiene and unsanitary conditions, those who are predisposed to chronic infection or malignancy, and those with poor access to healthcare⁵. Myiasis is a rare condition in human beings although frequently reported in vertebrate animals, main parasites being flies of order of diptera (maggots), which feed on the host's dead or living tissue. This parasitic infestation commonly seen in mouth breathers, alcoholism, senility, in oral and maxillofacial traumas or in old age groups especially mentally handicapped persons.

Low socio economic status, immunocompromised state, debilitated and unhygienic living conditions may also act as predisposing factors. Diagnosis is usually made by proper clinical history, and investigations. Traditional management of oral myiasis is removal of maggots using hemostats or blunt tweezer. Rupture of larvae must be avoided. When there is large amount of larvae with tissue destruction is present, then the area will be treated with local applications of certain solvents like turpentine oil, mineral oil, ether, chloroform, ethyl chloride, mercuric chloride, creosote, saline, phenol, calomel, olive oil, iodoform to remove the maggots completely. Male predilection of occurrence has been noted in most literatures because of their more outdoor activities and neglecting the oral hygiene when compared to the female counterpart⁶.

Our experience indicates that conservative, nonsurgical management approach is both safe and effective.

CONCLUSION

Oral Myiasis is a rare disease primarily caused by the invasion of tissue by larvae of certain dipteran flies. Oral Myiasis leads to rapid tissue destruction. Our experience indicates that conservative, nonsurgical management approach is both safe and effective.

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FIGURES

Figure 1: Preoperative photograph



Figure 2 : MRI

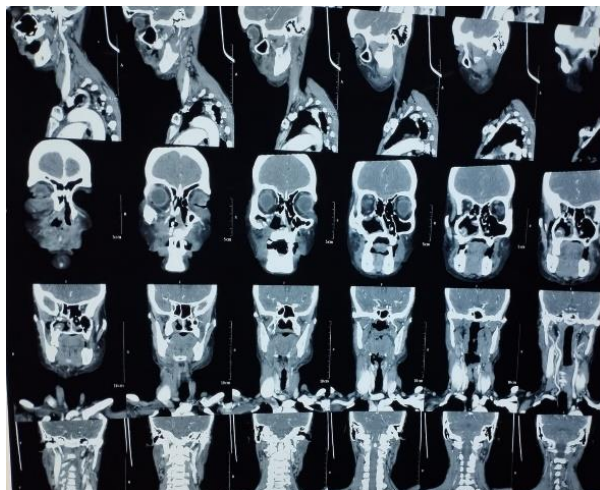


Figure 3: Maggots extracted from Facial region



Figure 4: Necrotic tissue removed



Figure 5 : Bronchoscopy

Figure 6 : Post operative photograph



Figure 7 : After 10 days

