REPLACEMENT OF PROCLINED MAXILLARY AND MANDIBULAR ANTERIOR TEETH WITH IMMEDIATE IMPLANTPLACEMENT AND LOADING: A CASE REPORT.

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Abstract : Tongue thrusting habit is the primary etiological factor in the development of an anterior open bite. Management of such abnormal habit includes removal of the underlying etiology, retraining exercises along with the support of mechanical restrictive orthodontic appliances. Palatal crib or palatal spurs are the most commonly used habit-breaking appliances. Even though the habit is corrected but prosthodontic corrections of anterior open bite cases is often necessary. Tongue thrusting can often lead to periodontal problems in anterior tooth segment which clinically can be seen as extrusion and protrusion of teeth, mobility, and gingival recession. Correction of poorly prognosis teeth with immediate dental implant placement can be a viable option. This case report discusses a case with anterior open bite and severely Proclined anterior teeth segment corrected with immediate implant placement and loading.

Keywords : Tongue thrusting, anterior open bite, palatal crib, immediate implant placement, immediate implant loading, angulated abutments, phonetics.

Introduction

An anterior open bite can be caused due to a number of factors like unfavourable growth pattern, hereditary, pacifier and digit sucking habits, retained infantile swallowing habits, enlarged lymphoid tissue, tongue function and tongue posture. Thus to manage such complex and challenging malocclusions, a dentist often requires a combination of behaviour modification and orthodontic and dento-facial orthopaedic therapies[1]. Unfortunately, stoppage of habit is only a part of the treatment.

Tongue thrusting can lead to various periodontal problems in the patients such as extrusion of teeth, severe proclination of teeth which often leads to gingival recession, loss of periodontal support, mobility in teeth. Even though palatal crib is a very good option for stoppage of habit, it has some disadvantages like it can stop the moment of tongue in anterior direction which will restrict the tongue for its cleansing action. This condition can lead to plaque accumulation and gave birth to various periodontal condition. Immediate implant placement may be defined as implant placement immediately following tooth extraction and as a part of the same surgical procedure, or as implant placement immediately following extraction of a tooth[2]. Immediate implants following extraction have become an increasingly popular strategy to preserve bone and reduce treatment duration. This technique also improves aesthetics by preserving the soft tissues[3].Correction of severely proclined and extruded teeth with immediate implant placement and loading can shorten time-to-teeth and reduce the number of visit. It can be applied if sufficient primary stability is achieved; this is known as immediate provisionalization.

Indeed, a 2014 study found that patients preferred immediate implant placement in the anterior maxilla, when compared to other treatment protocols[4]. It may therefore offer a suitable solution for high patient satisfaction, when clinically indicated.

With close communication between prosthodontist and lab technician, immediate implant placement and immediate loading can provide a better aesthetics, more patient comfort, less chair side time

and maintain patient's confidence and positive attitude as anterior teeth is very much important in day to day life. This case report discusses correction of 45yr old male patient with Proclined and extruded anterior teeth segment by immediate implant placement and loading.

Case Report

A 45yr old patient with chief complaint of forwardly placed upper and lower teeth and wanted to get a better smile. Patient had no history of any systematic or debilitating disease. On Past dental examination patient was on orthodontic treatment (Fixed Palatal Crib, orthodontic appliance) for stoppage of Tongue thrusting habit.

On Intra oral examination, Spacing was present in upper and lower anterior teeth with upper central and laterally were proclined, lower central incisors were proclined and extruded. Poor was prognosis with 21 and 22 (F.D.I. system). Oral hygiene status of the anterior teeth segment was poor. Extra oral examination revealed anterior open bite with lips incompetency and severely proclined incisors. Thickening of both the upper and lower lips were there, Phonetics of the patient was also severely hampered. (Fig 1a shows Pre-operative extra-oral picture of the patient), (Fig 1b shows Pre-operative intraoral image of the patient), (Fig 1c shows C.B.C.T. planning for maxillary region), and (Fig 1d shows C.B.C.T. planning for mandibular region).

(Fig 1a shows Pre-operative Extra-oral image) (Fig 1b showing Pre-operative Intra oral image with the palatal crib in place)

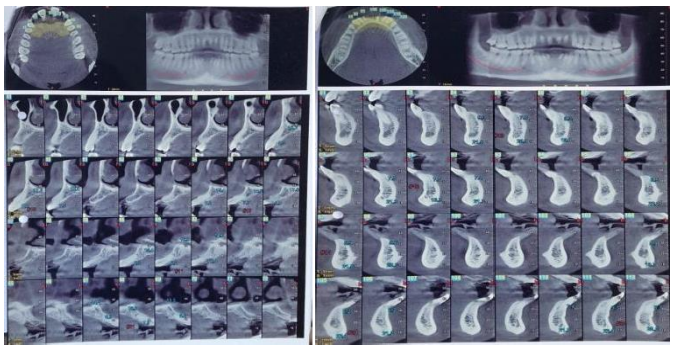


Fig 1c showing C.B.C.T. of maxillary region & Fig 1d C.B.C.T of mandibular region

Diagnosis and treatment plan

Severely Proclined upper incisors with spacing present between upper anterior teeth. Extrusion of lower central incisors with grade 3 mobility (Grace and Smales mobility Index) and spacing present between two adjacent lateral incisors. Extraction of upper central and lateral incisor was planned followed by immediate implant placement and provisional restoration. Patient was explained about the treatment plan and patients consent was taken prior to the surgery.

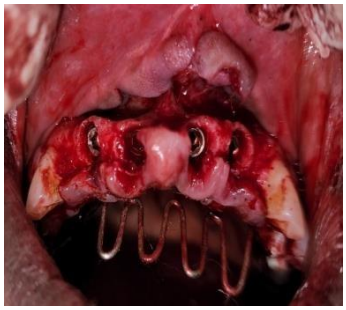
Implant surgery and Provisional restoration

On the day of surgery patient was instructed to a Chlorhexidine 2% mouth rinse immediately prior to the surgery. The patient's face was disinfected with 7.5% povidone iodine, the oral cavity prepared with 5% povidone iodine and the patient draped as per routine surgical principles. All implant surgeries were performed under local anaesthesia (2% lignocaine with epinephrine). Extraction of upper four teeth were carried out, extraction socket was curettage and checked for any infection. For better assessment of labial and palatal bone,a crestal incision extending till the proximal surfaces of teeth on either side of the surgical site was given. Vertical releasing incision was performed as required by each particular situation and full thickness mucoperiosteal flap reflected and site of osteotomy marked with the lance drill. (Fig 2a shows Extraction of 11, 12, 21, and 22). Crestal relieving incision between two canines followed by vertical relieving incision was given and full thickness flap was reflected[5]. (Fig 2b shows Full thickness mucoperiosteal flap reflected)

(Fig 2a shows Full thickness of 11,mucoperiosteal flap reflected

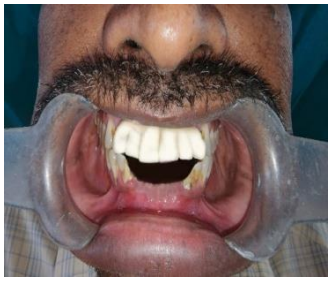
Fig 2b shows Extraction 12, 21, and 22

Osteotomy was prepared to the desired depth and width by sequential enlargement of osteotomy site with the osteotomy drills of increasing diameters, upto 3.65mm(width) * 13mm (length). 4 Implants (size- 4.2mm*13mm each, company- AlphaBio$_{TEC}$, SPI) were placed in 11 12 21 22 region with inserting torque value of 40Nm for each implant and transfer copings were placed and impression was made for provisional restoration and full thickness flap was closed and sutures were given. (Fig 2c shows Implant placement), (Fig 2d shows placement of transfer coping and full thickness flap closed and sutured) (Fig 2e shows intra oral provisional restoration) (Fig 2f shows extra oral provisional restoration), (Fig 2g shows O.P.G. of maxillary implant placement)



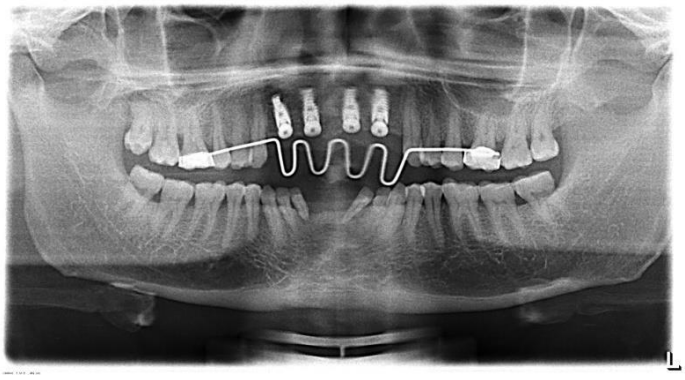
(Fig 2c shows Implant placement)

(Fig 2d shows placement of transfer coping and full thickness flap closed and sutured)



(Fig 2e shows intra oral provisional restoration) (*Note- Fig 2e was clicked at 2nd surgical visit)

(Fig 2f shows extra oral provisional restoration)

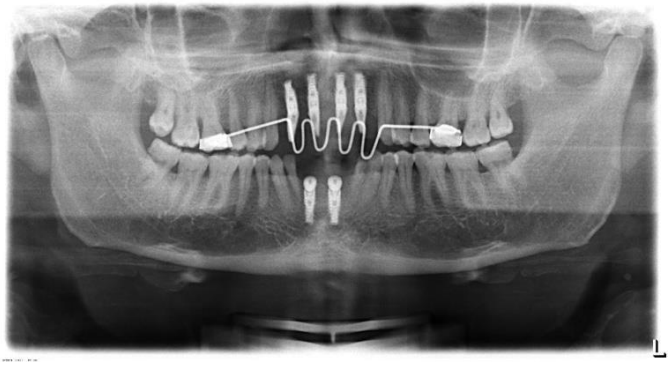


(Fig 2g shows O.P.G. of maxillary implant placement)

At second surgical visit after 15 days extraction of lower central incisor was planned with 2immediate implant placement (size- 4.2mm*13mm each, company- Alpha Bio$_{TEC}$, SPI), Provisional restoration was not given as there was more space for two unit provisional restoration and cantilever has to be avoided for implant stability and osseointegration. (Fig 3a shows immediate extraction and implant placement), (Fig 3b shows R.V.G. of implant placement), (Fig 3c shows O.P.G. after implant placement).

(Fig 3a shows immediate extraction andimplant placement)

(Fig 3b shows R.V.G. of implant placement)



(Fig 3c shows O.P.G. after implant placement).

Patient was already informed about the treatment plan and was satisfied as his lower anteriors absence did not make any greater difference in his smile.

Table Type and position of implant (relation to the tooth)

Sr.no	Position	Implant diameter	Implant length	Implant Type, Specification, Surface
1.	11	4.2mm*	13mm	AlphaBio$_{TEC}$, SPI
2.	12	4.2mm*	13mm	AlphaBio$_{TEC}$, SPI
3.	21	4.2mm*	13mm	AlphaBio$_{TEC}$, SPI
4.	22	4.2mm*	13mm	AlphaBio$_{TEC}$, SPI
5.	31	4.2mm*	13mm	AlphaBio$_{TEC}$, SPI
6.	41	4.2mm*	13mm	AlphaBio$_{TEC}$, SPI

Medication and Post-operative Care

Tab. Augmentin 625mg (glaxosmithkline export limited, Dubai) once daily for 6 days, as well as Tab. ZerodolS.P.as an analgesic (IPCA Laboratory), once daily for 4 days were administered starting 1 day before surgery. In addition, the patient was advised to use a 0.1% chlorhexidine digluconate rinse (Chlorhexamed Fluid, GlaxoSmithKline, Buehl, Germany) twice daily for 4 weeks. Patient was asked not to chew any hard food from anterior teeth, not to eat very spicy and hot food, cold compression with ice was advised for pain and swelling relief. Sutures were removed 10 days after surgery.

Maintenance

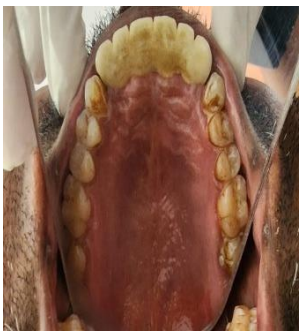
Frequent follow up after 1 week, 4 week, 8 week, 12 weeks to check for any signs of infection. No signs of infection was observed during this visits and patient was called for final restoration after 4 months.

Prosthodontic Treatment

Before calling for final restoration, patient was called a week earlier and second stage surgery was performed and healing cap was placed for gingival emergence profile. Then patient was called for final restoration and impression were made by using open tray transfer coping and vinlypolysiloxane material (NeoendoNeopure A-Silicone Impression material). Shade matching was done using Vita classical shade guide.

Metal Ceramic crowns were planned due to low socio-economic status. Patient was called and cement retained bridge was fabricated using Type 1 GIC (Hy- bond glassionomer. SHOFU Inc.) (Fig 4a shows Finalprosthesis Intra oral bite view), (Fig 4b shows maxillary occlusal view and 4c shows mandibular occlusal view), (Fig 4d Shows Post-operative extra oral picture), (Fig 4e shows Post-operative O.P.G. 3 months after final prosthesis insertion)(Fig 5 shows comparison of pre-Operative and Post-operative picture

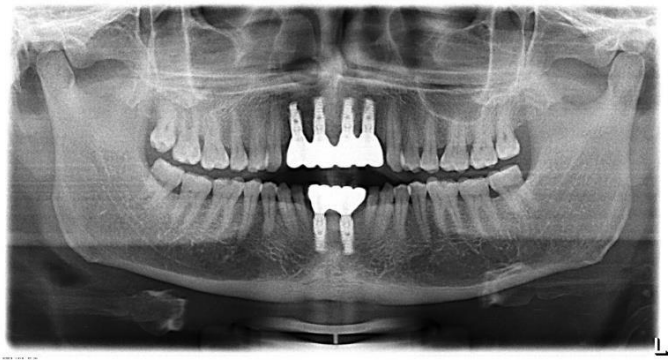
(Fig 4a shows Final prosthesis Intra oral bite view)



(Fig 4b shows maxillary occlusal view)

(Fig 4c shows mandibular occlusal view)

(Fig 4d Shows Post-operative extra oral picture)



(Fig 4e shows Post-operative O.P.G. 3 months after final prosthesis insertion)

(Fig 5 Comparison of pre-operative and Post-operative appearance)

Discussion

Tongue thrusting can be defined as a behavioural pattern in which the tongue makes contact with any

teeth anterior to the molars during swallowing. The most important consideration for the correction of the tongue thrusting habit is to redirect the tongue's resting position. So to effectively manage this, the fixed palatal crib is a good treatment modality. Thus, both the crib design and duration of the treatment are two important considerations for success[6]. A palatal crib corrects an anterior open bite as it prevents the tongue to rest onto the teeth. The designing of the crib be such that it should extend far enough inferiorly to keep the tongue from positioning itself below the crib[7].

However, In this case tongue thrusting habit had already caused severe proclination and extrusion of anterior teeth segment, it was necessary to stop the habit and immediate replacement of poorly organised teeth.

The primarily requirement of classic protocol for placing the implants is that the implant site, that is to say, the alveolus, is completely healed after extraction. This technique, apart from the time required for healing after tooth extraction, also needs a healing period after implant placement, making the treatment markedly prolonged in time[8]. This classic technique or protocol for implant placement, has been used since the beginning of the implant placement in order to reduce and minimize the risk of apical bacterial infection, migration and remodelling during early loading[9].

The problem with having long periods of healing time after tooth extraction is the re-absorption that occurs on site. The substantial reduction in bone volume produced in the extraction socket over time can compromise the favourable positioning of the implants and their subsequent restoration[10].

To prevent re-absorption in a post-extraction alveolus, Lazzara introduced, for the first time in 1989, a protocol consisting of the placing implants immediately after tooth extraction[11]. This protocol has been widely accepted over time due to the many advantages that it brings; preservation of aesthetics, shortening of treatment time, maintenance of alveolar walls, reduction in operating time and the best positioning of the implant[12].

However, using this technique of immediate implantplacement after the extraction of a tooth with periapical pathology has been much debated[13, 14].

Numerous clinical studies suggest that a socket where a tooth has periodontal or endodontic infection is a marker that predicts infection, and hence the failure of implant treatment. Therefore immediate implant placement is not recommended where there is an infected alveolus[15]. In contrast, numerous studies argue that under controlled conditions, i.e. with certain pre and postoperative measures, immediate implants in infected alveolus can be successful. Most studies that support this method claim that success depends largely on the administration of antibiotics and correct curettage of the alveolus after extraction. Techniques of bone regeneration of defects caused by infection after dental implant placement are also proposed[12, 13, 15].

The placement of a temporary prosthesis prior to placement of a definitive prosthesis can allow the tissue to grow faster and take on the definitive gingival form as it can be modified over several appointments to achieve the desired formation[16].

Schwartz-Arad and Chaushu[17, 18], in their literature review on immediate implants describe survival rates, for the same groups, of 93.9% to 100%. That same year, the same author[19], in a retrospective study of 7 years of follow-up obtained a success rate of 95%. Subsequently, Chaushu et al.[20], in a clinical study comparing immediate versus non-immediate implantation obtained a success rate for the former of 82.4 percent, and for non-immediate implants 100%. Perry et al[21].in a 5-year retrospective evaluation, which compared immediate implants with non- immediate implants obtained survival rates of 90.03 percent and 90.04 percent respectively. This technique is supported by literature with high survival rates reported by Becker et al.[22] (97.2% percent), Wagenberg and Froum[23](96% percent).

The use of angled abutments facilitates paralleling nonaligned implants, thereby making prosthesis fabrication easier. These abutments also can aid the clinician in avoiding anatomical structures when placing the implants. In addition, use of angled abutments can reduce treatment time, fees and the

need to perform guided bone regeneration procedures[24]. In the following case 25^0 angled abutment were used in both the upper and lower implants to correct the implant angulation.

Anterior openbites cause impaired masticatory, malfunction of tongue, speech defects, disuse atrophy of teeth and periodontal tissue, esthetic problem. It is corrected by some available orthodontic methods according to its etiologic factors and growth stage. Removable appliances with tongue crib, spring loaded occlusal bite block, M.E.A.W. with rubber elastics, vertical chin cap and high pull head gear are selected for its correction[25]. Although in every case only breakage of habit does not fulfill all the demands by the patient and surgical and prosthodontic correction is required, and combined therapy acquire better results than single treatment method. Removal of etiologic factors and accurate diagnosis is the best way of prevention of its recurrence.

Phonetics of the patient is largely depends upon bilabial sound ('b' and 'p'), labiodental sound ('f' and 'v'), linguodental sound ('this' and 'that'), linguoalveolar sound ('t''d' and's')[26]. Tongue, upper and lower incisors, and lips of the patient play a vital role in the production of following sound, correction of following anatomical structure can bring about normalcy in the following patient.

Conclusion

Tongue thrusting is a debilitating habit and should be stopped as early as possible, however in many cases the habit had already damaged the existing smile of the patient. Nevertheless sometimes correction of such cases has to go with prosthodontic treatment modalities in which the poor prognosis of existing teeth opens a door for immediate replacement of teeth with dental implants.

Rather than having to wait a rather long period of time before your implants are completed, the immediate load option will allow you to move on with your life by putting this dental work in the past as soon as possible. You'll be able to take pride in the new look of your smile, and your confidence will likely receive a boost as a result.

However, immediate implant placement may also lead to a higher implant failure rate, inability to predict future soft and hard tissue level, and difficulty in achieving implant primary stability, but in our case, primary stability was good and so the upper anterior teeth were immediately placed and loaded also which didn't hamper the smile of the patient. On the other hand lower implants were delayed loaded.

We conclude that proper planning, handling of the patient by taking coordinative effort of various departments, and improvising the plan can lead to the successive outcome of the treatment which in turn results in better aesthetics and smile of the patient which eventually is more satisfying to patient as well as to the operator.

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