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Management of congenitally missing bilateral maxillary lateral incisors with Dental Implants

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The replacement of single tooth in pre-maxilla is challenging because of highly specific soft and hard tissue criteria, in addition to all other esthetic, phonetic, functional and occlusal requirements. Anterior single- tooth implant is the modality of choice to replace missing congenitally maxillary lateral incisors

Congenitally missing teeth are frequently presented to the dentist. Interdisciplinary approach may be needed for the proper treatment plan. The available treatment modalities to replace congenitally missing teeth include prosthodontic fixed and removable prostheses, resin bonded retainers, orthodontic movement of maxillary canine to the lateral incisor site and single tooth implants. Implants are a viable option for replacement of congenitally missing lateral incisors and should be considered before the commencement of definitive treatment plan. Early diagnosis and proper planning can achieve excellent aesthetics. Interdisciplinary treatment plays a vital role to achieve an excellent, esthetic result for a most predictable outcome. The aims for this presentation to present a case series of replacement of bilaterally, congenitally missing maxillary lateral incisors with dental implants.

I. Introduction

The successful use of dental implants to replace missing teeth has been one of the most popular, exciting and evolving areas of clinical dentist. When implants are thought as a treatment option, treatment planning has become more complex for the dental practitioner and an interdisciplinary team approach is recommended [1,2]. Interdisciplinary approach would involve a preprosthetic and orthodontic treatment and following consultations with an oral surgeon and a restorative dentist, implant treatment was selected as a treatment modality [2,3].

The maxillary lateral incisor is the second most frequently missing tooth after the mandibular second premolar even though Muller et al. found that maxillary lateral incisors experience the most agenesis (not including third molars).[4] Agenesis, the absence of permanent teeth, is a common occurrence among dental patients. The total incidence of tooth agenesis is about 4.2% among patients that are seeking orthodontic treatment ; and with the exception of third molars, the maxillary lateral incisors are the most common congenitally missing teeth with about a 2% incidence . [5,6] There are different treatment alternatives for patients with a missing lateral incisor because of congenital reasons [1,5]. Esthetic and functional problems can arise when an orthodontic space closure is realized and the canine is moved into the missing lateral incisor's space [2,6]. The two major alternative treatment options are orthodontic space closure or space opening for prosthetic replacements. But they both can compromise aesthetics, periodontal health and function. Treatment alternatives for restoring edentulous spaces resulting from congenitally missing permanent lateral incisors include removable partial dentures, conventional fixed bridges, resin-bonded bridges, autotransplantation, orthodontic repositioning of canines to close the edentulous space and single-tooth implant.[1,2,5]

Since the maxillary lateral is in the anterior esthetic zone, details of the total smile and individual dental esthetics need to be considered. Recent literature ranks esthetics high in orthodontic patient diagnosis. "Wylie emphasized that the goal of orthodontic treatment should be to attain the best possible esthetic result, both dentally and facially . Studies have shown the importance of

having an attractive smile; attractive people are perceived to be kinder, more sensitive, interesting, modest, sociable, exciting, obtain better jobs and lead more fulfilling lives.[7]

For patients with a congenitally missing maxillary lateral incisor, multiple factors should be considered when formulating a treatment plan. [8] These should include available space for the crown and root, canine position, molar occlusion, smile/dental/gingival esthetics, bone quality and quantity, age, facial profile, lip posture and finances. [8,9]

II. Case Series

Clinical Case Report

Case (1):

A 20 Years old female referred from orthodontic department to implant clinic after finishing re-distribution of spaces, her chief complaint was "I feel shy when smiling without teeth", she was physically healthy with no history of dental trauma, she had slightly convex facial profile with lip competence. Upon intra-oral examination patient was shown to have class I molar relationship right and left and class I canine relationship right and left. Congenitally missing tooth #12, 22. Speaking of prevalence of hypodontia and developmental malformation of permanent teeth in Saudi Arabia among schoolchildren it was found that the most frequently missing teeth in Saudi Arabian children were the lower second premolars, followed by the maxillary lateral incisors and the maxillary second premolars. Agenesis of Saudi Arabian lateral incisors was significantly more frequent in maxilla ($p<0.05$) than in the mandible (2).The patient maxillary dental midline was coincide with facial midline, but mandibular dental midline was shifted 2 mm to the left side, overbite was 10%. (Figure 1). According to house classification patient was philosophical type.

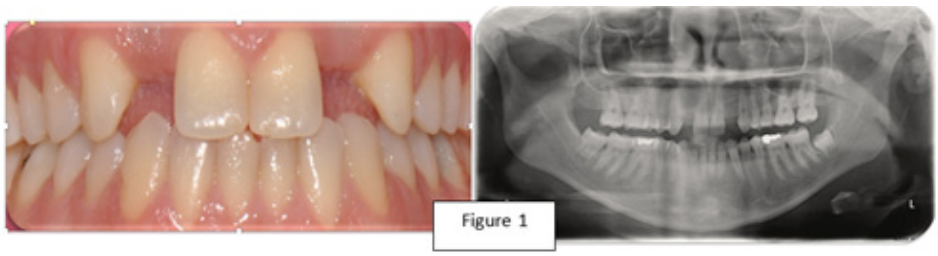


Figure 1

The restorative replacement of congenitally missing maxillary lateral incisors raises several treatment planning concerns. Therefore, it is beneficial to use an interdisciplinary treatment approach to obtain the most predictable outcome (3). Upon soft tissue examination, patient was found to have healthy attached gingiva of 5 mm width with pink, firm and stippled appearance. As well as free gingiva with pink, firm and flat consistency. Probing depth was generalized 2 to 3 mm all over. With thick biotype. Patient had no mobility in any of the teeth. Upon space analysis the mesiodistal width of tooth #12 was found to be 6 mm, while #21 was 7 mm. bone width was read at 3 sites, at crestal bone, then 3 mm from crest and 6 mm from crest. At the site of tooth #12 readings were 3 mm, 7 mm and 8 mm respectively. For tooth #33 bone readings were 4 mm, 5.8 mm, 6 mm, 9mm respectively.

Proposed treatment plan for the missing upper lateral incisors was to surgical place implant fixture are the missing area of #12, #22 (Figure 2) followed by implant retained all ceramic crowns. Two stage technique was chosen for this treatment which

included Local anesthesia 4% articaine with epinephrine, followed by midcrestal with intrasulcular incision one tooth mesial & distal for #12, #22. AstraTech (Osseospeed) size 3.0 x 11 mm implant fixture for both sites and cover screw was placed. Followed by simple interrupted suture using Vicryl 4-0 and left for 2 month healing period. Hawley retainer with #12, #22 porcelain crowns was placed. (Figure 3)

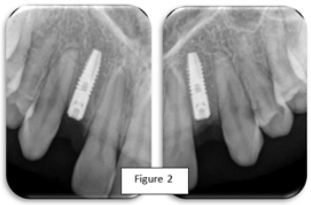


Figure 2


Figure 3

After the 2-month duration, a second stage surgery was done to the implant sites and temporary implant abutment and provisional crowns were placed. (Figure 4). One of the advantages of placing custom provisional restoration instead of healing abutment at second stage surgery is to generate the exact emergence profile immediately and to allow the soft tissue to heal to its desired dimension. (4) Reaching to the prosthetic phase of treatment, conventional loading was done using cement-retained IPS e.max press crowns abutments with an implant level impression type. Hybrid abutments were used with shade A3 selection. Concerning Using Lithium-Dsilicate Hybrid Abutments for Implant Restorations, IPS e.max, pressable lithium disilicate offers a solution in combination with a titanium abutment, enabling laboratory ceramists and dentists to provide implant restorations that demonstrate predictable function, esthetic ,without compromising strength, durability and life-like optical characteristics. (5) (Figure 5) shows site of #12, 22 after prosthetic part insertion.

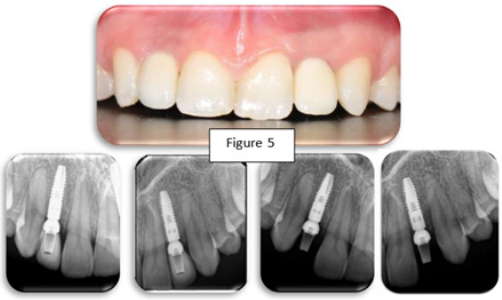


Figure 5

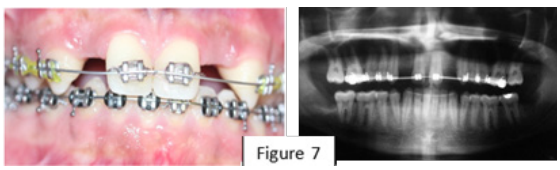
Furthermore, concerning screw-retained Versus Cement-Retained Implant Restorations current concepts shows that no differences were significantly found between the two types of prosthesis in terms of implant survival or success rates. Prosthesis success rates (>72 months), cement-retained prostheses demonstrated a 93.2% success, compared with 83.4% with screw-retained prostheses.

It is generally agreed that the current trends to favor cement-retained implant restorations for their superior esthetics, occlusion, ease of fabrication and reduced chairside time. (6) Finally Implant maintence and recall consisted of 3 month recall in the first year, followed by 6 month recall in the second year, then an annual visit every year. (Figure 6) shows preoperative and postoperative.

Case (2):

18 years old male patient presented to implant clinic referred from orthodontic department, his chief complaint was "I feel ugly while I am smiling due to my front teeth spacing" upon examination patient had congenital missing laterals #12, #22. Patient had no medical history. Family history consisted of diabetes and hypertensive from father's side and diabetes from mother's side. Oral hygiene habits included brushing twice daily. Patient is philosophical type according to house classification.

Upon clinical examination; extra-oral and intraoral shows normal measures with facial symmetry and an average smile line. Patient had class I molar occlusion right and left sides. With an overbite 3mm and overjet 2 mm. Proposed Treatment plan consisted of orthodontic redistribution for space regaining at side #12, #22, followed by surgical placement of implants at the same site and with implant supported ceramic crowns. (Figure 7) shows intraoral photo after orthodontic space distribution.



Surgical placement of implant consisted of local anesthesia 2 carpules of 2% Lidocaine with epinephrine. Followed by crestal with intra-sulcular incision one tooth mesial & distal + T-shape modified papillary regeneration incision, reflection of flap, then expansion of bone was done for #22 and 2-stage implant placement of Astra system size 3.5x 11 mm for both #12 and 22 then cover screw. Suturing Vicryl with simple interrupted suture technique done and left for 4-month healing period. Post-surgical medications prescription included augmentin 1 gm, sulpadine, ibuprofen and chlorohexidine mouth wash. Then on the same day Maryland Bridge on site #12, 22 was placed after surgery (Figure 8). After 4 month of healing 2nd stage was done & final impression was taken and screw retained provisional crowns were placed for emergence profile and soft tissue heaing. After 2 month period insertion of Zirconia cemented crowns was done (Figure 9).

Case (3):

29 years old male patient presented to implant clinic complaining of missing front teeth. Patient is smoking ASA II. Patient had no significant medical and family history, with good oral hygiene brushing twice a day. House classification was philosophical patient. Extraoral examination showed facial symmetry with no swellings and no muscular tenderness. Smile line was average. Intraoral examination showed all parameters within normal limits and bilateral class I molar relation. Vertical overbite was 3mm and horizontal overjet was 2mm.

Proposed treatment plan consisted of implant placement at site #12, 22. Patient underwent smoking cessation protocol 2 weeks prior implant placement by using 5 A's protocol which consisted of - Ask, Advise, Assess, Assist and Arrange.

At the day of implant placement, procedure done consisted of local anesthesia 2 carpules 2% Lidocaine with epinephrine. Miscrestal and sulcular flap with one tooth mesial and one distal + T shape modified papillary regeneration incision, osteotomy site preparation, 3i BIOMED 3.25 x 11.5 mm implant with GBR was placed and cover screw then vicryl suture with single interrupted technique. (Figure 10). After 3 weeks provisional essix retainer with crowns at site of #12, 22 was placed. After 6 month of implant placement 2nd stage and provisional screw retained crown was placed. Lastly, after 2-month final impression was taken using implant level technique with heavy and light putty impression material and porcelain fused to metal cemented crown was placed at site of implants #12, 22. (Figure 11)

III. Conclusions

The replacement of missing teeth in the esthetic zone is challenging, unique surgical and prosthetic concepts are implemented for proper result. Orthodontic space closure and implant substitution of missing maxillary incisors produced similar satisfactory esthetic results. Neither of the treatments impaired temporomandibular joint function. It is important that the orthodontist together with the other specialists frame a treatment objective which are realistic and meet the needs of the patient. Constant

interaction and communication among the team members and the patient at all levels of treatment are the keys to the success of the interdisciplinary treatment.

Biography

Zainab Hasan Sulaimani is a dentist and educator with a comprehensive and unique expertise. She combines her dual roles as the program director for the dental implant fellowship at jeddah specialty dental center, saudi arabia, as well as holding the title of consultant in restorative and dental implants.

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