

## MANAGEMENT MISSING LATER INCISOR IN MONOZYGOTIC TWINS: TWO CASE REPORTS

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**Tooth loss of anterior region is the result of congenital anomaly or of a traumatic event. Maxillary lateral incisor is very important in masticatory function because permit lateral protrusion movement of mandible and is a key point in aesthetic of smile. Tooth agenesis is one of the most common developmental anomalies in man and it often is a feature of syndromes. Tooth developmental results by interactions of genetic and environmental factors, in particular mutations in MSX1, PAX9 contribute tooth agenesis, but also radiotherapy, chemotherapy, maternal systemic diseases aid genetic aberrations. Upper lateral incisor is in a unfavorable anatomical position because it's in fusion area of facial processes for this it's the most common tooth loss in oral cleft. The management of these patients is complex and it includes an orthodontic, prosthetic and surgical analysis This report addresses the fundamental considerations related to replacement of congenitally missing lateral incisors by a team approach.**

Tooth loss of anterior region is the result of congenital anomaly or of a traumatic event. Maxillary lateral incisor is very important in masticatory function because permits the lateral protrusion movement of mandible and is a key point in the aesthetic of smile. Tooth agenesis is one of the most common developmental anomalies in man and it often is a syndromic feature (1). Dental agenesis is a genetically and phenotypically heterogeneous condition. Tooth development is under genetic control. Abnormal gene function may disrupt specific signaling pathways that are involved in tooth development (tooth number or abnormal size or shape). In particular mutations in Msx1, Msx2, Dlx1, Dlx2, Barx1 and PAX9 contribute to tooth agenesis and abnormal shape as demonstrate by Vieira et al.(2) and Miletich et al (3). Msx1 determines the position and shape of teeth. Mice lacking Msx1 protein function manifest cleft palate, deficient mandibular and maxillary alveolar bones and failure in tooth development(2).

PAX is a member of a gene family encoding transcription factors that play a key role during embryogenesis. In mice Pax-9-deficient causes the arrest of tooth development at the bud stage(4). Mutations of these proteins in humans represent genotype-phenotype correlations of non-syndromic hypodontia, but also radiotherapy, chemotherapy, maternal systemic diseases aid genetic aberrations (5). Upper lateral incisor is in a

unfavorable anatomical position because it's in fusion area of facial processes for this it's the most common tooth loss in oral cleft. Thesleff (6) demonstrated that lateral incisors, second premolars and third molars are the teeth most frequently affected for spatial constraints imposed upon neighboring developing teeth or to their susceptibility to fall below a developmental threshold.

### *Preoperative assessments*

The management of these patients is complex and it includes an orthodontic, prosthetic and surgical analysis. In the first the dentist must know medical and dental history of patients because uncontrolled medical conditions or parafunctional habits as bruxism or smoking status should be evaluated in treatment plan. The dentist should assess oral health of patients by Plaque Index (PI), Bleeding on Probing (BOP) and Periodontal Probing Depth (PPD). The patient should have excellent plaque control and there should be no gingivitis or periodontal disease. Patient's compliance is basilar. In the second the operator should control caries risk by Decayed Missed Filled Teeth (DMFT), should arrest the caries process by composite restorations and prevent new lesions by fluoride. Examination of restorations must include an assessment of the effect that existing restorations have on the health of the adjacent periodontium. Commons problems are:

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1) surface roughness of the restoration, 2) interproximal overhangs, 3) impingement of the restoration margin on the zone of the attachment. Clinical examination must be completed by radiographic examination that confirms problems detected during oral examination, shows bone topography, attachment levels, periapical radiopacities. Aesthetic considerations should be estimated by diagnostic wax set-up. It permits to value symmetry between maxillary dental midline and facial midline, incisal plane, lower and upper lip, incisal embrasures that increase from maxillary central incisors to canine, in fact uniform incisal embrasures are esthetically unnatural. It's important also to value tooth to tooth proportions and widths: the natural proportion of the width of the maxillary central incisor to the lateral incisor is approximately 1.2 to 1.0 (7). It's important to estimate finally gingival scaffold and smile line. Diagnostic wax set up is important also for color and gives to the patients an idea of final restoration.

The treatment of choice is the most conservative that satisfies the expected aesthetic and functional objectives of the patients. The single-tooth implant is one of the most common treatments for this situation in young people because it doesn't touch adjacent tooth and it is longeval (8, 9). The single-tooth implant should be used if there aren't caries, fractures or e.g. in adjacent teeth or a patient with a Class III tendency malocclusion requiring proclination of the maxillary incisors. Restorative treatment is only the final step of treatment plan, in general in young people implant position is the best treatment that permits to preserve other teeth, but before implant position, the ortodontist must create the adequate space and the dentist wait facial development complete. Oesterle et al.(10) refer that implants should be placed only after the age of 15 in females and 18 in males to avoid potential problems caused by skeletal growth, but the way most predictable to monitor facial growth is evaluation with cephalometric radiographs taken 6 month to 1 year apart.

#### *Steps for treatment of this situation*

##### *1) Orthodontist's role*

The orthodontist assesses 3 parameters during treatment: buccolingual alveolar ridge of edentulous zone, mesiodistal width and the interradicular spacing. After evaluation of study models and cephalometric tracing, the orthodontist selects the best orthodontic technique (20-22). The goal is the eruption of permanent canine in lateral position and then moved distally because it permits and increase of buccolingual width as reported Kokich (11), if this condition it is not possible the osseous ridge will not completely develop. The mesiodistal width is established by diagnostic wax-up, generally it is 5-7 mm. This determines implant's size in relation of adjacent teeth. The physiological space for growth of the papillae

is 1,5-2 mm between platform and adjacent tooth (12), if the distance is more than 2 mm, the complete papilla formation is compromised and there is the effect of "black triangle"(13).

The interradicular spaces to place an implant is about 5 mm, the problems are due to improper mesiodistal root angulations. For this reason it is important to take a periapical radiograph of the edentulous area prior to removing orthodontics' appliances.

##### *2) Interim tooth replacement*

During the time period of complete facial growth, the dentist should use a resin-bonded fixed partial denture as Maryland that preserves the space for implant. This prosthetic solution is very conservative because the adjacent teeth are treated in a conservative way: this solution uses bonding between retainer and teeth. It is a durable solution and conditions interdental papilla, but if there is a deep overbite there is stress on bonded interface and major probability of failure.

##### *3) Surgical approach*

Implant therapy is a predictable technique, but the placement in anterior maxilla follows aesthetic targets, it is important to know patient's expectations to avoid patient dissatisfaction. One of the features most neglected is rating of gingival biotype: a thin biotype determines the risk for postsurgical recession because it is less resistant to trauma. In this situation the dentist should recommend soft tissue augmentation. Surgical approach is the final step of treatment plan, but it follows clear rules. According to Tischler's guidelines for implant placement in aesthetic zone (14), we briefly explain: (a) employ a conservative flap design; (b) evaluate the existing bone and soft tissue; (c) time the placement correctly; (d) visualize the three-dimensional position of the implant; (e) consider healing time before implant loading; (f) consider the determinants of emergence profile.

All these points are based on concept that implantology is driven by restoration (15). In particular appear very important visualize the three-dimensional implant's position and its angulation (18, 19).

If it consider buccolingual position, it is important to place the implant not too far buccally because it should result in gingival recession for a dehiscence of the buccal cortical plate or too far palatally because it is unaesthetic and unhygienic (16). The buccal aspect of the implant platform should touch an imaginary line that touches the incisal edges of the adjacent teeth. It is also important to mask the metal of implant or abutment and create a gradual emergence profile, but keep a micro gap for health of implant. In general the crestal bone is placed 1.5 mm to apical of implant as reported by Cochran et al.(17). In



**Fig. 1.** Pre-Operatory Orthopantomografi (patient A)



**Fig. 2.** Pre-Operatory Orthopantomografi (patient B)



**Fig. 3.** Definitive prosthesis on patient A

this situation it is possible use cemento-enamel junction of adjacent teeth to determine apicoronal position of the implant platform; in this case CEJ of lateral incisor is located 1 mm more apically than the CEJs of central incisor and canine.

The implant angulation should mimic the angulation of adjacent teeth if they have a good alignment.



**Fig. 4.** Definitive prosthesis on patient B

#### 4) Alternative treatments

##### *Substitution canine*

Camouflage of canine is possible if the patient has Angle Class I malocclusion with crowding to need mandibular extractions or Angle Class II malocclusion without crowding. These situations permit to maintain an anterior group function. The profile should be balanced. Other parameters to consider are the aesthetics aspects: color, shape of canine and gingival parables if patient has gummy smile.

##### *Conventional prosthetic restorations*

This kind of restoration is not the first choice in young people because it removes much dental tissues, but in case of fractures or caries or other crowns problems it's a possible solution to consider.

### CASE REPORT

Two monozygotic twins with congenital missing of permanent maxillary lateral incisors are presented in this case report. The two cases were very similar from the orthodontic treatment and implant therapy aspects.

Two patients were 16 year old female who had congenital missing of right lateral incisors; (Fig.1-2) in two twins the eruption of canine in lateral position increased buccolingual width during distal movement and permitted a fully development of alveolar bone. Orthodontic alignment achieved appropriate space between roots to place the implants that it was maintained by a resin-bonded fixed partial denture: this restoration models also gum for aesthetics. Implants were placed 36 months after evaluation with cephalometric radiographs taken 6 month to 1 year apart. Implants 3,75 mm diameter and 11 mm length were positioned between central incisors and canines and it was maintained 1,5 mm mesially and distally. Acrylic temporary teeth were positioned after

surgical treatment. After a week, there were good healing and six months later were positioned metal-ceramic crowns: the crowns looked like natural ones and provided the patient with pleasing smile. (Fig.. 3-4)

### DISCUSSION

This case report described diagnosis and treatment planning for surgical preparation and placement of dental implants in the maxillary right areas and fabrication of two single crowns. A good diagnosis is basilar for achievement of treatment. In congenitally missing teeth suggest successful results because there are no pathologic symptoms or radiological findings.

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