INTERDISCIPLINARY APPROACH IN THE TREATMENT OF CONGENITALLY MISSING LATERAL INCISOR

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ABSTRACT

In dentistry treatment of difficult cases may be accomplished using an interdisciplinary approach. This article describes the orthodontic treatment in a female patient (12-years old) which was diagnosed with congenitally missing of upper left lateral incisor and Angle's Class III malocclusion. The treatment plan was interdisciplinary using preprosthetic orthodontic treatment for facilitate the surgical, implant and restorative treatment. The treatment were favorable, fulfilled the patient expectation and improving facial esthetics and restoring the functions. This case demonstrates that an interdisciplinary team (orthodontist, dental surgeon, prosthodontist) is required for the successful treatment of the congenitally missing of lateral incisor to create ideal conditions for the insertion of the dental implant.

Key words: orthodontics, prosthodontics, interdisciplinary approach, congenitally missing lateral incisors

INTRODUCTION

Currently dentists are facing a growing aesthetic demand from patients. This often requires an interdisciplinary approach to assess, diagnose and treating existing problems through a combination of orthodontic, periodontal, surgical and prosthodontic treatments [1].

In many cases obtaining favorable results in aesthetic restorations depends on the position of the teeth, the clinical dimensions of the crowns, the gingival architecture. Communication between disciplines is essential to achieving improved aesthetic results [2]. Interdisciplinary treatment can ensure success in difficult cases. For example, the collaboration between the orthodontist and the prosthodontist is beneficial in cases requiring to achieve the parallelism of the teeth, their favorable distribution and repositioning within the dental arch, in order to allow the physiological distribution of the masticatory forces and the optimal prosthetic restoration [3].

One of the most common situations that require collaboration between the orthodontist and the prosthodontist is the treatment of congenitally missing of the upper lateral incisors which often compromises smile esthetics [4]. Most patients presenting this dental anomaly need and seek orthodontic and prosthetic treatment for restoring edentulous spaces with prosthodontic treatment (removable partial dentures, conventional fixed bridges, resin-bonded bridges, single-tooth implant) [3].

The aim of this paper is to present and evaluate the result of the collaboration between the orthodontist and the prosthodontist in solving a complex case with congenital missing lateral incisors. This interdisciplinary approach involved preprosthodontic orthodontic treatment for facilitate the surgical, implant and restorative treatment.

CASE REPORT

AA, girl, 12 years asked for orthodontic

treatment in the Department of Orthodontics, „Gr. T. Popa“ U.M.Ph. of Iasi. Her chief complaint was about aesthetics: „Aesthetics; my front teeth are spaced and not fit together“. Facial, the patient was mesofacial with a normal height of the lower face. The patient presented: facial symmetry without menton deviation or canted maxillary plane, competent lips, relatively straight profile, nasolabial obtuse angle, during the smile the inferior incisors are more visible compared to the upper ones (fig. 1).

Intra-oral the patient presented permanent dentition, upper and lower arch symmetry, moderate spacing, upper right lateral incisor rotated, no dental midline shifting. Patient exhibited Angle's Class I molar and canine relationship on the right side, and class II canine and class III molar relationship on the left side, bilateral posterior cross bite, tendency to anterior cross bite and open bite (edge-to-edge incisors relationship), good oral hygiene and periodontal health (fig. 2).

Figure 1. Pretreatment extra-oral photos

Figure 2. Pretreatment intra-oral photos

No pathology was detected on panoramic radiograph that showed the presence of all the permanent teeth and developing tooth germs except of upper left lateral incisor and upper second molars. Also at the age of 11 years there is no evidence of the presence of germs for the third molars. The root morphologies of the teeth, alveolar bone levels, the size, shape, and position of condyle heads and temporomandibular joint space were normal. Cephalometric evaluation revealed skeletal Class III, hypodivergent growth pattern,

normal lower anterior facial proportion, upper and lower incisors slightly proclined, good profile (fig. 3 and table 1).

The treatment objectives of this case were to achieve dental aesthetics and to establish a normal relationship of occlusion, to give to patient an aesthetic smile. In order to achieve the treatment objectives, an interdisciplinary approach was needed: orthodontic treatment followed by prosthodontic treatment. Orthodontic treatment was necessary for redistribution and opening a space between the maxillary central left incisor and the left canine to allow restorative replacement of the missing 22, achieving canine guidance, obtaining anterior guidance and establishing a normal occlusion.

Figure 3. Pretreatment radiographies

Table 1. Pretreatment cephalometric values

Variable	Standard	Pretreatment
SNA (°)	82	84
SNB (°)	80	85
SND (°)	77	83
ANB (°)	3	2
Wits appraisal (mm)	2	-3
Upper incisor to NA (mm/°)	4/22	6/24
Lower incisor to NB (mm/°)	4/25	4/26
Upper incisor to SN plane (°)	103	104
Lower incisor to mandibular plane angle (°)	86	92
Interincisal angle (°)	135	140
FH/ML(°)	25	23
SN/ML (°)	30	26
Ar-t -Go (mm)	N/A	45
Me/NL (mm)	N/A	56
Facial height index (%)	70	80
Upper lip thickness (mm)	N/A	17
Total chin thickness (mm)	N/A	14
Z angle (°)	75	74

For accomplished the orthodontic treatment objectives we applied preadjusted edgewise appliance (MBT prescription 0.022″ slot) with 0.014-in and 0.016-in nickel-titanium and 0.016-in to 0.020-in and 0.018 × 0.025-in stainless steel archwires in both arches and intermaxillary Class III elastics to improve the overjet and overbite.

During orthodontic treatment, after opening space for 22, provisional teeth were fixed in the archwire for aesthetic reasons (fig. 4). In this case, the bucco-lingual width of the alveolar ridge was insufficient and it was necessary to perform a bone graft before the time of implant placement to achieve a sufficient dimension of the alveolar ridge. At the age of 16 years, the orthodontic treatment was almost completed and 6 months before debonding, the implant (MIS - 3.75/11.5) was placed (fig. 5).

Figure 4. Panoramic radiograph revealing sufficient space for placement of the implant

Figure 5. Panoramic radiograph revealing the inserted implant

Treatment result. The results of treatment fulfilled the patient expectation. The redistribution of maxillary teeth helped in gaining the space for implant insertion for prosthodontic reconstruction of upper left lateral incisor. The facial esthetics was improved significantly and good occlusion relationship was achieved (Class I incisor, canine, and molar relationship with good buccal segment intercuspidation, symmetry of dental midline (fig. 6 and 7).

DISCUSSIONS

The congenitally missing of lateral incisors are often found in orthodontics practice [5, 6, 7], and sometimes the treatment choice (opening spaces for future prosthesis or closing the spaces anteriorly) is a difficult decision for the orthodontist. For the congenitally missing lateral incisors there are several treatment options (canine substitution [8], a tooth-supported restoration [9], and a single-tooth implant [10]. The appropriate treatment depends on the class of malocclusion, facial profile, the nasolabial angle, incisors relationship, amount of space required, and the adjacent teeth [11]. In the case presented, the combination of orthodontic and prosthodontic treatment ensured a favorable result in the restoration of esthetics as well as other dental and facial functions. This was possible by carefully selecting the treatment plan, based on the diagnosis: the choice of the method of opening the space and inserting an implant was justified by the existence of the class III growth pattern as well as by the unilateral absence of the lateral incisor and also of the second maxillary molars.

Treatment alternatives for restoring

edentulous spaces resulting from congenitally missing laterals include removable partial dentures, conventional fixed bridges, resin-bonded bridges, auto-transplantation, orthodontic repositioning of canines to close the edentulous space, and single-tooth implant [12]. The ideal treatment is the most conservative option that satisfies individual esthetic and functional requirements and there is probably no universal ideal solution, applicable to all patients with this type of anomaly. There still exists in scientific literature a debate whether is better to open or close spaces in congenitally missing lateral incisors. The orthodontist does not have a universal protocol for treatment, it must make a correct diagnosis and take into account the advantages and disadvantages of different treatment methods [13, 14]. Silveira in his study conducted on 978 research articles showed that choosing the best treatment solution for the congenital absence of a maxilla incisor can often be a challenge in achieving a balance between aesthetics, occlusal balance and periodontal health and space closure is evaluated better esthetically than prosthetic replacements [15].

Figure 6. Posttreatment extra-oral photos

Figure 7. Posttreatment intra-oral photos

The treatment plan should be established after a discussion with the whole team (orthodontist, dental surgeon, prosthodontist) because it should offer a dynamic view of tooth position and determine whether restorative treatment can be enhanced by tooth movement. The new tooth position can eliminate pathologic occlusion, create a healthier periodontal environment and allows the prosthodontist to insert more aesthetic, functional, stable, and durable restorations [4]. The advances in osseointegrated implants and modern prosthetic crowns have increased the popularity of space opening to replace the missing lateral incisors. Studies have shown that the technique single-tooth implant-supported restorations represents a favorable option because no adjacent tooth is prepared for restorations, and implants have a success rate of 90% over 10 years. The aim of pre-implant orthodontics is to offer adequate room for the placement of the implant and

prosthetic crown (for the lateral incisor site 5-7 mm, space between the roots of the adjacent teeth with 1.5-2 mm space between the adjacent crowns and implant head). Implant must be placed after growth cessation to avoid infraocclusion of the implant with an unaesthetic gingival architecture due to the continuing vertical growth of the jaws [16-26].

CONCLUSIONS

The multidisciplinary approach through orthodontic treatment, followed by single-tooth restoration, was a favorable treatment, successfully restoring function and aesthetics for the congenitally missing single lateral incisor. It was necessary to work as a team to have ideal conditions before and after implant placement.

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