REVIEW

The Orthodontic Management of Adult Patients with Congenitally Missing Teeth

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Abstract

The dental profession faces an increasing number of adult patients complaining from spaces due to congenitally missing teeth. Management of patients with missing teeth requires a careful and multidisciplinary treatment approach depending on the number of missing teeth and the skeletal severity of the case. Treatment of this kind of malocclusion can be approached by either opening the space for implant placement in place of missing teeth or by closing the space of missing teeth depending on the amount of space and the skeletal features accompanying such type of malocclusion.

Keywords: *Missing teeth, Orthodontic management, Implants*

Introduction

It is not uncommon to have patients with congenitally missing tooth, two teeth or more; the prevalence could reach up to 5%. Patients with hypodontia are those with congenital lack of few teeth. While oligodontia patients are those who have a congenital absence of more than six teeth (when wisdom teeth are not included), oligodontia is not common like hypodontia, and is usually associated with syndromes like ectodermal dysplasia[1] [**Fig. 1**].

The frequency of missing teeth for Caucasian population ranges between 3.5% to 9.5% for the permanent dentition, and only 0.4 % in the deciduous dentition. Missing teeth are frequent in both jaws but more often seen in the mandible, and more likely to be bilateral.[2]

The order of frequency of missing teeth is the following from highest to lowest: mandibular and maxillary third molars; maxillary lateral incisors as well as mandibular second premolars, maxillary second premolars, and the mandibular central incisors.
The trend is that the last tooth i.e. the distal tooth of a group, is the missing one, except for the mandibular incisors where the mandibular central incisor is usually the missing tooth.

Although there is no big difference in the prevalence of hypodontia between males and females; but many studies have shown that maxillary lateral incisor teeth are more frequently missing in females rather than in males. However, males show more common congenitally absent maxillary 2nd premolars when compared to females.
In patients with congenitally missing teeth, deformities in tooth size and shape e.g. peg-shape lateral incisors, are more frequent. It is also possible for a supernumerary tooth to appear in the same mouth where there are congenitally missing teeth especially in cleft patients.[3, 11]

Occasionally, a second premolar may be missing on one side while the tooth on the opposite side quite atypical is only partially formed with no eruptive force.

Figure 1: A growing patient with missing upper lateral incisors & lower second premolars. Wisdom teeth are congenitally absent too.

The etiology of missing teeth could be hereditary due to an autosomal dominant gene. *Brook* suggested a multi-factorial model with an underlying scale of continuous variation related to tooth number and size. [4, 5]

Agenesis might be an expression of an evolutionary process in which the jaws and dentition of man are being reduced. Peg-shaped teeth can be seen as an incomplete expression of the gene for agenesis of this tooth. However, the size of the jaws has no correlation with the absence of teeth.

It is also noted that when permanent teeth are missing, the roots of the deciduous predecessors may show no resorption. Dental development is found to be delayed in patients with hypodontia.[6]

There is a high correlation between missing lateral incisor and impacted canine, the roots of lateral incisors could act as a guide for the eruption of maxillary canines.[7]

Clinical Features

Hypodontia is commonly associated with various intra and extra oral effects. Extraorally, patients may exhibit a low mandibular plane angle, and a decreased lower anterior facial height.[8]

While the intraoral effect would probably involve a retroclination of upper and lower incisors which may lead to an increased interincisal angle; rotations and drifting of the existing teeth that can also be evident. In place of missing teeth, narrow ridges in all dimensions are evident due to the alveolar bone deficiency.

Wherever maxillary lateral incisors are missing, the permanent canines often erupt mesial to the deciduous canines, into the space of the missing teeth. In addition, the premaxilla is deficient due to the fact that no alveolar bone is formed, occasionally resulting in a flat face with anterior cross-bite tendency. [9, 10]

Treatment Options

In cases of missing teeth, treatment may include either closing spaces of missing teeth or opening these spaces and preparing adjacent teeth for fixed or removable prosthesis.[9] The decision of treatment planning of these cases is recommended to be a multidisciplinary discussion involving the orthodontist, prosthodontist, periodontist and the oral surgeon so as to study each case individually.

Opening spaces for prosthetic replacement of teeth will restore arch dimensions and will have good extraoral effects especially concerning the lip support. Occlusion should be restored to its physiologic norms of overjet, overbite and buccal intercuspation. This treatment option is commonly considered for cases with hypodontia of several missing teeth especially when extraoral features require lip support in order to improve the facial profile by placing the anterior teeth at their proper clinical and cephalometric position.[11]

The ideal replacement for missing teeth is the osteointegrated implants that do not require loss of tooth material from adjacent teeth. Preparation for implants requires enough space for implant placement, and proper root alignment of teeth adjacent to the space in order to facilitate insertion of these implants [**Fig. 2, Fig. 3, and Fig. 4**].

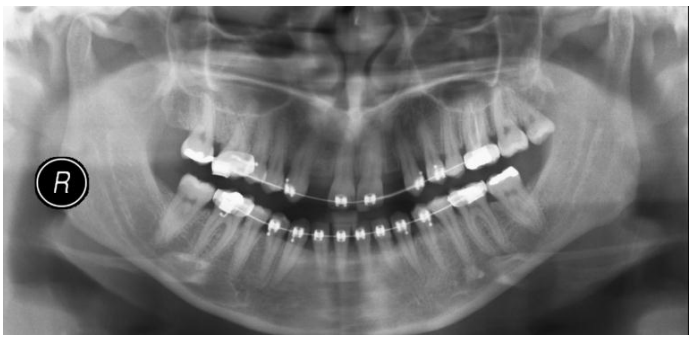

Figure 2: An adult patient suffering from narrowing spaces of missing lateral incisors

Figure 3: Spaces are opened for implants in place of missing lateral incisors and roots of adjacent teeth are aligned

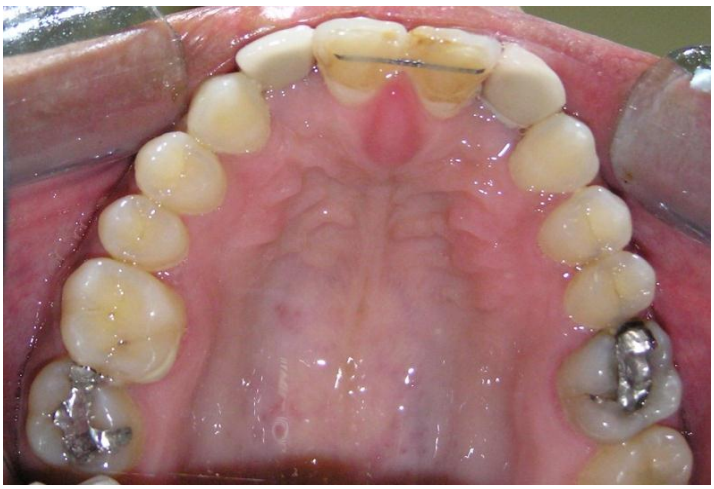

Figure 4: Implants were placed with porcelain prosthetic crowns to replace the missing lateral incisors

Closing spaces of missing teeth is better to be considered when one or two teeth are missing in each jaw to avoid prosthetic replacement of missing teeth.[12] The orthodontist should balance the amount of space closed with the resulting facial features due to tooth movement and the distance the teeth have to move to avoid root resorption which are the main considerations in order to have a periodontically healthy mouth [**Fig. 5, Fig. 6, and Fig. 7**].

Closing upper spaces in Class II protruded upper teeth could be a logic option of treatment in the cases of missing upper lateral incisors and upper second premolars. [9]

Figure 5: An adult patient with missing upper lateral incisors

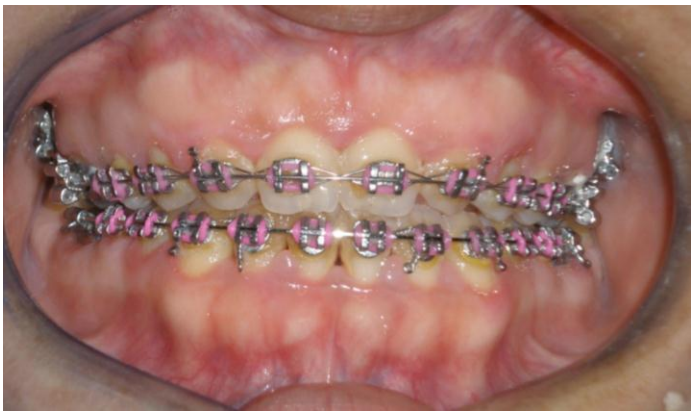

Figure 6: Fixed orthodontic appliance to close spaces of missing lateral incisors

Figure 7: Closing the space orthodontically with the maxillary canine substituting the missing lateral incisor

The use of miniscrews allows closure of spaces in situations considered not ideal for this type of orthodontic treatment where they are used as an anchorage device to avoid undesirable side effects.

Conclusions

Treatment of patients with missing teeth requires a careful and multidisciplinary treatment approach depending on the number of missing teeth and the skeletal severity of the case. It is important to decide whether to open the spaces or to close them taking into consideration the amount of space and the possible placement of implants later on. Besides, skeletal features and future esthetic outcome are crucial in taking the right decision that might result in a functionally appropriate and esthetically satisfactory appearance for the patient.

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