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Case Report **Dental Medicine**

About a Multidisplinary Approach for the Management of Hypodontia: Case Report

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Abstract

Hypodontia is a congenital absence of one or more teeth. It is a common malformation with a variable etiology. Early diagnosis and multidisciplinary intervention is required to reach an optimal outcome. Orthodontic treatment is often required to manage space and facilitate later restorative treatment. This article describes a multidisciplinary treatment approach for congenitally missing maxillary lateral incisor and second premolars involving orthodontics and prosthodontics specialties.

Keywords: Hypodontia, diagnosis, multidisciplinary, orthodontics, prosthodontics, treatment.

INTRODUCTION

Hypodontia is known as the congenital absence of one or few teeth [Nunn JH *et al.*, 2003]. It is the most common human malformation. Genetic and environmental components are involved in its etiology. Furthermore, congenitally missing teeth are frequently found in healthy people (Polder BJ *et al.*, 2004). It is presently known that several genetic and syndromic disorders can increase the risk of hypodontia (Lucas J *et al.*, 2000). The most frequent absent teeth are the third molars. Then, comes mandibular second premolars (2.8 %), upper lateral incisors (1.6%), upper second premolars (0.23%) and mandibular incisors (0.08%) [Cameron J *et al.*, 1996].

Cases of hypodontia require complex treatment depending on missing teeth, the amount of residual space and the presence of other malocclusions.

A successful treatment is built on an interdisciplinary intervention of a committed team. It is usually composed of a general practitioner, a pediatric dentist, an orthodontist, an implantologist and a prosthodontist. Efficient treatment planning is compulsory to achieve optimum outcome for the patient.

The goal of this article is to present a case of hypodontia in which the treatment plan consists of an orthodontic phase followed by a prosthetic intervention.

CASE REPORT

A_16–year-old girl was referred to the orthodontic department of the dental university of Monastir, Tunisia.

The patient's chief complaint was "having small teeth". She had no medical history of general or oral anomaly.

Extra oral examination revealed a slightly reduced lower face height, a convex facial profile and normal skeletal base relationship.

Intra oral examination revealed a class II canine and molar malocclusion in the late mixed dentition. It is noticed that the lateral right incisor is peg-shaped. Oral hygiene and gingival status were good. #55 was extracted after carie infection (Figure 1).

Radiographic examination confirmed that: #22, #15, #18, #35, #38, #45, #48 are missing (Figure 2).

Given the malocclusion of the patient, a multidisciplinary approach involving orthodontics and advanced restorative phase is required. Collaboration between team members is essential during initial examination, treatment planning and clinical management of the case.

Multiple treatment options were considered. Extraction of the second primary molars or their preservation is taken into account.

After consultation with the patient, a combined ortho- restorative approach was adopted.

The objective of orthodontic treatment is to align teeth, correct the deep bite and manage spaces to anticipate prosthodontic care. The final decision was to maintain second temporary molars. They were not included in the fixed appliance.

Upper and lower fixed appliances (0.022*0.028-in slot) were installed. Treatment started with 14 et 23 distalisation with power chains.

The levelling was planned according to this sequence of arch wires: 0.014NiTi, 0.018 NiTi, 0.018 Stainless steel, 0.017*0.025 ss, 0.018*0.025 stainless steel and 0.019*.025 stainless steel. Space opening for the lateral incisors with nickel-titanium springs was planned. Adequate spacing was maintained to replace the upper second premolar. In order to guide the orthodontist to accomplish the most ideal aesthetic and functional result, a Digital Smile Design (DSD) procedure is realized during treatment. The orthodontic goals were achieved with good treatment outcome. Debonding was completed after 28 months of treatment and conventional clear retainers with replacement teeth were fitted right after in view of prosthetic replacement (Figure 3).

The patient was then assessed in the fixed prosthodontic department for the management of edentulous spaces. A temporary crown was placed on #12, an adhesive bridge to replace #22. The primary second molars are functional and are retained for now. In the long term, these teeth will be replaced with dental implants.

Table 1: Cephalometric analysis

Angles	Initial values	Normative values
SNA	76	82° ± 2
SNB	72	80° ± 2
ANB	4	0-4°
AoBo	2mm	-2° - +2mm
FMIA	55°	68°
IMPA	100°	87°
FMA	25	20°-30°
GoGn/SN	36	32±5
I/i	125	135°
I/F	106°	107°

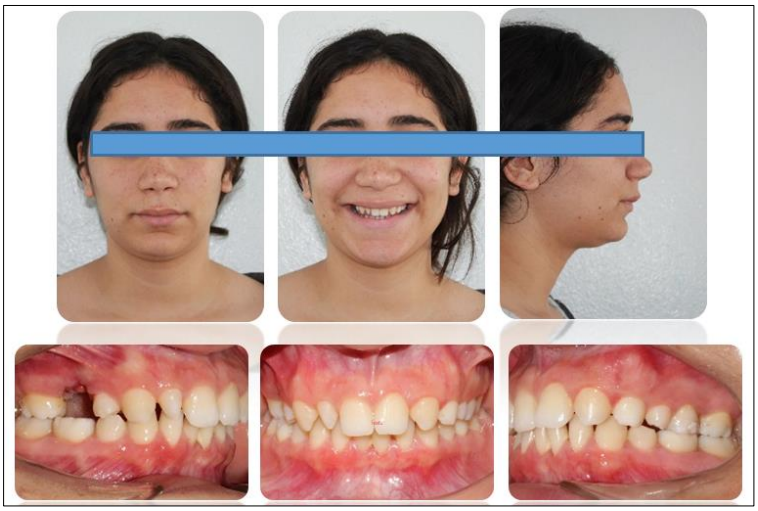

Figure 1: Initial presentation: exobuccal photographs and clinical views of malocclusion

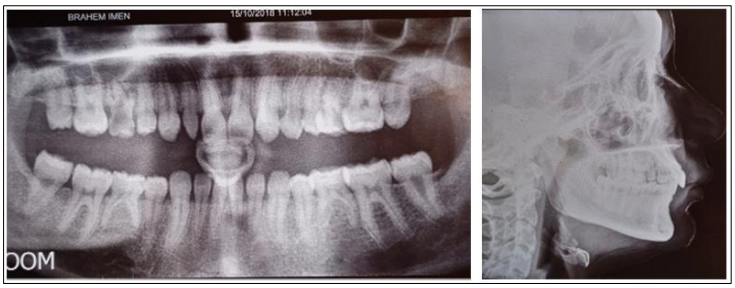

Figure 2: Panoramic radiograph and lateral cephalogram before treatment

Figure 3: Steps of treatment from teeth alignment to debonding

Figure 4: Digital smile design analysis during treatment

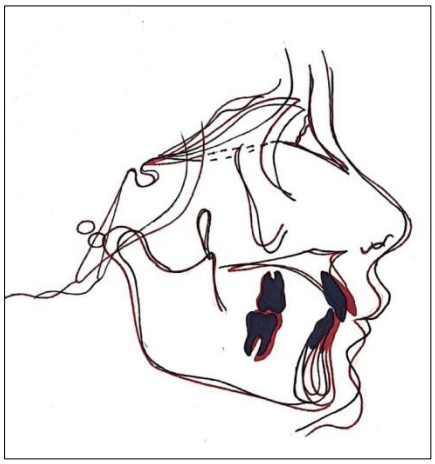

Figure 5: cephalometric superimposition before and after treatment

DISCUSSION

Hypodontia is a multifactorial phenomenon related to genetic and environmental factors. Authors have proposed various concepts focusing on those factors, although the contribution of both elements is well recognized now. Certain studies held an evolutional point of view. For instance, Clayton hypothesized, in his work, that the last tooth of each "class" was "vestigial body" and will disappear during the evolution process [Clayton J M, 1956]. More recently, many researchers contend that the human dentition will be reduced under the evolutionary change. Vastardis believes that the size of the jaws and the number of teeth will be reduced by human evolution [Vastardis H, 2000]. On the other hand, anatomical approach consists on environmental changes during tooth maturation. Svinhufvud lends support to this

theory. He explains that teeth developing in areas of jaw fusion are more exposed to agenesis [Svinhufvud E *et al.*, 1988]. In contrast, Kjaer suggests that regions where innervation is developed last are delicate areas and, in which, agenesis is more likely to happen (Kjær I *et al.*, 1994). However, proposing genetic contribution in tooth agenesis was a turning point in the way of thinking. It was discovered that hypodontia is transmitted by a dominant autosome with variable expressivity and incomplete penetrance [Grahn´en, H., 1956].

Afterward, Brook highlighted the association between sex differences, tooth number and size (Figure 6). He claimed that females are more likely to have hypodontia and microdontia, while, males are more likely to have supernumerary teeth and megadontia [Brook A H *et al.*, 2014].

Due to genetic research advances, it's now possible to make the identification and gene sequencing in tooth morphogenesis. Studies on twins and families have suggested that agenesis of premolars and lateral incisors are due to a dominant autosomal gene with incomplete penetrance and variable expressivity [Alvesalo L *et al.*, 1969, Cobourne M T., 2007]. However, it is still not confirmed whether hypodontia is a consequence of a single or polygenetic gene defect [Larmour C. J *et al.*, 2005].

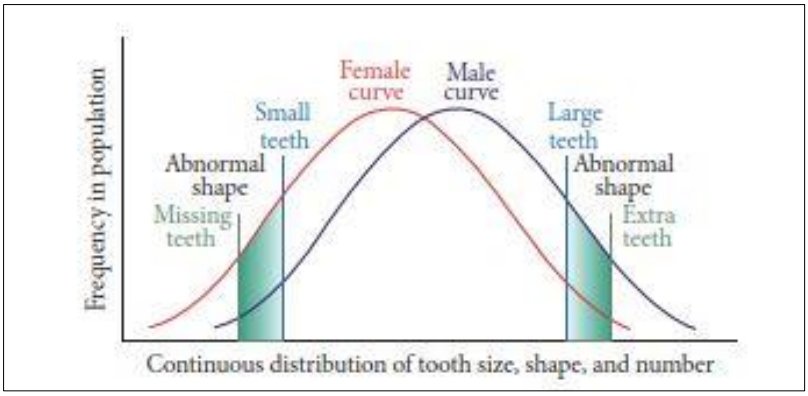

Figure 6: Model showing continuous distribution of tooth size, shape and number according to gender (10)

In our case, hypodontia is found to be associated to microdontia with no family history of dental abnormalities. Therefore, the genetic etiology could not be confirmed.

Commonly, the general practitioner or the pediatric surgeon initiates the multidisciplinary treatment upon the diagnosis of hypodontia. He prevents carious lesions and maintains primary teeth in place in order to preserve not only space, but also, the alveolar bone. For these reasons, the primary teeth in this case were maintained [Dhanrajani P J, 2002] There preservation should not be considered if root resorption already took place and is affecting their stability [Valle A L *et al.*, 2011]

Orthodontic treatment should be performed as soon as the primary teeth 'extraction is indicated. The main goal is to prevent adjacent or antagonist tooth's migration.

In this case, the primary second mandibular molars are maintained throughout the orthodontic treatment. Enamel reduction could not be achieved because of the divergent morphology of roots. Consequently, molar classe I could not be obtained in the end of the orthodontic treatment.

After the orthodontic phase, dental implants may be the best choice. Other solutions, such as fixed prostheses, are relatively invasive due to the reduction of intact teeth.

Treatment with dental implants can only be initiated when the physical growth is completed. Otherwise, vertical growth of the facial skeleton should be taken into consideration. In the current case, physical growth is expected, thus, maintaining space for future implants was the treatment of choice.

CONCLUSION

The successful management of this case was achieved with early diagnosis and a multidisciplinary approach in treatment planning.

The orthodontic treatment allowed maintaining space to replace missing teeth, improving the esthetics and the function.

REFERENCES

- Alvesalo, L., & Portin, P. (1969). The inheritance pattern of missing, peg-shaped, and strongly mesio-distally reduced upper lateral incisors. *Acta Odontologica Scandinavica*, *27*(6), 563-575.
- Brook, A. H., O'Donnell, M. B., Hone, A., Hart, E., Hughes, T. E., Smith, R. N., & Townsend, G. C. (2014). General and craniofacial development are

complex adaptive processes influenced by diversity. *Australian Dental Journal*, *59*, 13-22.

- Cameron, J., & Sampson, W. J. (1996). Hypodontia of the permanent dentition. Case reports. *Australian Dental Journal*, *41*(1), 1-5.
- Clayton, J. M. (1956). Congenital dental anomalies occurring in 3,557 children. *J Dent Child*, *23*, 206-208.
- Cobourne, M. T. (2007). Familial human hypodontia–is it all in the genes?. *British dental journal*, *203*(4), 203-208.
- Dhanrajani, P. J. (2002). Hypodontia: etiology, clinical features, and management. *Quintessence international*, *33*(4), 294-302.
- Grahnén, H. (1956). Hypodontia in the permanent dentition: a clinical and genetic investigation. *Odontol Revy*, *7*(3), 1-100.
- Kjær, I., Kocsis, G., Nodal, M., & Christensen, L. R. (1994). Aetiological aspects of mandibular tooth agenesis—focusing on the role of nerve, oral mucosa, and supporting tissues. *The European Journal of Orthodontics*, *16*(5), 371-375.
- Larmour, C. J., Mossey, P. A., Thind, B. S., Forgie, A. H., & Stirrups, D. R. (2005). Hypodontia—a retrospective review of prevalence and etiology. Part I. *Quintessence Int*, *36*(4), 263-70.
- Lucas, J. (2000). The syndromic tooth--the aetiology, prevalence, presentation and evaluation of hypodontia in children with syndromes. *Annals of the Royal Australasian College of Dental Surgeons*, *15*, 211-217.
- Nunn, J. H., Carter, N. E., Gillgrass, T. J., Hobson, R. S., Jepson, N. J., Meechan, J. G., & Nohl, F. S. (2003). The interdisciplinary management of hypodontia: background and role of paediatric dentistry. *British dental journal*, *194*(5), 245-251.
- Polder, B. J., Van't Hof, M. A., Van der Linden, F. P., & Kuijpers-Jagtman, A. M. (2004). A meta-analysis of the prevalence of dental agenesis of permanent teeth. *Community dentistry and oral epidemiology*, *32*(3), 217-226.
- Svinhufvud, E., Myllärniemi, S., & Norio, R. (1988). Dominant inheritance of tooth malpositions and their association to hypodontia. *Clinical Genetics*, *34*(6), 373-381.
- Valle, A. L. D., Lorenzoni, F. C., Martins, L. M., Valle, C. V. M. D., Henriques, J. F. C., Almeida, A. L. P. F. D., & Pegoraro, L. F. (2011). A multidisciplinary approach for the management of hypodontia: case report. *Journal of Applied Oral Science*, *19*, 544-548.
- Vastardis, H. (2000). The genetics of human tooth agenesis: new discoveries for understanding dental anomalies. *American Journal of Orthodontics and Dentofacial Orthopedics*, *117*(6), 650-656.