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Prosthetic Rehabilitation of Severe Hypodontia: A Clinical Report

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Abstract. This case report is a five year recollection outlining the treatment of a 14 year old boy with severe hypodontia presented at the specialist and consultant clinics at the Faculty of Dentistry, King Abdulaziz University. The treatment integrated restorative reconstruction of anterior and posterior teeth with prosthetic removable partial dentures to re-establish the vertical dimension of occlusion. This process resulted in an improvement to patient's appearance, esthetics and function as well as a positive impact on the patient's confidence and self image.

Keywords: Hypodontia, Removable partial dentures OVD, Prosthetic Rehabilitation.

Introduction and Literature Review

Hypodontia also known as oligodontia, is defined as 'the congenital absence of several teeth'[1]. The characteristics of this condition include hypoplastic conical teeth, reduced bone height and bone width, inclination of some adjacent teeth, and over-eruption of opposing teeth[2,3].

Some authors classified hypodontia in relation to the number of missing teeth as mild hypodontia, when 2 to 5 teeth are congenitally missing; moderate hypodontia where 6 to 9 teeth are congenitally missing, and severe hypodontia if 10 or more teeth are congenitally missing[4].

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The etiology of hypodontia is unknown, though genetic factors, epigenetic factors and environmental factors are thought to be the basis of the condition[5-8].

Developmental anomalies of the dentition are rare when compared to the more common oral disorders such as dental caries and periodontal diseases; however, their clinical management is usually complicated. Most of the published literature relating to dental anomalies is on Caucasian populations, while reports on the prevalence of hypodontia in Saudi Arabia and other Arab countries in particular are few. An early study in 1989[9] reported the prevalence of hypodontia to be 2.2% among 4-12 year old in Gizan area. In 1999, a survey of 1,010 subjects (52.7% males and 47.3%), aged 12 - 40 years who attended the dental clinics of the Faculty of Dentistry, King Abdulaziz University (FD-KAU) between 1995 and 1997 reported the prevalence of hypodontia (excluding third molars) to be 4.16%, and 6.32% of subjects with hypodontia exhibited multiple missing teeth[10]. In a more recent study of 1,878 children attended the dental clinics in the North West Armed Forces Hospital, Tabuk, sixty-eight children had 133 permanent teeth missing, 42% unilaterally, 37% bilaterally, 3% trilaterally, and 18% quadrilaterally. It was interesting to find even gender distribution of missing permanent teeth, hence, higher prevalence of missing primary teeth in females compared to males[11].

Dental treatment in patients with hypodontia is critical for their physiological, and psychological health and development. It can start at a young age, unfortunately, and due to the reduced number of teeth as well as their abnormal morphology esthetics, often presents a challenge to the treating dentist[12]. Complex multidisciplinary rehabilitation can include surgery, multiple restorations, prosthetic and orthodontic treatment often needed at an early age with a timeline treatment plan in addition to lifelong maintenance[13,14]. Prosthodontic treatment in these patients is demanding due to the knife edge alveolar ridges, which impairs the retention and stability of prostheses[15]. There is usually a need to remake dentures as patients grow. Implants supporting fixed and/or removable prosthesis should be placed when growth has been completed according to the dental and skeletal maturity, not chronologic age[16]. The complexity of such oral and maxillofacial rehabilitation was illustrated in a study of 112 patients with oligodontia referred to university hospitals in Denmark, from 1997 to 2001 with 1126 missing

teeth. 97% of patients received orthodontic treatment while 90% of the patients required fixed implant-supported prosthetic restoration to replace missing teeth. Adjunct surgery was also performed (73% alveolar ridge augmentations, 43% sinus floor augmentation, 18% inferior alveolar nerve transposition and 27% orthognathic surgery)[17]. Another retrospective study was conducted in the Netherlands between 1990 and 2008. 44 patients with severe hypodontia were referred to an academic center of special dental care and treated with 214 endosseous implants, and had a 5 year survival rate of 89.8%[18].

This clinical report describes the treatment of a young patient with hypodontia attending the specialist and consultant clinics of the Prosthetic Department, FD-KAU. A combination of direct composite restorations and interim maxillary, and mandibular removable partial dentures (RPD) was employed. This was performed to establish a healthy occlusal vertical dimension, improve esthetics and function until the completion of skeletal growth; afterwards, the patient was referred for implant retained prosthesis.

Clinical Report

The patient - a young man of Thai origins - was 14 years old when he first attended at FD-KAU in 2007. The patient was medically fit with no medical or familial history of Ectodermal Dysplasia. Clinical examination revealed normal extra oral and TMJ structures. Intra-oral examination showed mixed dentition and the presence of torus palatinus in the hard palate of the maxilla. The deciduous teeth retained were the remaining roots of the lateral incisors and canines in all four quadrants in addition to the remaining roots of the lower central incisors and the primary second molars in all quadrants. The permanent teeth present were the upper central incisors, the lower left first premolar, the lower right lateral incisor, and the first and second molars. This is in agreement with reports that in patients with hypodontia and ectodermal dysplasia, maxillary second molars, canines, central incisors, and mandibular canines are the most commonly present primary teeth[19].

Most of the retained deciduous teeth were badly decayed and displayed severe tooth surface loss. Additionally, the patient had undeveloped alveolar ridges and a reduced vertical dimension of occlusion (OVD). Moreover, there was mild plaque deposition and mild

gingival inflammation (Fig. 1). Panoramic and periapical radiographs revealed no development of primary or secondary teeth/tooth germs.

Maxillary and Mandibular primary impressions were made using irreversible hydrocolloid alginate impression material (Aroma Fine DF

Fig. 1. Intra oral pictures of maxillary and mandibular arches at initial examination visit.

III, GC Corp., Tokyo, Japan) in modified stock trays. These impressions were poured in a Type III stone to form study casts, plus construct special trays and record blocks by using auto polymerizing acrylic resin (Ostron 100 Powder, GC Corp., Tokyo, Japan), and form wax occlusal rims. The diagnostic jaw relation was recorded in the position of physiologic rest which was determined by facial measurements according to the free way space. The interocclusal distance was confirmed by phonetics. Facebow and interocclusal records were used to mount the diagnostic casts in the centric relation position on a semi adjustable articulator (Hanau Wide Vue, Waterpik Technologies Inc., Fort Collins, CO USA) by using an ear piece face-bow (Hanau, Waterpik Technologies, Inc., Fort Collins, CO USA) and an interocclusal registration record (Exabite™ II. Vinyl Polysiloxane Bite Registration Crème. GC America, Inc., Alsip, IL USA). The diagnostic wax-up was prepared to provide optimum vertical dimension, plane of occlusion and esthetics. This was presented to the patient, to his parents, and the treatment was discussed and planned. The decision was made to extract all remnant roots. The un-restorable permanent lower first molars were

surgically removed to prevent excessive bone loss and resorption. The choice of extracting or maintaining the deciduous teeth until they are naturally lost is a hard call to make as some may become ankylosed[20]. In this case however, the maxillary right primary second molar was retained as the tooth was healthy from a dental and a periodontal point of view requiring a simple restoration of the mesial carious lesion, and more importantly, it would aid in the retention of the denture.

The reduced OVD was restored using direct composite restorations (Feltik Supreme, Feltik LS - 3M/ESPE) on all permanent second molars to provide stable intercuspation at an increased vertical dimension (Fig. 2). Following composite occlusal buildup of all permanent second molars, the maxillary and mandibular final impressions were recorded using poly silicon impression material (Imprint™ II Quick Step Vinyl Polysiloxane Impression Material, 3M/ESPE). Then, poured in dental stone, and record base and wax occlusal rims were constructed as previously discussed (Fig. 2). The final jaw relation was recorded again in the position of physiologic rest and casts were mounted in the centric relation as previously discussed.

Fig. 2. Interocclusal registration record. Wrought wire clasps were used to aid in the retention of the maxillary record base during jaw relation.

The anterior teeth were selected and set to meet both esthetics and phonetics. Whereas, anatomic posterior teeth were arranged and tried in

after which the final processing was carried out. The dentures were finished, polished and delivered to the patient. The mandibular and maxillary interim RPDs were fabricated with heat-polymerizing acrylic resin with the aid of wrought wire clasps for retention (Fig. 3).

Fig. 3. The interim maxillary and mandibular interim RPD equipped with wrought wire clasps for retention.

Fig. 4. The RPD insertion appointment before the composite resin restoration of anterior teeth and following the restoration build up and RPD insertion.

The upper centrals were morphologically restored with composite to close the dental diastema. The patient was instructed on denture care and cleaning (Fig. 4).

The RPD provided the patient with esthetic and function by replacing missing teeth to re-establishing the occlusion and restore OVD. At follow up visit, the patient expressed satisfaction with the dentures, the new OVD, function and esthetics. He expressed that they had an important impact on his social confidence. The importance of continuous dental recalls and maintenance including the restoration of carious lesion on primary maxillary right second molar where stressed to the patient. As well as the value of regular dental hygiene appointments and topical fluoride for prophylaxis against caries were also stressed to the patient, especially in light of the significant number of missing teeth. Unfortunately, the patient did not attend any further recall appointments at FD-KAU for a period of five years.

In 2012 and at the age 19, the patient attended FD-KAU for continuation of treatment. At the assessment visit, the patient was still using the interim upper and lower RPD. He was satisfied with the esthetics and function they provided. Dental examination revealed deepening of proximal caries in the primary maxillary right second molar which the patient neglected to treat. A localized red, soft papula was present in the labial aspect of the interdental papilla between the maxillary central incisors but was asymptomatic. The oral mucosa was healthy underneath the dentures and the permanent second molars were sound. Composite restorations on all teeth were discolored with signs of wear and attrition (Fig. 5 and 6). As the skeletal and dental growths were complete, the patient was referred for definitive treatment including ridge augmentation, sinus lift, and implant supported prosthesis as well as porcelain veneers on the maxillary central incisors.

Conclusion

This clinical report verified that interim RPDs accompanied with direct composite restorations is a simple and relatively inexpensive method of treatment for young patients with hypodontia. This treatment improves esthetics and oral function for the patient and establishes a favorable plane of occlusion on OVD. Furthermore, the patient's social confidence is significantly improved as a result of the dental treatment. Regular follow up and recall visits are essential for maintaining the

established occlusal plane and monitoring composite restorations to manage and correct any defects.

Fig. 5. Frontal and lateral view of patient at 5 years follow-up.

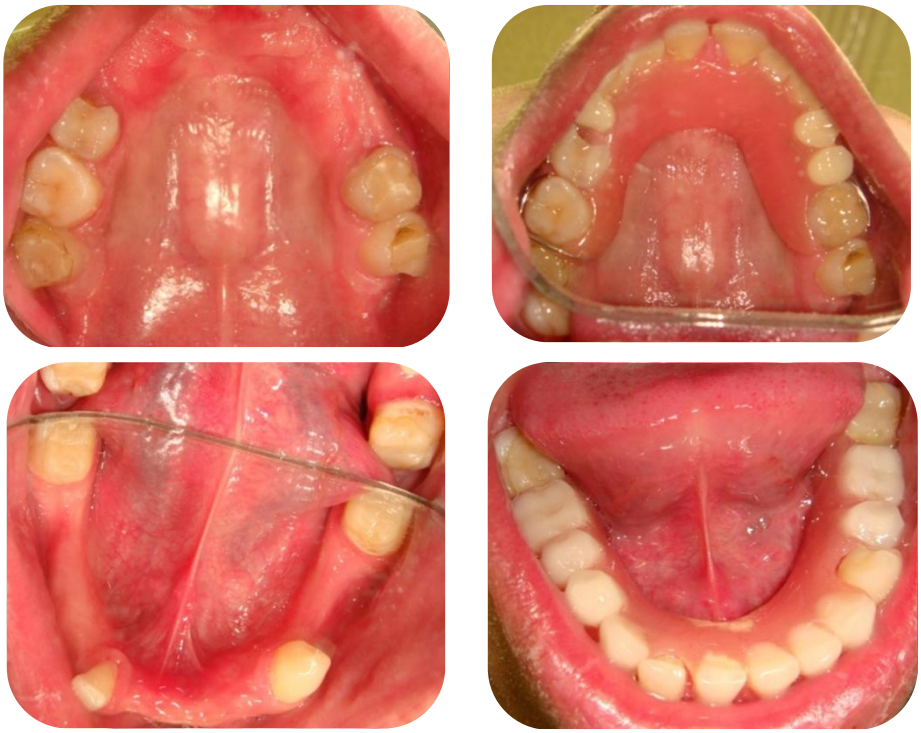

Fig. 6. Maxillary and mandibular arches at 5 years follow-up.

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تقرير علاج حاله نقص حاد في الأسنان

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المستخلص. يستعرض هذا التقرير الخطوات العلاجية التي لتبعت لعلاج صبي يبلغ من العمر ١٤ عاما بالعيادات الاستشاريةوالتخصصية بكلية طب الأسنان – جامعة الملك عبد العزيزحيث كان يعاني من نقض حاد في الأسنان وقد تمتإعادة تأهيل الفكين بتوظيف الحشوات التجميلية لبناء الأسنان الأمامية والخلفيةإضافة إلى الاستعاضات المتحركة لتهيئ الوضع الأمثل للفكين. كان لهذا العلاج أثر ايجابي واضح من الناحية الجمالية والوظيفيةإضافة إلى دعم وتعزيز الحالة النفسية والثقة لدى المريض على مدى ٥ سنوات من المتابعة.