

Hypodontia – Implant supported management – A Case Report

Dr. Suchetana Chakraborty¹, Dr. Debojit Biswas², Alakananda Chowdhury³

^{1,2,3}PG Student, Dept of Orthodontics and Dentofacial Orthopaedics, Haldia institute of Dental Sciences and Research

ABSTRACT

Introduction: Hypodontia is a developmental condition characterized by the congenital absence of one or more teeth excluding the third molars (wisdom teeth). Oligodontia and anodontia are more severe forms of dental agenesis, characterized by the absence of more than six teeth and by the complete absence of teeth, respectively.

Prevalence: Hypodontia of mandibular lateral and central incisors is relatively rare; in fact, with a third molar exclusion, prevalence ranges about 6.1% for the central and 4.3% for the lateral of both congenitally missing teeth in the Mondial population

Case report: A 15 year old male patient reported to the Dept of Orthodontics and Dentofacial Orthopaedics with chief complain of spacing in both the upper and lower front teeth, Angle's Class I molar bilaterally with upper and lower anterior spacing was observed.

Treatment plan: The case was diagnosed as Angle's class i malocclusion with upper and lower anterior spacing . The patient was strapped up with a pre adjusted bracket (MBT) prescription. After space consolidation extraction of retained deciduous teeth was done followed by immediate implant placement.

Discussion: There are several problems arising when hypodontia of mandibular incisors and premolars occurs bilaterally and the chosen treatment plan includes orthodontic space closure followed prosthetic replacement missing premolars.

Conclusion: Early diagnosis and a multidisciplinary approach to treatment, involving orthodontists, prosthodontists, and sometimes geneticists, are crucial for managing this condition effectively.

Key word:- Hypodontia, Implant, Orthodontic space closure, Interdisciplinary treatment

INTRODUCTION

Hypodontia is a developmental condition characterized by the congenital absence of one or more teeth excluding the third molars (wisdom teeth). Oligodontia and anodontia are more severe forms of dental agenesis, characterized by the absence of more than six teeth and by the complete absence of teeth, respectively. Four main theories have been reported about the aetiology of dental agenesis; it might be considered an expression of the evolutionary trend or might be due to environmental or systemic factors such as trauma, inflammation, infections in the jaw or disturbance of the endocrine system [3]. Heredity or familial distribution can be the primary cause, in addition to the hypodontia of lower Incisors, anomalies in the development of the mandibular symphysis may affect the formation of tooth buds [3]. It is the most common dental anomaly and can affect both the primary and permanent dentitions. This condition can have significant implications for dental health, aesthetics, and function. Hypodontia can have significant psychological effects, especially in children and adolescents. Missing teeth can lead to self-consciousness, social anxiety and a reluctance to smile or speak in public. Counselling and support, along with dental treatment, can help mitigate these effects.

Prevalence

Hypodontia of mandibular lateral and central incisors is relatively rare; in fact, with a third molar exclusion, prevalence ranges about 6.1% for the central and 4.3% for the lateral of both congenitally missing teeth in the Mondial population [4]. A higher prevalence can be found in the Japanese, Chinese, and Korean population [5, 6]. According to Polder *et al.*, the mandibular second premolars are the most frequently missing teeth, followed by the maxillary lateral incisors and maxillary second premolars; furthermore, the prevalence of hypodontia can range from 3 to 6.3% and is higher in females than in males [7, 8]

Types of hypodontia

1. Isolated hypodontia: missing teeth without any associated syndromes or other anomalies. It is the most common form.

2. Syndromic hypodontia: missing teeth associated with genetic syndromes such as ectodermal dysplasia, Down's syndrome, cleft lip and palate.

Treatment options

1. Orthodontic treatment: to close the spaces and align the remaining teeth properly.
 - space maintainers: to keep the space open for a potential future implant or bridge if a tooth is congenitally missing.
2. Prosthetic solutions: Dental implants, Bridges, Partial dentures
3. Restorative options: composite restoration, porcelain or composite veneers can be used to improve the appearance of the smile.

CASE REPORT

A 15 year old male patient reported to the Dept of Orthodontics and Dentofacial Orthopaedics with chief complain of spacing in both the upper and lower front teeth. Extra oral examination shows apparently symmetrical mesoprosopic face with straight profile. Lips were competent. Nasolabial angle is 105 degree. Intra oral examination reveals Angle's Class I molar and Angle's Class I molar canine relation bilaterally with upper and lower anterior spacing. Measured overjet was 4mm and overbite was 4mm.

Radiographic examination-Shows all permanent teeth are present in orthopantomogram except
25(Impacted)
32,34,35,42,44(Absent)
65,74,75,84(Retained)

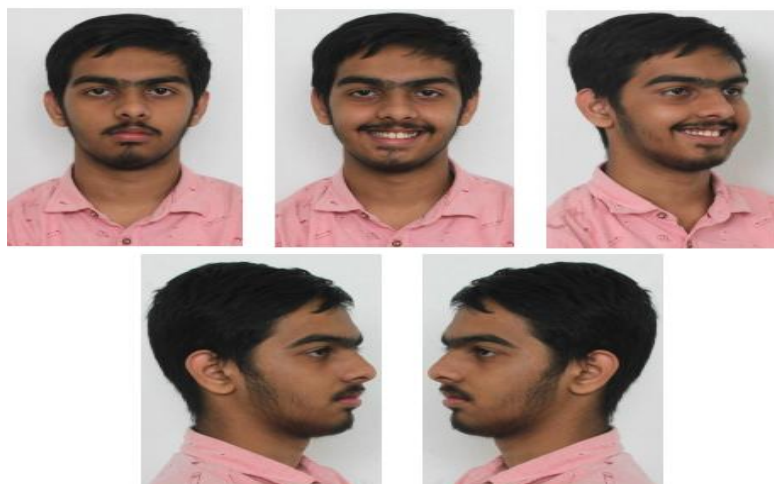
Treatment objectives:

- To correct the axial inclination
- To close the present spaces
- To achieve an ideal overjet and over bite
- To achieve a good profile.
- To achieve a flat occlusal plane.
- To achieve maximum intercuspation in posterior teeth
- To achieve an adequate functional occlusal intercuspation with a class i incisor and molar relationship.
- To achieve adequate soft tissue balance.

Treatment plan: On the basis of above essential and supplemental diagnostic aids, this case is diagnosed as Angle's class i malocclusion with upper and lower anterior spacing.

The patient was strapped up with a pre adjusted bracket (MBT) prescription. Proper wire sequence was followed as a routine protocol. Space consolidation was started on a rigid stainless steel wire. After space consolidation extraction of retained deciduous teeth was done followed by immediate implant placement.

ARIGNNA BHATTACHARIYA PRE-TREATMENT EXTRA ORAL PHOTOGRAPHS



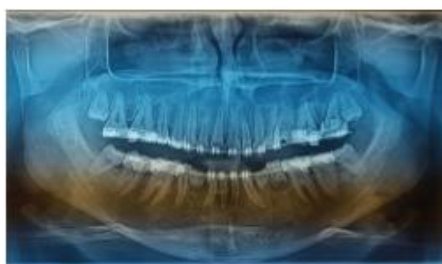
ARIGHNA BHATTACHARIYA
PRE-TREATMENT INTRA ORAL PHOTOGRAPHS



Mid treatment intra oral photographs



CBCT planning was done for proper planning of implant placement





DISCUSSION

There are several problems arising when hypodontia of mandibular incisors and premolars occurs bilaterally and the chosen treatment plan includes orthodontic space closure followed prosthetic replacement missing premolars. In this treatment strategy, the canines are substituted for lateral incisors. According to the literature, it should be pointed out that space closure by protraction of the posterior teeth and canine substitution of congenitally missing lateral incisors is and has been considered an acceptable compromise [9]. This therapeutic choice, from an aesthetic and functional point of view, would be the most conservative treatment with a good aesthetic result. The substitution of canine for missing lateral incisors may produce a tooth size discrepancy with a mandibular anterior excess due to the greater mesiodistal canine diameter (1 mm greater than the lateral incisor), while equality of tooth size can be found between the mandibular first premolar and canine [9,10]. Bolton analysis can be used in order to assess the extent of tooth size discrepancy and to plan its correction; furthermore, it can be used for predetermining the function and aesthetic outcomes [11]. The interproximal reduction of the mandibular teeth may be recommended for achieving adequate interdigitation and ideal overjet and overbite at the end of the orthodontic treatment [9, 12-14]. The forward movement of canines for space closure may expose them to the risks of periodontal complications because of the discrepancy between the width of the alveolar bone and the size of the canine root. Moreover, an early mesial shift of the canines in the incisor area can be usually found, resulting in a well-developed alveolar bone structure [12, 15]. This therapeutic choice, from an aesthetic and functional point of view, would be the most conservative treatment with a better aesthetic result.

Preventive and Long-Term Care

- **Regular Dental Visits:** Ongoing monitoring by a dentist or orthodontist to manage and treat any arising issues effectively.
- **Oral Hygiene:** Maintaining good oral hygiene to prevent complications in the remaining teeth, such as decay or periodontal disease.

CONCLUSION

Hypodontia is a common dental condition with various implications for oral health and overall well-being. Although cases of bilateral agenesis of lower incisors and premolars are relatively rare, the clinical management of this condition always needs a careful diagnosis and treatment planning. Early diagnosis and a multidisciplinary approach to treatment, involving orthodontists, prosthodontists, and sometimes geneticists, are crucial for managing this condition effectively.

Advances in dental technology and genetic research continue to improve the options and outcomes for individuals with hypodontia.

REFERENCES

- [1]. J. H. Nunn, N. E. Carter, T. J. Gillgrass et al., "The interdisciplinary management of hypodontia: background and role of paediatric dentistry," *British Dental Journal*, vol. 194, no. 5, pp. 245–251, 2003.
- [2]. A. H. Al-Ani, J. S. Antoun, W. M. Thomson, T. R. Merriman, and M. Farella, "Hypodontia: an update on its etiology, classification, and clinical management," *BioMed Research International*, vol. 2017, Article ID 9378325, 9 pages, 2017.
- [3]. [3] G. V. Newman and R. A. Newman, "Report of four familial cases with congenitally missing mandibular incisors," *American Journal of Orthodontics and Dentofacial Orthopedics*, vol. 114, no. 2, pp. 195–207, 1998.
- [4]. [4] K. Khalaf, J. Miskelly, E. Voge, and T. V. Macfarlane, "Prevalence of hypodontia and associated factors: a systematic review and meta-analysis," *Journal of Orthodontics*, vol. 41, no. 4, pp. 299–316, 2014.
- [5]. B. N. Satish, P. Kumar, M. Furquan, D. Hugar, and F. K. Saraswati, "Bilateral agenesis of permanent mandibular central incisors: report of two cases," *Journal of International Oral Health*, vol. 6, no. 3, pp. 103–105, 2014.
- [6]. T. Yamaguchi, K. Hosomichi, K. Yano et al., "Comprehensive genetic exploration of selective tooth agenesis of mandibular incisors by exome sequencing," *Human Genome Variation*, vol. 4, no. 1, article 17005, 2017.
- [7]. B. J. Polder, M. A. Van't Hof, F. P. Van der Linden, and A. M. Kuijpers-Jagtman, "A meta-analysis of the prevalence of dental agenesis of permanent teeth," *Community Dentistry and Oral Epidemiology*, vol. 32, no. 3, pp. 217–226, 2004.
- [8]. S. Paduano, R. Rongo, R. Bucci et al., "Is there an association between various aspects of oral health in Southern Italy children? An epidemiological study assessing dental decays, periodontal status, malocclusions and temporomandibular joint function," *European Journal of Paediatric Dentistry*, vol. 19, no. 3, pp. 176–180, 2018.
- [9]. R. A. Simms, "Management of orthodontic treatment when first premolars are substituted for canines," *The Angle Orthodontist*, vol. 47, no. 4, pp. 239–248, 1977.
- [10]. R. Zhang, Y. Bai, and S. Li, "Use of Forsus fatigue-resistant device in a patient with Class I malocclusion and mandibular incisor agenesis," *American Journal of Orthodontics and Dentofacial Orthopedics*, vol. 145, no. 6, pp. 817–827, 2014.
- [11]. E. Lapenaite and K. Lopatiene, "Interproximal enamel reduction as a part of orthodontic treatment," *Stomatologija*, vol. 16, no. 1, pp. 19–24, 2014.
- [12]. P. Curiel and M. Santoro, "Treatment of a patient with a crowded class I malocclusion and a congenitally missing mandibular incisor," *American Journal of Orthodontics and Dentofacial Orthopedics*, vol. 122, no. 6, pp. 661–665, 2002.
- [13]. M. I. Masoud, "Bilateral missing lower permanent incisors: a case report," *Australian Orthodontic Journal*, vol. 29, no. 2, pp. 193–199, 2013.
- [14]. S. E. Barros, G. Janson, F. C. Torres, M. R. de Freitas, and R. R. de Almeida, "Class I malocclusion treatment: influence of a missing mandibular incisor on anterior guidance," *American Journal of Orthodontics and Dentofacial Orthopedics*, vol. 138, no. 1, pp. 109–117, 2010.
- [15]. K. Nagaraj, M. Upadhyay, and S. Yadav, "Mini-implant anchorage for a skeletal class II malocclusion with missing mandibular incisors: a case report," *World Journal of Orthodontics*, vol. 9, no. 2, pp. 155–166, 2008.