

Managing Functional and Aesthetic Rehabilitation Non-Syndromic Oligodontia with Removable Prosthetics

Mega Moeharyono Puteri*, Nadira Jasmin,
Kirana Mahadewi, Tiara Nurramadhanty

Department of Pediatric Dentistry, Faculty of Dental Medicine,
Universitas Airlangga, Surabaya, Indonesia

Jl. Mayjen Prof. Dr. Moestopo No.47, Surabaya, Jawa Timur 60132
Faculty of Dental Medicine, Universitas Airlangga
Surabaya, East Java, Indonesia

*Corresponding author details: Mega Moeharyono Puteri; mega-m-p@fkg.unair.ac.id

ABSTRACT

Background: Oligodontia is defined as a congenital tooth agenesis with the absence of six or more permanent teeth. Oligodontia is a developmental issue during the initial formation and growth stages of teeth that can cause numerical abnormalities. Although it was linked to systemic disorders, it can also be linked to non-syndromic oligodontia. To restore aesthetic, functional, and psychosocial aspects, one of the treatments given to patients with oligodontia is a removable partial denture. **Case:** An 11-year-old male patient came to the Teeth and Mouth Dentistry Hospital Universitas Airlangga accompanied by his mother and grandmother. The patient and his family complained that several of his permanent teeth had not yet erupted. The patient also complained that some of his primary teeth had not yet shed. From radiographic findings, there is agenesis of teeth 14, 15, 24, 25, 34, 35, 44, 45. **Management:** The treatment options offered to patients' removable partial denture to replace missing teeth. **Conclusions:** Removable partial dentures can be used as a treatment option for patients with suspected non-syndromic oligodontia.

Keywords: oligodontia; congenital tooth agenesis; removable partial denture; quality of life.

BACKGROUND

Developmental issues during the initial deficiencies in the first and second stages of tooth formation (also known as the initiation and proliferation phases) can cause numerical abnormalities, including missing teeth (agenesis) or extra teeth (supernumerary). Congenital tooth agenesis refers explicitly to the failure of a tooth to develop, defined as the absence of one or more teeth, excluding third molars. Classification systems typically categorize this condition into three types based on radiographic findings: agenesis of one to five permanent teeth excluding third molars (hypodontia); agenesis of 6 or more permanent teeth excluding third molars (severe hypodontia or oligodontia); and agenesis of all permanent teeth, including third molars (anodontia). [1–5]

Agenesis of a permanent tooth can lead to improper tooth alignment and interfere with typical craniofacial growth, potentially causing issues with eating, speaking, appearance, and emotional well-being. When tooth agenesis occurs alongside craniofacial conditions such as ectodermal dysplasia, cleft lip and palate, or genetic syndromes like Apert syndrome and Crouzon syndrome, it is

classified as syndromic. If no other clinical features are present, the condition is considered non-syndromic. [2]

Oligodontia, characterized by the congenital absence of six or more permanent teeth (excluding third molars). Its prevalence varies by population, ranging from 0.1% to 0.5% depending on ethnicity and region. Oligodontia is reported at 0.14% in Caucasians in North America, Australia, and Europe. While for the Asian population, 0.25% in China and 0.1% in Japan. Although some studies suggest a higher prevalence in females, there is no clear explanation for this difference. [6–8]

Oligodontia is often observed as a feature of systemic disorders such as ectodermal dysplasia, Down syndrome, Nance-Horan syndrome, Rieger syndrome, and cleft lip and palate. In contrast to syndromic oligodontia, non-syndromic cases are typically associated with genetic mutations in genes such as PAX9, AXIN2, EDA, and MSX1, or caused by environmental factors, including drug exposure that affects tooth germ development and nutritional deficiencies.

Although a specific missense mutation (P20L) has been identified in some patients with congenital tooth absence, the definitive cause of non-syndromic oligodontia remains unclear. [1,9,10]

Patients with oligodontia frequently experience psychosocial challenges during childhood and adolescence due to their altered appearance and unclear speech caused by congenital tooth absence. Because any tooth along the dental arch may be missing, it is crucial to carefully assess the number and location of missing and remaining teeth, as well as the condition of the alveolar ridge, when planning treatment. Prosthetic rehabilitation can be accomplished through various approaches, including resin-bonded restorations, fixed dental prostheses (FDP), removable dentures, and dental implants. However, the choice of treatment is often influenced by factors such as the quantity and position of missing teeth, as well as the condition of the remaining teeth and alveolar bone. [1]

CASE PRESENTATION



FIGURE 1: Pre-treatment Intraoral Photograph.



FIGURE 2: Extraoral Photograph.



FIGURE 3: Panoramic Radiograph.

An 11-year-old male patient came to the Teeth and Mouth Dentistry Hospital Universitas Airlangga accompanied by his mother and grandmother. The patient and his family complained that several of his permanent teeth had not yet erupted. The patient also complained that some of his primary teeth had not yet shed. The patient wanted to consult and find a solution to his condition.

After conducting intraoral, extraoral, and panoramic radiographic examinations (Figure 1 - Figure 3), it was found that there were reversible pulpitis of 53, 63, 84 with no mobility, irreversible pulpitis of 64 with 2 degrees of mobility, and gangrene radix on tooth 75, 85. From radiographic findings, there is agenesis of teeth 14, 15, 24, 25, 34, 35, 44, 45.

The patient's facial profile is symmetrical. There was no significant medical history, and the patient was in good mental health. The patient reported no familial history of missing teeth, no prior history of extractions, or previous significant dental treatment. The patient was found to have eight missing teeth, which qualifies as the absence of more than six teeth. Suspecting the diagnosis of non-syndromic oligodontia for the patient. After providing dental health education to the patient and considering the costs, the patient and family opted for removable partial denture treatment.

CASE MANAGEMENT

Prior to the insertion of the removable partial denture, several preliminary treatments must be completed. First, extractions of 64, 75, and 85. Then, the composite strip crown of teeth 53 and 63, followed by the GIC sandwiched technique with composite on teeth 84.

To proceed, impressions were made using elastomeric impression materials. The design of a removable partial denture is as follows (Fig. 4). Clasps are located on teeth 23, 26, 36, and 46, with mesial rests on teeth 36 and 46, and an acrylic plate as the base.

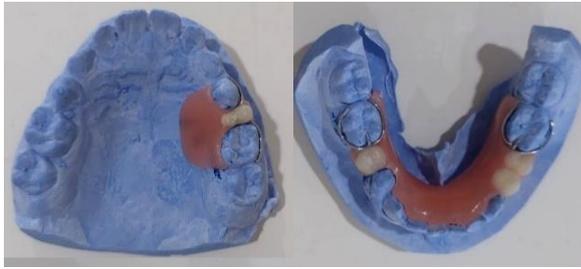


FIGURE 4: Removable Partial Denture Design.



FIGURE 5: Intraoral photograph post-preliminary treatment.



FIGURE 6: Intraoral photograph after removable partial denture insertion.

DISCUSSION

In many patients with oligodontia, there is a congenital delay in the development of permanent teeth along with prolonged retention of primary

teeth. This can lead to unstable bite conditions, including traumatic occlusion and under-occlusion, often caused by root resorption and ankylosis. The extended retention of primary molars beyond their usual exfoliation period is a rare phenomenon referred to as persistence or retention. Few studies have explored this condition in depth. When the crown, roots, and surrounding alveolar bone remain healthy, these retained primary teeth can function effectively for many years, extending into adolescence and adulthood. [1,11]

The absence of developing permanent premolar tooth germs is the most common reason for the prolonged retention of primary molars. Certain syndromes, such as ectodermal dysplasia, are associated with a high number of missing teeth. Additionally, tooth agenesis can result from environmental factors such as trauma, infection, or radiation exposure. Children who lack multiple permanent successor tooth germs are more likely to experience retention of their primary teeth compared to those without premolar agenesis. In this particular case, primary molar retention is suspected. [11] In this case, there is a suspected primary molars retention. Although the teeth were treated for aesthetic purposes, they were not used as anchors.

Oligodontia is a rare genetic disorder that represents the congenital absence of more than six teeth in primary, permanent, or both dentitions, excluding third molars. Oligodontia is often referred to as the severe form of hypodontia. Managing the condition of congenitally missing teeth, in this case severe hypodontia or oligodontia, can be difficult, intricate, and time-consuming, often necessitating a multidisciplinary approach to ensure the best aesthetic and functional results as well as effective treatment planning. It is essential to address the patient's needs in a way that balances both function and appearance. It can be treated either by orthodontically closing the spaces or by creating space for prosthetic replacements. [10,12] After the patient has consulted and taken into account the costs, in this case, the patient prefers to use a removable partial denture.

Using removable dentures for prosthetic rehabilitation in children offers the benefit of easy adjustments as the jawbones grow and develop. It also requires no-minimal preparation of the abutment teeth. A key challenge in providing prosthetic treatment to children is encouraging both the patients and their parents, who might undervalue the importance and advantages of timely intervention. Therefore, applying specialized management and motivational strategies is crucial to ensure the child remains cooperative throughout the treatment process. [13,14]

Ultimately, oligodontia imposes aesthetic, functional, psychosocial, and financial challenges on those affected. For these individuals, oligodontia is a lifelong condition that demands thorough treatment planning to achieve the best possible results.

Treatment strategies also include long-term maintenance and counselling for the patient's family. [15-17]

The primary aim of the treatment of removable partial dentures in this case is to replace missing teeth, helping improve chewing function, restore appearance, prevent undesirable tooth movement, and improve speech, which leads to psychological benefits by boosting the patient's self-confidence and social interactions. A removable partial denture may be preferred due to cost considerations and easier maintenance of oral hygiene. [15,18]

CONCLUSIONS

Removable partial dentures provide a practical and adaptable solution for prosthetic rehabilitation in children with non-syndromic oligodontia, allowing for easy modifications as the jaw develops. However, successful treatment requires motivating both the child and their parents to appreciate the importance of timely intervention. Removable partial dentures not only restore chewing ability, appearance, and speech but also help prevent unwanted tooth movement, ultimately enhancing the patient's self-confidence and social engagement. Their affordability and ease of hygiene maintenance often make them a preferred treatment option in pediatric cases.

REFERENCES

- [1] Kang HG, Huh YH, Park CJ, Cho LR. Rehabilitation of a patient with non-syndromic partial oligodontia. *Journal of Advanced Prosthodontics*. 2016;8(3).
- [2] Baba R, Sato A, Arai K. Consecutive tooth agenesis patterns in non-syndromic oligodontia. *Odontology*. 2022;110(1).
- [3] Al-Ani AH, Antoun JS, Thomson WM, Merriman TR, Farella M. Hypodontia: An Update on Its Etiology, Classification, and Clinical Management. Vol. 2017, *BioMed Research International*. 2017.
- [4] Dean JA. McDonald and Avery's Dentistry For The Child And Adolescent, Eleventh Edition. Elsevier. 2022.
- [5] Yazdizadeh M, Sharifi M, Torabi Parizi A, Alipour F, Ghasempour M, Zanguei E, et al. Dental management of a pediatric patient with progressive familial intrahepatic cholestasis having dental anomalies: a case report and brief review of the literature. *BMC Oral Health*. 2023;23(1).
- [6] Zhou M, Zhang H, Camhi H, Seymen F, Koruyucu M, Kasimoglu Y, et al. Analyses of oligodontia phenotypes and genetic etiologies. *Int J Oral Sci*. 2021;13(1).
- [7] Ren J, Zhao Y, Yuan Y, Zhang J, Ding Y, Li M, et al. Novel PAX9 compound heterozygous variants in a Chinese family with non-syndromic oligodontia and genotype-phenotype analysis of PAX9 variants. *Journal of Applied Oral Science*. 2023;31.
- [8] Goto H, Kimura M, Machida J, Ota A, Nakashima M, Tsuchida N, et al. A novel LRP6 variant in a Japanese family with oligodontia. *Hum Genome Var*. 2021;8(1).
- [9] Aronovich S, Hsieh YL, Conley RS, Stieper B, Yatabe M, Liu F. Interdisciplinary dental management of patient with oligodontia and maxillary hypoplasia: a case report. *BMC Oral Health*. 2022 Dec 1;22(1).
- [10] Mayama H, Kuwajima Y, Da Silva JD, Khorashadi S, Lambert RF, Ishida Y, et al. Cephalometric measurements of non-syndromic oligodontia in early dental age in a Japanese population. *Clin Cosmet Investig Dent*. 2019;11.
- [11] Iraqi G, Helal N, Arafa A, Helal F. Retained Primary Molars and Related Reasons in Umm Al-Qura University, Makkah: A Retrospective Study. *Open Dent J*. 2019;13(1).
- [12] Johal A, Amin M, Dean R. The impact of orthodontic treatment on a young person's quality of life, esthetics, and self-esteem in hypodontia: A longitudinal study. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2023;164(6).
- [13] Goswami M, Chauhan N. Prosthetic Management with Removable Partial Dentures in Pediatric Dental Care: Case Series. *Int J Clin Pediatr Dent*. 2023;16(3).
- [14] Puranik C. Restorative Options for Hypodontia in the Anterior Sextant of Adolescent Patients. *Open Access Journal of Dental Sciences*. 2020;5(4).
- [15] Hiremath MC, Srinath S, Professor A, Hiremath DC. *RGUHS Journal of Dental Sciences* Mallayya C H et al Non-Syndromic Oligodontia: A Case Report CASE REPORT. Vol. 13, *RJDS*. 2021.
- [16] Meade MJ, Dreyer CW. Tooth agenesis: An overview of diagnosis, aetiology and management. Vol. 59, *Japanese Dental Science Review*. 2023.
- [17] Schonberger S, Kadry R, Shapira Y, Finkelstein T. Permanent Tooth Agenesis and Associated Dental Anomalies among Orthodontically Treated Children. *Children*. 2023;10(3).
- [18] Shaha M, Varghese R, Atassi M. Understanding the impact of removable partial dentures on patients' lives and their attitudes to oral care. *Br Dent J*. 2021