



Case Report

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Full-Mouth Rehabilitation of an 18-Year-Old Male with Non-Syndromic Partial Anodontia Using Monobloc Basal Implants and CAD-CAM Polymer Prostheses: A Case Report with 1-Year Follow-Up

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Abstract

Background: Congenital absence of multiple teeth (tooth agenesis) can result in functional impairment, compromised esthetics, and significant psychosocial distress, particularly in adolescents and young adults. Definitive implant-supported rehabilitation is generally recommended only after completion of craniofacial growth to avoid infra-position and esthetic complications. **Case presentation:** An 18-year-old male presented with partial anodontia, with only 18 teeth present in the oral cavity, including over-retained primary teeth. The patient's chief complaints were difficulty in mastication and social embarrassment. Clinical and radiographic evaluation revealed a non-syndromic pattern of tooth agenesis. Full-mouth rehabilitation was performed using monobloc basal dental implants and CAD-CAM fabricated polymer-based fixed prostheses (SAPTeeth™). Natural teeth were endodontically treated and restored with full-coverage crowns. Immediate implant loading was performed in selected regions using a flapless approach. **Results:** At 1-year follow-up, the patient demonstrated stable peri-implant tissues, satisfactory occlusion, and no biological or mechanical complications. The patient reported marked improvement in function and quality of life. **Conclusion:** Implant-supported full-mouth rehabilitation using monobloc basal implants and polymer-based CAD-CAM prostheses may be a viable treatment option in carefully selected young adults with completed growth and severe tooth agenesis.

Keywords: Partial anodontia, Tooth agenesis, Basal implants, CAD-CAM prosthesis, Full-mouth rehabilitation, Polymer prosthesis.

INTRODUCTION

Tooth agenesis is one of the most common developmental anomalies of the craniofacial complex and includes hypodontia and oligodontia, depending on the number of missing teeth [1]. Severe forms can significantly compromise mastication, speech, facial esthetics, and psychosocial well-being [2].

Management of such patients requires long-term planning and often a multidisciplinary approach involving pediatric dentistry, orthodontics, prosthodontics, and oral and maxillofacial surgery [3]. Dental implants offer a predictable restorative option; however, their placement in adolescents is controversial due to ongoing craniofacial growth and the risk of infra-occlusion [4,5]. Once growth is complete, definitive implant-supported rehabilitation may be considered [3-5].

This case report describes the comprehensive rehabilitation of an 18-year-old male with non-syndromic partial anodontia using monobloc basal implants and CAD-CAM polymer-based fixed prostheses, with a 1-year clinical follow-up.

CASE PRESENTATION

Patient information

An 18-year-old male reported to the clinic with the chief complaint of missing teeth leading to difficulty in chewing and social discomfort. The patient expressed dissatisfaction with his appearance and reported reduced confidence during social interactions.

Medical history was non-contributory. No systemic abnormalities were detected. Family history revealed a similar dental condition in the patient's younger sister, suggesting a possible hereditary pattern, although no syndromic features were present.

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CLINICAL FINDINGS

(As shown in Figure 1 and Figure 2)

Intra-oral examination revealed only 18 teeth present in the oral cavity. The teeth present according to the FDI notation were:

Permanent Teeth (#): 17, 16, 13, 11, 21, 23, 27, 47, 45, 43, 42, 33, 35, 37

The teeth 66, 76, and 86 were over-retained primary molars. No teeth were extracted as part of the treatment.

Extra-oral examination showed normal facial proportions with no dysmorphic features.



Figure 1: Pre-treatment extra-oral photographs



Figure 2: Pre-treatment intra-oral photographs

DIAGNOSTIC ASSESSMENT

Panoramic radiography (as shown in Figure 3) confirmed the absence of multiple permanent tooth germs and the presence of retained primary teeth, consistent with a diagnosis of non-syndromic partial anodontia (severe hypodontia/oligodontia) [1-6].



Figure 3: Pre-treatment panoramic radiograph

Based on the patient's age (18 years), clinical assessment, and psychological concerns, definitive implant-supported full-mouth rehabilitation was planned.

TREATMENT PLANNING

The primary treatment objectives were:

- Restoration of functional mastication
- Improvement of dental esthetics and facial harmony
- Enhancement of psychosocial well-being
- Provision of a stable, long-term fixed prosthetic solution

The treatment plan included:

- Endodontic treatment of all salvageable natural teeth
- Full-coverage crown preparation ("crown cutting")
- Placement of immediate loading monobloc basal dental implants
- Fabrication of CAD-CAM polymer-based fixed prostheses (SAPTeeth™)

CLINICAL PROCEDURE

Endodontic and tooth preparation phase

All retained permanent and primary teeth deemed restorable underwent root canal treatment. Following endodontic therapy, tooth preparation was performed to receive full-coverage crowns, ensuring adequate ferrule and occlusal alignment.

Implant placement

Monobloc basal dental implants were placed in the 41, 31, 22 regions using a flapless surgical technique. Immediate loading was performed in these regions. No bone grafting procedures were required.

Immediate loading protocols have been reported to be successful in carefully selected cases when primary stability and controlled occlusion are achieved [7,8].

Prosthetic rehabilitation

Digital impressions were obtained, and prostheses were designed using CAD-CAM technology (as shown in Figure 4). A polymer-based prosthetic system (SAPTeeth™) was selected due to its favorable biomechanical properties, including lower elastic modulus and shock-absorbing characteristics, which may reduce stress transmission to implants and supporting structures [9-11].

The definitive fixed prostheses were delivered in both arches. A canine-guided occlusal scheme was established to minimize lateral forces on the restorations [12].

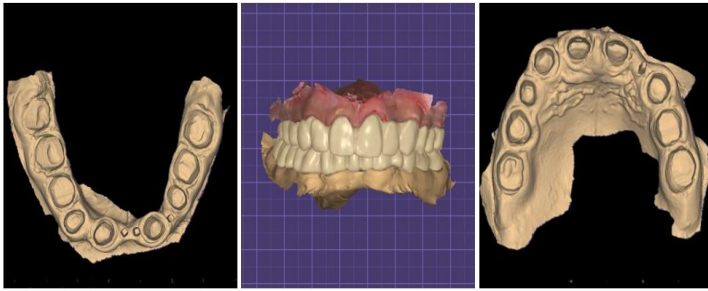


Figure 4: CAD-CAM design screenshots



Figure 5: Final intra-oral and extra-oral photographs

Outcome and Follow-Up

The patient was reviewed periodically over a 1-year follow-up period. Clinical and radiographic evaluation revealed:

- Healthy peri-implant soft tissues
- Stable occlusion
- No prosthetic fractures or loosening
- No implant failure

The patient reported excellent masticatory efficiency and expressed high satisfaction with the esthetic and functional outcome.



Figure 6: One-year follow-up

DISCUSSION

Severe tooth agenesis presents complex functional and psychosocial challenges that often necessitate definitive fixed rehabilitation once growth is complete [2,3]. Although implant placement in adolescents remains controversial, careful case selection and timing allow predictable outcomes [4,5].

Monobloc basal implants engage cortical bone and have been proposed as a treatment option in compromised dentitions, with reports of acceptable survival rates when proper biomechanical principles are followed [7,13].

The use of polymer-based CAD-CAM prostheses offers potential advantages over rigid ceramic materials by providing improved stress distribution and shock absorption, which may be beneficial in full-arch implant restorations [9-11].

The limitation of this report is its single-case design and limited follow-up duration. Long-term studies are required to validate the durability of polymer-based prostheses in such rehabilitations.

CONCLUSION

This case demonstrates that full-mouth rehabilitation using monobloc basal implants and CAD-CAM polymer-based fixed prostheses can successfully restore function, esthetics, and quality of life in a young adult with severe non-syndromic tooth agenesis, provided growth completion and meticulous planning are ensured.

Ethical Statement

Written informed consent was obtained from the patient for treatment and for publication of clinical details, radiographs, and photographs. All procedures were performed in accordance with the ethical standards of institutional and national research committees and with the principles outlined in the Declaration of Helsinki.

Conflicts of Interest

The author reports no conflicts of interest.

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