

A modified Essix-based transitional prosthesis for replacement of a mandibular central incisor in a growing adolescent: A case report

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Abstract

Anterior tooth loss in children and adolescents presents a clinical challenge because treatment must restore esthetics and function while accommodating ongoing craniofacial growth and changes in the developing dentition. Conventional removable partial dentures may provide an interim replacement; however, their bulk, retention requirements, and patient acceptance may affect compliance. Essix appliances offer a lightweight, esthetic, and minimally invasive alternative that can be adapted to the existing dentition and modified to replace a missing anterior tooth. This case report describes the management of a 13-year-old male patient with a missing mandibular left central incisor following extraction of a previously fractured tooth. A conventional removable partial denture had initially been provided; however, the patient demonstrated poor compliance with its use. Considering the patient's age, esthetic concerns, ongoing dental development, and need for a conservative interim prosthesis, a modified Essix-based transitional prosthesis was fabricated. The appliance utilized the remaining dentition for retention and incorporated a replacement tooth corresponding to the missing mandibular left central incisor. Following delivery, satisfactory adaptation, retention, esthetics, and comfort were observed. The patient reported greater acceptance of the appliance compared with the previously provided removable partial denture. This case highlights the potential use of a modified Essix-based transitional prosthesis as a conservative and reversible option for anterior tooth replacement in growing adolescents, particularly when conventional removable prostheses are poorly accepted.

Keywords: Essix appliance, pediatric prosthodontics, interim prosthesis, anterior tooth loss, removable partial denture, adolescent dentistry

Introduction

Anterior tooth loss in children and adolescents can have considerable esthetic, functional, phonetic, and psychosocial consequences. Management of a missing anterior tooth in a growing patient requires consideration of craniofacial growth, developing dentition, occlusal relationships, and the timing of definitive rehabilitation. Interim prosthetic treatment should therefore restore esthetics and function while minimizing interference with normal growth and avoiding unnecessary alteration of the remaining permanent teeth ^[1].

Conventional acrylic removable partial dentures have traditionally been used for interim replacement of missing anterior teeth. Although they can provide satisfactory tooth replacement, their bulk, retention requirements, and potential effects on comfort and speech may influence patient acceptance and compliance ^[1]. In adolescents, esthetic concerns may further affect willingness to wear a conventional removable prosthesis.

The Essix appliance was initially introduced as an orthodontic retention appliance and subsequently gained applications in provisional prosthetic rehabilitation ^[2, 3]. It is a removable thermoplastic appliance that derives retention primarily through adaptation to the contours and natural undercuts of the existing dentition. Its relatively thin and lightweight design, favorable esthetics, and ease of modification make it useful when a conservative interim prosthesis is required ^[2, 3].

Essix appliances have been described for replacement of missing anterior teeth and as provisional anterior prostheses. Sheridan *et al* ^[3] described the use of Essix technology for fabrication of temporary anterior bridges, while Moskowitz *et al* ^[4] reported its use as a provisional anterior prosthesis. A modified Essix retainer has also been described as a provisional restoration for a child with an extensively fractured anterior tooth ^[5]. Banu *et al* ^[6] subsequently reported the use of a modified Essix retainer incorporating pontics for rehabilitation of anterior tooth loss in a 7-year-old child.

The present case describes the use of a modified Essix-based transitional prosthesis in a 13-year-old adolescent who demonstrated poor compliance with a conventional removable partial denture following extraction of a fractured mandibular central incisor. The report emphasizes a conservative approach to interim anterior tooth replacement that preserves the remaining dentition while accommodating ongoing growth and dental development.

Case Presentation

Clinical Findings

A 13-year-old male patient reported to the Department of Paediatric and Preventive Dentistry for evaluation of an interim replacement for a missing mandibular anterior tooth. The patient had a history of trauma to the mandibular anterior region approximately seven years previously following a fall from a bicycle at the age of six years.

The mandibular left central incisor (31) had sustained a root fracture associated with pulpal and clinical symptoms and was subsequently extracted because of an unfavorable prognosis. The extraction had been performed before the present prosthetic rehabilitation. Following extraction, a conventional removable partial denture had initially been provided to replace the missing mandibular central incisor. However, the patient demonstrated poor compliance with the appliance and reported difficulty with its regular use. He

was therefore referred for reassessment and consideration of an alternative interim prosthetic option.

On clinical examination, the mandibular left central incisor was absent, resulting in an anterior edentulous space. The remaining mandibular anterior teeth were clinically satisfactory and were considered suitable for retention of a thermoplastic appliance. The primary concern at presentation was the lack of regular use of the conventional removable partial denture and the resulting absence of an acceptable anterior tooth replacement.



Fig 1: Intraoral clinical appearance showing the missing mandibular left central incisor and the anterior edentulous space.

Clinical Assessment

Clinical assessment included evaluation of the edentulous space, condition of the remaining dentition, occlusal relationship, and suitability of the existing teeth for retention of a thermoplastic appliance.

The previously provided removable partial denture was also evaluated. Although it was intended as an interim replacement, the patient reported poor compliance with its use. The patient's age, ongoing dental development, and the need to preserve the adjacent permanent teeth were considered during treatment planning.

Treatment Planning

Considering the patient's previous difficulty with the conventional removable partial denture, an alternative interim prosthetic approach was planned.

At 13 years of age, the patient was undergoing continued dental and craniofacial development. Considering these factors and the need to avoid irreversible alteration of the remaining permanent teeth, definitive fixed or implant-supported rehabilitation was deferred. A removable and reversible prosthesis was considered more appropriate for the interim management of the edentulous space.

A modified Essix-based transitional prosthesis was planned to replace the missing mandibular left central incisor. The treatment objectives were to restore anterior esthetics, provide satisfactory retention and comfort, avoid

preparation of the remaining permanent teeth, and allow future modification or replacement as the dentition developed.

Impression Procedure

Maxillary and mandibular impressions were obtained to record the existing dentition and the mandibular anterior edentulous region accurately. The impressions were subsequently used to prepare the working casts for fabrication of the transitional prosthesis.

Laboratory Fabrication

A modified Essix-based transitional prosthesis was fabricated on the working cast using the existing dentition for retention and incorporating a replacement tooth corresponding to the missing mandibular left central incisor. The thermoplastic material was adapted over the selected teeth to obtain retention through the natural contours and undercuts of the dentition. A replacement tooth was incorporated into the appliance to restore the appearance of the missing mandibular central incisor.

The appliance was trimmed and finished to provide smooth borders and adequate adaptation while minimizing potential irritation of the gingival and soft tissues. No preparation, reduction, or alteration of the remaining permanent teeth was required.



Fig 2: Laboratory fabrication of the modified Essix-based transitional prosthesis with the incorporated replacement tooth.

Clinical Delivery and Occlusal Adjustment

Before insertion, the borders and surfaces of the appliance were evaluated and finished to eliminate sharp or irregular areas that could cause soft-tissue irritation. the appliance



Fig 3: Intraoral delivery and adaptation of the modified Essix-based transitional prosthesis.

Occlusion was evaluated to ensure that the appliance did not interfere with the existing occlusal relationship. Necessary adjustments were performed to obtain satisfactory fit, retention, comfort, and occlusal harmony.

The patient and parent were instructed regarding insertion and removal of the appliance, oral hygiene, cleaning, storage, and appropriate appliance use. They were also advised to report any discomfort, loss of retention, or soft-tissue irritation.

Follow-up and Outcomes

The patient was recalled at 1 month, 3 months, and 6 months following delivery of the modified Essix-based transitional prosthesis. At the 1-month follow-up, the appliance demonstrated satisfactory fit and retention, with no evidence of soft-tissue irritation or discomfort. The replacement tooth remained stable and provided satisfactory esthetic appearance. The patient and parent reported good acceptance and regular use of the appliance.

At the 3-month follow-up, satisfactory adaptation and retention were maintained. The replacement tooth remained stable, and no significant changes in occlusion or the position of the adjacent teeth were observed. Oral hygiene was satisfactory, and no adverse effects related to appliance use were noted. The patient continued to report satisfactory comfort and acceptance.

At the 6-month follow-up, the appliance continued to provide satisfactory esthetics, retention, and comfort. No clinically significant soft-tissue changes or complications were observed. The remaining mandibular anterior teeth remained clinically healthy, with no preparation or alteration required. The patient continued to use the appliance satisfactorily.

At each follow-up visit, the appliance was assessed for retention, adaptation, soft-tissue health, oral hygiene, and overall patient acceptance. The patient and parent were reinforced regarding appropriate insertion and removal, cleaning, storage, and the need to report any discomfort, loss of retention, or damage to the appliance. Continued periodic follow-up was advised because of the patient's age and ongoing dental development, with future modification or replacement of the appliance anticipated as required.

was inserted intraorally, and its adaptation and retention were evaluated. The position and appearance of the replacement tooth were assessed in relation to the adjacent teeth and the edentulous space.

Discussion

The loss of a permanent anterior tooth in an adolescent presents a complex restorative challenge. In addition to restoring esthetics and function, treatment must account for continuing craniofacial growth, eruption and positional changes of the remaining permanent teeth, and the timing of definitive rehabilitation. A conservative interim prosthesis may therefore be appropriate during active growth and dental development.

In the present case, a conventional removable partial denture had initially been provided following extraction of the fractured mandibular left central incisor. However, the patient demonstrated poor compliance with its use. The effectiveness of a removable prosthesis depends not only on its clinical design but also on regular patient use. Consequently, the treatment objective in this case was to provide an alternative prosthesis that was conservative, esthetically acceptable, and suitable for use during continued growth.

Conventional acrylic removable partial dentures remain a practical option for interim replacement of missing anterior teeth. However, their acrylic bulk and prosthetic components may influence comfort, speech, esthetics, and patient acceptance ^[1]. These considerations can be particularly relevant in adolescents, for whom the visibility and perceived bulk of a removable appliance may affect willingness to wear it.

Essix appliances provide an alternative approach to interim tooth replacement. Retention is primarily obtained through adaptation of the thermoplastic material to the contours and natural undercuts of the existing dentition. Sheridan *et al* ^[2], described Essix appliances as orthodontic retainers, and subsequent work demonstrated their application in temporary anterior bridge fabrication ^[3]. The thin and relatively transparent nature of the material provides an esthetic alternative to appliances with visible metallic components.

Moskowitz *et al* ^[4], described Essix appliances as provisional anterior prostheses for patients requiring temporary replacement of anterior teeth. Their use illustrates the versatility of thermoplastic appliances in situations

where conventional prosthetic treatment may not be desirable or appropriate.

The pediatric application of modified Essix appliances has also been reported. Blake *et al* [5], described the use of an orthodontic thermoplastic retainer as a provisional anterior restoration in a child with an extensively fractured anterior tooth. Banu *et al* [6], subsequently reported rehabilitation of anterior tooth loss in a 7-year-old child using a modified Essix retainer incorporating pontics. These reports demonstrate the potential applicability of modified thermoplastic appliances as conservative interim solutions in pediatric patients.

In the present case, the patient's age and ongoing dental development were important considerations in treatment selection. A removable appliance allowed the missing tooth to be replaced without irreversible preparation of the adjacent permanent teeth. Furthermore, the prosthesis could be monitored and modified or replaced if changes occurred in the developing dentition. This characteristic is particularly relevant when definitive rehabilitation needs to be deferred.

Preservation of the remaining permanent teeth was another important consideration. The modified Essix-based transitional prosthesis required no preparation or reduction of the adjacent teeth. Avoiding unnecessary removal of healthy permanent tooth structure is advantageous in young patients and allows future definitive treatment to be planned according to the patient's dental and skeletal development.

Patient acceptance was also relevant in this case. The previously provided removable partial denture had not been used consistently. The modified Essix-based prosthesis was selected as an alternative because of its relatively thin profile, esthetic appearance, and removable nature. The patient subsequently reported greater acceptance of the appliance. However, because this observation was based on a single case and was not assessed using a standardized compliance or patient-satisfaction scale, it should not be interpreted as evidence that Essix appliances universally improve compliance.

Another advantage of the Essix-based design is its esthetic appearance. The transparent thermoplastic material minimizes the visibility of the appliance and avoids the metallic clasps commonly associated with conventional removable partial dentures. This characteristic may be particularly valuable for adolescents with concerns regarding their appearance.

The removable nature of the prosthesis also facilitates oral hygiene and allows periodic clinical assessment. As eruption and positional changes of the permanent dentition occur, the appliance can be adjusted or replaced. This provides a transitional approach that can bridge the period between tooth loss and definitive rehabilitation.

The present case differs from previously reported pediatric applications in that the modified Essix-based transitional prosthesis was used specifically for replacement of a mandibular central incisor in a growing adolescent who had demonstrated poor acceptance of a conventional removable partial denture. The clinical value of the approach therefore lies in its use as an alternative, conservative transitional option tailored to the patient's needs rather than in the introduction of an entirely new prosthetic concept.

Despite its advantages, the appliance should be regarded primarily as an interim solution. Its clinical performance depends on adequate adaptation and retention, appropriate

appliance design, patient compliance, and regular follow-up. Changes in tooth eruption, tooth position, occlusion, alveolar ridge contour, or appliance integrity may necessitate modification or replacement. Appropriate oral hygiene instructions are also essential because removable thermoplastic appliances may contribute to plaque accumulation if inadequately cleaned.

Treatment planning for anterior tooth loss in adolescents should therefore be individualized. Although conventional removable partial dentures may provide satisfactory tooth replacement, factors such as comfort, esthetics, retention, and patient acceptance can influence their clinical usefulness. A modified Essix-based transitional prosthesis may be considered when a conservative, removable, and esthetic interim solution is required.

The main limitation of this report is that it describes a single clinical case and therefore cannot establish the long-term effectiveness or superiority of the modified Essix-based prosthesis over conventional removable partial dentures. In addition, patient acceptance was based on clinical observation and subjective reporting rather than a standardized assessment. Further clinical studies with longer follow-up and standardized patient-reported outcome measures would be useful to evaluate the durability, acceptance, and clinical performance of such appliances in growing patients.

Clinical Significance

- A modified Essix-based transitional prosthesis can provide an esthetic interim replacement for an anterior tooth in a growing adolescent.
- It may be considered when a conventional removable partial denture is poorly tolerated or inconsistently used.
- The appliance can provide tooth replacement without preparation or irreversible alteration of the adjacent permanent teeth.
- Its thin and relatively lightweight design may enhance comfort and esthetic acceptability.
- The removable design permits monitoring, modification, or replacement as the dentition develops.
- It may serve as a transitional prosthesis until definitive rehabilitation becomes appropriate following further growth and dental development.

Conclusion

Anterior tooth loss in a growing adolescent requires a treatment approach that balances esthetic and functional rehabilitation with preservation of the developing dentition. In the present case, a modified Essix-based transitional prosthesis provided interim replacement of a missing mandibular left central incisor following poor acceptance of a conventional removable partial denture.

The appliance provided satisfactory adaptation, retention, esthetics, and comfort without requiring preparation of the adjacent permanent teeth. Its removable and reversible nature also permitted continued monitoring during dental development.

Although the findings are limited to a single case, this report highlights the potential role of a modified Essix-based transitional prosthesis as a conservative interim option for anterior tooth replacement in growing adolescents, particularly when conventional removable prostheses are poorly accepted.

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