# INTERIM PROSTHETIC ALTERNATIVES FOR PAEDIATRIC PATIENTS: BRIDGING THE GAP UNTIL DEFINITIVE CARE

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**Abstract**

Early loss of mandibular first permanent molars in children poses significant restorative challenges due to ongoing craniofacial growth and unsuitability of definitive treatments such as implants or fixed prosthesis. These molars are key to maintaining occlusal harmony and arch integrity; their premature loss can result in drifting of adjacent teeth, supra-eruption of antagonists, and impaired function. Interim prostheses, including single tooth removable partial dentures (RPDs), Essix retainers, and flexible dentures, offer conservative, reversible, and cost-effective means to manage space and function in growing patients. These modalities align with the principles of pediatric dentistry, emphasizing minimally invasive treatment and growth consideration, while bridging the gap to definitive care.

Keywords: Interim prosthesis, pediatric prosthodontics, single tooth RPD, Essix retainer, permanent molar loss

## INTRODUCTION

The mandibular first permanent molar is among the earliest posterior teeth to erupt, typically around the age of six, and plays a foundational role in establishing proper occlusion, maintaining vertical dimension, and guiding eruption of adjacent teeth. Due to its early emergence, prolonged exposure to the oral environment, and deep pits and fissures, it is highly susceptible to dental caries, especially in children with poor oral hygiene or limited access to preventive care. Consequently, it is one of the most frequently extracted teeth in the pediatric population.

Premature loss of this key tooth during the mixed dentition stage poses significant clinical challenges. The absence of the first molar can result in undesirable sequelae such as mesial migration and tipping of the second molar, loss of arch length, supra-eruption of the maxillary antagonist, impaired mastication, and altered occlusal development. If left untreated, these changes can compromise permanent dentition alignment, necessitate future orthodontic intervention, and adversely affect facial growth patterns.

From a prosthodontic consideration, restoration of the lost permanent molar ideally involves options such as fixed partial dentures (FPDs) or endosseous implants. However, such definitive treatments are contraindicated in growing patients due to the potential for infra-occlusion and disruption of craniofacial growth. Moreover, financial constraints often limit access to advanced prosthodontic care, particularly in low-income or underserved populations.

In these circumstances, interim prosthetic solutions play a vital role. Removable partial dentures (RPDs), including single tooth replacements and vacuum-formed appliances like Essix retainers, offer practical, reversible, and cost-effective alternatives to maintain space, preserve arch integrity, support function, and meet esthetic needs during the transitional phase of growth. These approaches are particularly significant in pediatric dentistry, where treatment planning must consider the dynamic nature of growth and development alongside psychosocial factors such as self-

esteem and peer perception.

**Case 1: Single Tooth Removable Partial Denture (RPD) with Clasp Retention**

**Patient Profile:**

A 13-year-old male patient reported to the the Department of Pediatric and Preventive Dentistry of GNDDC, Sunam with a missing mandibular right first permanent molar (tooth #46), (FIG: 1) which had been extracted due to extensive carious destruction and failed endodontic therapy. The patient was in the late mixed dentition phase, and clinical examination revealed intact adjacent teeth with no significant space loss or tilting. The patient and parents expressed concerns regarding mastication and future alignment of the arch.

**Treatment Considerations:**

Given the patient's age, ongoing skeletal growth, and the contraindication of implants or fixed partial dentures at this stage, an interim prosthesis was considered the most appropriate management approach. A single tooth removable partial denture (RPD) was planned to maintain space and restore occlusal function until definitive treatment could be initiated post-growth.

Procedure:

- **Impression and Cast:** Maxillary and mandibular alginate impressions were made and poured in type III dental stone to obtain study casts.
- **Design:** A single tooth RPD was designed to replace tooth #46. The prosthesis was fabricated using heat-cured acrylic resin, incorporating C- clasp on the adjacent second premolar (#45) and molar (#47) (FIG: 2) for mechanical retention.
- **Try-in and Adjustment:** The appliance was tried intraorally to assess fit, retention, and occlusion. Minor adjustments were made to ensure passive fit and avoid soft tissue impingement.
- **Delivery and Instructions:** The patient was instructed to wear the appliance during the day, remove it at night, and maintain hygiene by cleaning the denture after meals. Dietary advice and instructions on insertion/removal were provided.

**Outcome:**

The patient adapted well to the prosthesis, with reported improvement in mastication and phonetics. On follow-up after two weeks, no ulceration or discomfort was noted. The appliance was well maintained, and regular reviews were scheduled to monitor eruption patterns and the need for future orthodontic or prosthetic intervention.

**Figure No. 1: Preoperative (w.r.t 46)**

**Figure No. 2 : Postoperative (w.r.t 46 single tooth RPD)**

**Clinical Significance:**

This case highlights the utility of a simple, cost-effective single tooth RPD in a growing child to preserve space, maintain function, and support occlusal development following early molar loss.

**Case 2: Essix Retainer for Posterior Tooth Replacement**

Essix retainers are transparent, removable, thermo plastic appliances commonly used in orthodontics for retention after treatment. They are fabricated using

vacuum-formed sheets of clear plastic over a dental cast and are designed to fit snugly over the dental arches. While primarily used to maintain tooth positions, they can also be modified to include prosthetic teeth (pontics) to temporarily replace missing teeth, particularly in esthetically sensitive or space-critical areas.

In pediatric patients and adolescents where fixed options like implants and FPDs are contraindicated due to ongoing skeletal growth, Essix retainers serve as valuable interim prostheses. Their advantages include excellent esthetics, minimal bulk, non-invasiveness, and ease of fabrication and removal. They are especially suitable when the goal is to maintain space, support esthetics, and provide moderate function until definitive rehabilitation is possible.

**Clinical Case**

**Patient Profile:**

A 14-year-old female patient reported to the Department of Pedodontics with a missing mandibular right first permanent molar (tooth #36), (FIG: 3) extracted previously due to extensive caries. The patient expressed concern about the visible gap during speech and function. No significant orthodontic abnormalities were noted, and space maintenance was deemed essential to prevent mesial drift of the second molar and overeruption of the maxillary antagonist.

**Treatment Plan:**

Considering the age, growth status, and the patient's esthetic concern, a vacuum-formed Essix retainer with a posterior pontic was chosen as the interim prosthetic solution.

**Procedure:**

- **Impressions and Model Preparation:** Maxillary and mandibular impressions were taken using alginate and poured in type III dental stone to create working casts.
- **Pontic Construction:** On the mandibular cast, a tooth-colored acrylic pontic was sculpted in the edentulous area corresponding to tooth #36. (FIG: 4)
- **Fabrication of Essix Retainer:** A 1.5 mm thick clear thermoplastic sheet was adapted over the modified cast using a vacuum-forming machine. The formed sheet was trimmed precisely to follow the gingival contour, ensuring comfort and esthetic coverage without impinging on soft tissues.
- **Try-in and Adjustment:** The appliance was inserted and checked for fit, retention, esthetics, and comfort. Occlusion was evaluated to ensure the pontic did not interfere with normal mandibular movements.
- **Instructions and Delivery:** The patient and guardian were educated about appliance care, including regular cleaning, safe insertion/removal, and avoiding hot water that could distort the retainer. The retainer was to be worn throughout the day, except during meals.

**Figure No. 3: Preoperative (w.r.t 36)**

**Figure No. 4: Postoperative (w.r.t 36 essix retainer)**

**Outcome**

The Essix retainer was well-tolerated, offering an esthetic and space-maintaining solution with acceptable

functional performance. The patient reported improved confidence during speech and social interaction. Follow-up after one month showed good compliance and hygiene with no soft tissue irritation or loss of retention.

**Clinical Relevance:**

This case underscores the versatility of Essix retainers in pediatric interim prosthodontics. By incorporating a posterior pontic, they can serve as a discrete and comfortable alternative to traditional RPDs, particularly in cooperative adolescent patients concerned with appearance and comfort.

**Discussion**

Premature loss of mandibular first permanent molars (FPMs) in pediatric and adolescent patients is frequently encountered in clinical practice. If extraction is unavoidable, space maintenance is essential to prevent arch collapse, canine impaction, and malocclusion, as supported by systematic evidence on space maintainers in mixed dentition. Maintaining post-extraction space ensures proper eruption of adjacent teeth, preserves masticatory efficiency, and supports normal facial growth patterns.

Definitive fixed prosthodontic solutions are generally contraindicated in young patients due to ongoing skeletal development; implants carry a risk of infra-occlusion, and fixed appliances may disrupt jaw growth. In contrast, interim appliances—such as removable partial dentures (RPDs), Essix retainers, and flexible dentures made from materials like Valplast (nylon-based thermoplastic)—provide a less invasive and adaptable bridge to definitive treatment.

Flexible dentures composed of nylon thermoplastic offer not only aesthetic appeal but also functional space maintenance, better tissue adaptation, and increased comfort, without requiring abutment tooth preparation. These advantages contribute to improved compliance and reduced psychological stress in children. Similarly, the literature emphasized the value of flexible prostheses for pediatric cases, demonstrating their durability, stress distribution, and esthetic benefits. Regarding Essix retainers, comparative studies reveal that their clinical effectiveness in maintaining arch dimensions is comparable to traditional Hawley retainers, with additional benefits such as improved esthetics and patient comfort. The literature supports that Essix retainers effectively

preserve proximal contacts with relatively low contact loss (~15%), minimizing periodontal complications.

In present cases, the RPD (Case 1) provided a stable, cost-effective option using C-clasps, without impeding facial growth. In Case 2, the Essix retainer achieved excellent esthetics with minimal invasiveness, although it supported only limited masticatory function. These outcomes align with literature supporting non-invasive, adaptable interim modalities during growth.

In pediatric dentistry, several other space maintenance methods have proven effective and evidence-based:

Band-and-Loop (B&L) Space Maintainer: A conventional fixed device cemented to an adjacent molar band with a stainless-steel loop. Systematic reviews report high retention (up to 52 months) though decementation is a common failure mode.

Crown-and-Loop (C&L): Similar to B&L but using a stainless-steel crown as the anchor. Clinical evaluations have shown longer survival and greater retention compared to B&L.

Direct-Bonded Wire (DBW) and Tube-and-Loop (T&L): These bonded appliances avoid gingival trauma and require less lab involvement but show slightly shorter survival times and are technique-sensitive.

Fiber-Reinforced Composite (FRC) Space Maintainers: These esthetic, minimally invasive devices (e.g., Ribbond) have shown comparable survival rates to B&L in 12–18 month follow-ups. They are well accepted by children due to comfort and improved appearance.

Lower Lingual Holding Arch (LLHA): Effective in bilateral cases, LLHA prevents mesial migration of molars and maintains arch length during mixed dentition.

The selection of an appropriate space maintainer must consider survival rate, ease of fabrication, esthetic demand, patient compliance, and eruption timing. These modalities when used judiciously preserve oral structures, maintain function and space, and support the child's emotional and social development.

The incorporation of contemporary materials like thermoplastic Valplast and fiber-reinforced composites provides clinicians with additional tools to achieve space maintenance without compromising esthetics or function. Future comparative studies will further clarify the long-term effectiveness and patient-centered outcomes of these interim prosthetic modalities.

**CONCLUSION**

The management of early mandibular molar loss in children through interim prosthetic solutions. It highlights clinical applications of removable partial dentures, Essix retainers, and flexible thermoplastic appliances as space maintainers. Two case reports illustrate their effectiveness in preserving arch integrity, function, and esthetics. Additionally, evidence-based fixed and bonded appliances, including band-and-loop, crown-and-loop, and fiber-reinforced composites, are reviewed. Emphasis is placed on minimally invasive, age-appropriate interventions that support oral development and patient comfort during growth.

**REFERENCES**


1. Alani A, Bishop K. The management of root resorption. Br Dent J. 2014;216(3):115–119.
2. Thilander B, Odman J, Lekholm U. Orthodontic aspects of the use of oral implants in adolescents. Eur J Orthod. 2001;23(6):715–731.
3. Nair AR, Gurunathan D, Krishnan V. Interim prosthetic rehabilitation in pediatric patients: A clinical review. J Indian Soc Pedod Prev Dent. 2020;38(3):213–217.
4. Dhillon M, Gill NC, Kumar D. Removable partial dentures in pediatric dentistry: A case series. Int J Clin Pediatr Dent. 2016;9(4):372–375.
5. Sheridan JJ, Hastings J. Clear plastic appliances for retention and tooth movement. J Clin Orthod. 1992;26(11):648–653.
6. Basheer B, Prasad KV. Esthetic replacement of missing anterior tooth using Essix retainer: A case report. J Indian Soc Pedod Prev Dent. 2010;28(2):143–146.
7. Grover HS, Kaur A, Bhardwaj A. Role of vacuum formed retainers in pediatric dentistry. J Clin Diagn Res. 2016;10(6):ZD01–ZD02.
8. Proffit WR, Fields HW, Sarver DM. Contemporary Orthodontics. 6th ed. Elsevier; 2018.
9. Chopra S, Bansal P, Bansal P. Essix Appliance: An Innovation Modification for use as Temporary Bridge - A Case Report. J Adv Med Dent Scie Res. 2020;8(1):184-186.
10. Mahato M, Saxena N, Samani K, Marwah N, Chalana S. Maintenance of space by innovative clinical application of flexible partial denture: a case report. Int J Contemp Pediatr. 2023;10(6):955–958.
11. American Academy of Pediatric Dentistry. Guideline on management of the developing dentition and occlusion. Pediatr Dent. 2019;41(6):251–261.