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Distal shoe space maintainer for guidance of the erupting first permanent molar: A case report

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Abstract
Premature loss of a primary second molar before eruption of the first permanent molar may result in mesial migration of the unerupted permanent molar and a consequent reduction in arch length. The distal shoe space maintainer is an intra-alveolar appliance used to guide the eruption of the first permanent molar and preserve the available space in selected cases.[1–3] This case report describes the management of premature loss of the mandibular left primary second molar in a 6-year-old girl. The patient reported pain in the lower-left posterior region for three weeks. Clinical examination revealed extensive caries involving tooth 75, with tenderness to percussion and associated gingival inflammation. Radiographic examination demonstrated extensive coronal destruction with furcation radiolucency/perforation, and the tooth was considered to have a poor prognosis. Following extraction under local anaesthesia, a band-supported distal shoe appliance was fabricated using stainless-steel wire, adapted to extend into the extraction socket, and cemented to tooth 74 with glass ionomer cement. The position of the intra-alveolar extension was verified radiographically. Clinical reviews at 4 and 6 months showed satisfactory healing and continued function of the appliance. This case highlights the role of careful case selection, radiographic positioning, and periodic review when using a distal shoe appliance to guide the eruption of an unerupted first permanent molar.

Keywords: Distal shoe space maintainer, premature tooth loss, primary second molar, eruption guidance, space maintenance, pediatric dentistry

Introduction
Primary teeth contribute to mastication, speech, aesthetics, and the maintenance of arch integrity. They also guide the eruption and alignment of their permanent successors. Premature loss of a primary tooth may disturb the developing occlusion through drifting or tipping of adjacent teeth, reduction in arch length, and altered eruption paths.[1,5]
The primary second molar has particular importance in guiding the eruption of the first permanent molar. When it is lost before the permanent molar erupts, the latter may migrate mesially during eruption, potentially compromising arch length and molar positioning. Space maintenance should therefore be considered after assessment of the tooth lost, dental age, occlusion, available space, development and position of the successor, medical history, and the child's ability to attend follow-up visits [1].
The distal shoe space maintainer is a fixed, unilateral appliance indicated in selected cases in which the primary second molar is lost before eruption of the first permanent molar. Its intra-alveolar extension lies adjacent to the mesial surface of the unerupted permanent molar and serves as an eruption guide. Accurate radiographic assessment and placement are essential because an incorrectly positioned extension may injure the developing tooth or surrounding tissues [2, 4]. This report describes the use of a distal shoe appliance following extraction of a cariously involved mandibular left primary second molar.

Case Report
A 6-year-old girl reported to the Department of Pediatric and Preventive Dentistry, KVG Dental College and Hospital, Sullia, Dakshina Kannada, Karnataka, India, with a chief complaint of pain in the lower-left posterior tooth region for the preceding three weeks. The medical history was non-contributory.
Intraoral examination revealed deep caries involving the mandibular left primary second molar (75). The tooth was tender on percussion and associated with gingival inflammation. Radiographic examination showed extensive carious destruction, furcation radiolucency, and furcation involvement/. Based on the clinical and radiographic findings, the tooth was considered non-restorable and extraction was planned.



Fig 1: Preoperative intraoral view showing extensive caries involving tooth 75.



Fig 2: Preoperative radiograph showing extensive destruction and furcation involvement of tooth 75.



Fig 3: Extracted mandibular left primary second molar.

As the mandibular left first, permanent molar had not erupted, premature loss of tooth 75 posed a risk of mesial migration of the erupting permanent molar and subsequent space loss. A distal shoe space maintainer was therefore planned.

Under local anaesthesia, tooth 75 was extracted atraumatically. A stainless-steel band was adapted to the mandibular left primary first molar (74), which served as the abutment tooth. An intra-alveolar extension was fabricated using stainless-steel wire and adjusted to extend into the extraction socket, with the intention of guiding the erupting first permanent molar. The appliance was tried intraorally, and the position of the extension was verified radiographically before cementation. The appliance was cemented using glass ionomer cement.



Fig 4: Fabricated distal shoe appliance.



Fig 5: Intraoral view following insertion and cementation of the distal shoe appliance.

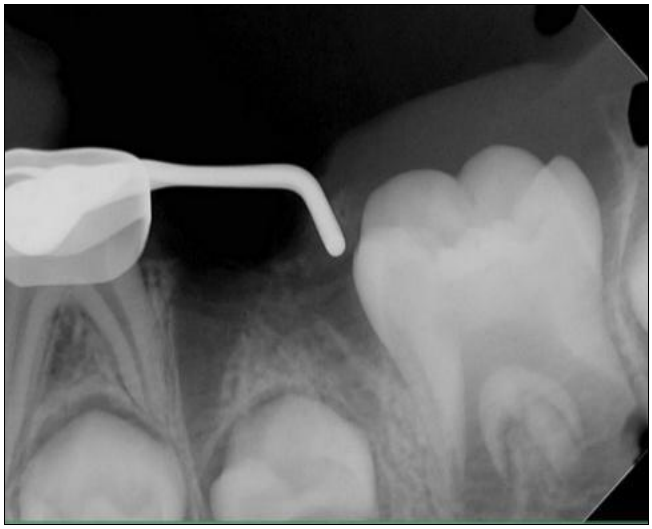


Fig 6: Post-insertion radiograph confirming the position of the intra-alveolar extension.



Fig 7: Postoperative intraoral view after appliance insertion.

Postoperative instructions regarding oral hygiene and appliance care were given to the patient and her parents. The patient was recalled periodically for clinical evaluation. At the 4-month and 6-month reviews, the extraction site showed satisfactory healing and the appliance remained in place. The clinical follow-up photographs documented continued appliance function and maintenance of the edentulous space. Continued review showeduntil adequate eruption of the permanent first molar and transition to an appropriate subsequent space-maintaining appliance.



Fig 8: Four-month follow-up.



Fig 9: Six-month follow-up.

Discussion

Premature loss of a primary second molar before eruption of the first permanent molar presents a specific space-management challenge. The distal surface of the primary second molar normally provides a guide for the erupting permanent molar. When this guide is lost, the permanent molar may erupt mesially, reducing the space available in the arch [2, 5].

Conventional appliances such as a band-and-loop space maintainer are generally used when the adjacent permanent molar has erupted and can provide a suitable point of contact or anchorage. They do not provide the same intra-alveolar eruption guidance required when the first permanent molar is still unerupted. In this clinical situation, a distal shoe appliance may be considered to maintain the space and guide the eruption path of the permanent molar [2, 3].

The distal shoe appliance usually consists of a band or stainless-steel crown on an abutment tooth and a rigid distal extension that enters the extraction socket. The terminal portion is positioned adjacent to the mesial surface of the unerupted first permanent molar. Radiographic verification is important to assess the depth and mesiodistal position of the extension and to avoid impingement on the developing tooth germ [3, 4].

Patient selection is critical. The clinician should consider the child's systemic health, healing capacity, oral hygiene, cooperation, the condition of the abutment tooth, and the possibility of regular follow-up. The intra-alveolar component requires monitoring for soft-tissue inflammation, infection, displacement, or interference with eruption. Space maintainers in general may also be associated with plaque accumulation, caries, decementation, breakage, and unwanted tooth movement [1, 5].

Evidence specific to distal shoe appliances remains limited. A systematic review identified a small body of clinical literature and noted that the available studies provided insufficient detail to establish definitive conclusions regarding efficacy and gingival response. The authors emphasized the need for better-quality studies and patient-centred outcome assessment [5]. Thus, although the distal shoe remains a clinically useful option in appropriately selected cases, its use should be individualized and accompanied by regular clinical and radiographic review.

In the present case, tooth 75 was extracted because of extensive carious destruction with furcation involvement/perforation and an unfavourable prognosis. As tooth 36 had not erupted, a band-supported distal shoe appliance was placed using tooth 74 for anchorage. Radiographic verification was performed after insertion. The 4-month and 6-month clinical reviews demonstrated satisfactory healing and continued appliance retention. These findings support the feasibility of the appliance in this case; however, longer follow-up is necessary to document the final eruption position of the permanent first molar and determine the appropriate subsequent space-maintenance strategy.

Conclusion

Premature loss of the primary second molar before eruption of the first permanent molar may compromise arch length and the eruption path of the permanent successor. In carefully selected patients, a distal shoe space maintainer can provide guidance to the unerupted first permanent molar

while preserving the available space. Accurate radiographic positioning, appropriate abutment selection, meticulous oral hygiene, and regular follow-up are essential. In the present case, satisfactory healing and continued appliance function were observed at the 4-month and 6-month reviews; further follow-up is required to confirm the final eruption outcome.

Clinical Significance

The case demonstrates the clinical application of a distal shoe appliance after premature extraction of a mandibular primary second molar before eruption of the first permanent molar. It also underscores the importance of radiographic verification and scheduled follow-up.

References

1. American Academy of Pediatric Dentistry. Management of the developing dentition and occlusion in pediatric dentistry. The Reference Manual of Pediatric Dentistry,2025:497–515.
2. Hicks EP. Treatment planning for the distal shoe space maintainer. Dental Clinics of North America,1973:17(1):135–150.
3. Brill WA. The distal shoe space maintainer, chairside fabrication and clinical performance. Pediatric Dentistry,2002:24(6):561–565.
4. Nouri MR, Kennedy DB. Optimal fit of chairside-fabricated distal shoe space maintainer. European Archives of Paediatric Dentistry,2013:14(5):351–354. doi:10.1007/s40368-013-0084-x.
5. Dadpe MV, Chordiya NA, Kale YJ, Dahake PT, Kendre SB, Mankar SS, *et al*. Evaluation of efficiency of distal shoe space maintainer, a systematic review. Journal of Advanced Oral Research,2023:14(1). doi:10.1177/23202068231166499.
6. Singhal M, Vashishta V, Chauhan A, Kumar Swarnkar S. Willet's distal shoe appliance for early loss of second deciduous molar, a case report with 2-year follow-up. University Journal of Dental Sciences,2020:6(2):68–70. doi:10.21276/ujds.2020.6.2.2.