

Clinical Management Of Premature Space Loss Using A Space Regainer: A Case Report

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1. Abstract

1.1. Background

Premature loss of primary teeth can result in space loss and malocclusion, particularly in early childhood. This case report discusses the management of space deficiency due to the extraction of tooth 84 because of infection, utilizing the Gerber space regainer appliance. The report contributes to the literature by emphasizing the importance of early intervention in space management and demonstrating the efficacy of the Gerber appliance in pediatric dental care.

1.2. Case Summary

A 7-year-old male patient presented to our clinic with space deficiency caused by the extraction of tooth 84 due to infection. No space maintainer had been placed, leading to the risk of impaction of tooth 44. To address this, a Gerber space regainer appliance was employed to create the necessary space for tooth 44 to erupt properly. Follow-up examinations revealed successful space creation, and tooth 44 was observed to be erupting in the correct alignment. The treatment was completed without complications, and the outcome was deemed successful.

1.3. Conclusion

The Gerber space regainer is an effective tool for managing space loss in early childhood, preventing malocclusion and facilitating proper tooth eruption.

Key Words:

Gerber appliance, pediatric dentistry, premature tooth loss, space regainer

Core Tip: Premature loss of primary teeth can lead to space deficiency and potential malocclusion in pediatric patients. In this case, the premature extraction of tooth 84 resulted in space loss, which could have impacted the eruption of tooth 44. Early intervention using the Gerber space regainer appliance was critical in preventing further occlusal complications. Timely diagnosis and application of appropriate space regaining techniques, such as the Gerber appliance, contribute to improved clinical outcomes and proper tooth alignment in young patients. Proactive management and careful monitoring are essential for long-term success in space management cases

2. Introduction

The premature loss of primary teeth, particularly molars, is a prevalent issue in pediatric dentistry that can have significant consequences on the development of a child's permanent dentition. Primary teeth are essential for maintaining arch integrity, guiding the eruption of permanent teeth, and preserving proper occlusal relationships [1]. When primary teeth are lost prematurely due to caries or trauma, the space within the dental arch may be compromised, often leading to mesial migration of adjacent teeth, crowding, and the impaction or ectopic eruption of permanent successors [2,3]. If these disruptions are not addressed in a timely manner, they may result in more complex malocclusions that require extensive orthodontic interventions [4]. Space maintainers and space regainers are critical interventions designed to prevent or correct space loss in the dental arch. Space maintainers are typically used when space must be preserved following premature tooth loss, whereas space regainers are employed when space has already been lost. These devices are pivotal in regaining arch length, facilitating the proper alignment of permanent teeth, and preventing the development of malocclusions [2, 5]. Space regainers are classified into removable and fixed types, with fixed space regainers, such as the Gerber space regainer and NiTi bonded space regainers, offering superior control and stability [1,4]. These appliances create space for unerupted permanent teeth through controlled distalization or tipping of adjacent teeth, effectively addressing space deficiencies [3]. Selecting the appropriate space regainer and the timing of intervention are crucial for successful outcomes. Early diagnosis and careful treatment planning, including radiographic assessments and space analysis, are essential for evaluating the extent of space loss and determining the most effective appliance [6]. Radiographs, such as panoramic and periapical images, are useful in identifying mesial shifts and crowding, while space analysis helps in evaluating the available arch length [1]. Early use of space regainers can minimize the need for more complex orthodontic treatments in the future,

reducing overall treatment time and costs [2] Fixed space regainers, such as the Gerber space regainer, offer advantages in pediatric patients as they do not rely heavily on patient compliance and can remain functional for extended periods [2]. Introduced by Bench R et al. in 1978, the Gerber space regainer is a fixed appliance that can be fabricated chairside, allowing for efficient space management without the need for laboratory processes [1]. This appliance applies gentle, controlled forces to regain space, creating adequate room for the eruption of permanent teeth and preventing malocclusions [5]. This case report discusses the use of the Gerber space regainer to manage space loss in a pediatric patient following the premature extraction of a primary molar. The report emphasizes the importance of timely intervention, the proper selection of space regaining appliances, and the need for continuous monitoring to achieve optimal outcomes in pediatric dental care [6]

3. Case Presentation

A 7-year-old male patient presented to the pediatric dentistry department with a primary concern of space deficiency in the lower right posterior region. The patient's dental history revealed that tooth 84, the lower right primary first molar, had been extracted under local anesthesia due to infection at a private clinic. Following the extraction, the patient did not return for subsequent dental visits or receive space maintenance treatment due to various circumstances. Six months later, the patient returned to the clinic, and clinical examination revealed significant space loss in the region previously occupied by tooth 84. A panoramic radiograph was obtained for further assessment, and measurements indicated that the remaining space, 1.401 mm, was insufficient for the eruption of the permanent first premolar. Consequently, a treatment plan was formulated to regain the necessary space for the proper eruption of the permanent tooth. The patient's parents were informed of the space deficiency, its potential consequences, and the importance of early intervention to preserve the arch length.

4. Treatment

To address the space deficiency, a Gerber space regainer, first introduced by Bench R et al. in 1978, was selected. The primary right second molar was banded using a $0.005 \times 0.180 \times 2$ " band with molar tubes (0.7 mm diameter, 10 mm length) welded both buccally and lingually. A 23-gauge wire equipped with an open coil spring was incorporated into the device. The entire assembly was cemented to the tooth using type I glass-ionomer luting cement, with the springs compressed to half their length. During the one-month follow-up, the regained space was measured at 6.072 mm, demonstrating the effectiveness of the appliance. After three months, the space regainer was removed, and a band loop space maintainer was placed to retain the achieved space and ensure proper alignment for future tooth eruption.

5. Outcome And Follow-Up

The application of the Gerber space regainer successfully addressed the

space deficiency caused by the premature extraction of the lower right primary first molar (tooth 84). Within one month, 6.072 mm of space was regained, providing sufficient room for the future eruption of the permanent first premolar. Early intervention prevented potential malocclusion and restored the necessary arch length. The treatment was well-tolerated by the patient, and no complications were reported during the process. After the space regaining phase, a band loop space maintainer was placed to secure the gained space, ensuring long-term stability. The patient was monitored regularly with monthly follow-up visits to assess the progress of space maintenance and dental development. After one month, the desired space was regained, and the permanent first premolar was positioned to erupt in the correct alignment. Three months later, the space regainer was removed, and a band loop space maintainer was placed to preserve the space. At the one-year follow-up, clinical and radiographic evaluations indicated that the permanent first premolar had not yet erupted but was on track for proper eruption without any issues in alignment. The space maintainer continued to function effectively, and the patient will remain under observation until the permanent tooth erupts.

6. Discussion

The management of space loss following premature extraction of primary teeth remains a critical concern in pediatric dentistry. Early loss of primary molars, particularly without the use of space maintainers or regainers, can lead to complications such as crowding, mesial migration of adjacent teeth, and misalignment of permanent successors [7]. In this study, the application of space regainers, specifically the Gerber space regainer, has proven to be an effective solution for addressing space deficiencies and ensuring proper eruption of permanent teeth. The literature supports the use of fixed space regainers, particularly for cases where patient compliance may be limited, as these appliances are not dependent on the patient's ability to manage removable devices [1,4,8]. The Gerber space regainer, first introduced by Bench R et al. in 1978, has been highlighted for its simplicity in design and ease of fabrication, as well as its ability to create sufficient space for the eruption of permanent teeth without the need for complex laboratory work [1-6]. Moreover, its fixed nature allows for controlled and predictable tooth movement, minimizing the risk of unwanted tipping or mesial drift of adjacent teeth [11]. Multiple studies have demonstrated the importance of early intervention in preventing long-term occlusal disharmony. Delayed treatment can lead to significant space loss, complicating future orthodontic treatments [2]. In particular, the use of space regainers, such as the NiTi bonded regainer or the banded helical retractor, has shown favorable outcomes in regaining lost space and preventing further complications [8,9]. These devices apply controlled forces to gradually move teeth into their correct positions, allowing for successful space recovery in cases where primary molars have been prematurely lost [1,12,13].

Radiographic evaluation and accurate diagnosis play a crucial role in determining the extent of space loss and guiding treatment planning [6]. In this study, panoramic radiographs and space analysis were essential tools in evaluating the patient's space requirements and planning the appropriate

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intervention. The Gerber space regainer was selected based on its ability to provide sufficient space recovery while minimizing patient discomfort and the risk of additional tooth movement. The choice of space regaining appliances should be tailored to each patient's specific needs, taking into account factors such as the degree of space loss, patient compliance, and the timing of permanent tooth eruption [3]. Fixed space retainers, such as the Gerber appliance, offer several advantages in terms of stability, ease of use, and predictable outcomes [10,14]. However, as with all orthodontic interventions, long-term follow-up is critical to ensure the success of the treatment and to monitor for any potential relapse. In conclusion, this case highlights the efficacy of the Gerber space regainer in managing space loss in pediatric patients. The timely application of space retainers can prevent future malocclusions and reduce the need for more extensive orthodontic treatments later in life. Further studies are needed to explore the long-term effects of different types of space retainers and to optimize treatment protocols for various clinical scenarios.

Figures

Figure 1: (a) Preoperative sagittal view of deficiency area. (b) Preoperative occlusal view of mandibular arch.



Figure 2: Preoperative orthopantogram



Figure 3: (a) Gerber space regainer on a model. (b) Fabrication of Gerber space regainer



Figure 4: Gerber space regainer after cementation on 85



Figure 5: (a) Intraoral image of one month follow-up. (b) Orthopantogram of one month follow-up

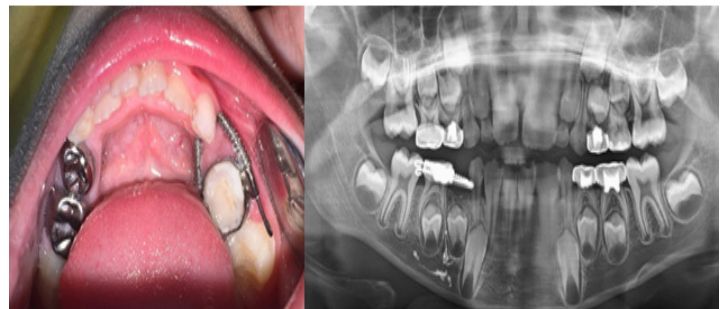


Figure 6: Intraoral images of one year follow-up (Classical bant-loop for retention)



Figure 7: Orthopanthogram of one year follow-up

7. Conclusion

The early and proactive use of the Gerber space regainer in this case effectively mitigated the space deficiency resulting from the premature extraction of tooth 84, ensuring the preservation of sufficient arch length for the eruption of the permanent first premolar. This case underscores the importance of timely intervention in pediatric dental space management to prevent malocclusion and facilitate optimal tooth eruption. The Gerber appliance, combined with diligent follow-up and space maintenance, proves to be a reliable approach in addressing complex cases of early tooth loss. Future follow-ups will be essential to monitor the eruption of the permanent tooth and ensure the long-term success of the treatment.

8. Footnotes

Informed consent statement: Informed written consent was obtained from the patient for publication of this report and any accompanying images.

Conflict-of-interest statement: The author declares that they have no conflict of interest to disclose.

9. Care Checklist (2016) Statement:

The author has read the CARE Checklist (2016), and the manuscript was prepared and revised according to the CARE Checklist (2016).

References

- Shah VU, Dave BH, Shah SS, Shah PS. Space management with Gerber space regainer. *J Integr Health Sci* 2021; 9:33-5. [PMID: N/A DOI: 10.4103/jihs.jihs_8_21]
- Chandak P, Baliga S, Thosar N. Space regainers in pediatric dentistry. *Int Dent Med J Adv Res* 2015; 1(1):1-5. [DOI: 10.15713/ins.idmjar.11]
- Watt E, Ahmad A, Adamji R, Katsimbali A, Ashley P, Noar J. Space maintainers in the primary and mixed dentition – A clinical guide. *Br Dent J* 2018; 225(4):293-5. [DOI: 10.1038/sj.bdj.2018.650]
- Negi KS. NiTi bonded space regainer/maintainer. *J Indian Soc Pedod Prev Dent* 2010; 28(2):113-5. [DOI: 10.4103/0970-4388.66751]
- Costa GC, Chalakkal P, Aras MA, Chitre V. Use of the open coil space regainer for tooth movement prior to prosthodontic treatment. *J Clin Diagn Res* 2015; 9(6). [DOI: 10.7860/JCDR/2015/12356.6045]
- Khalaf K, Mustafa A, Wazzan M, Omar M, Estaitia M, El-Kishawi M. Clinical effectiveness of space maintainers and space regainers in the mixed dentition: A systematic review. *Saudi Dent J* 2022; 34(1):75-86. [DOI: 10.1016/j.sdentj.2021.09.025]
- Ahmad AJ, Parekh S, Ashley PF. Methods of space maintenance for premature loss of a primary molar: A review. *Eur Arch Paediatr Dent* 2018; 19(4):311-20. [DOI: 10.1007/s40368-018-0357-5]
- Mallikarjun SB, Wilson B, Joppan S, Puthiyandi S. An Innovative Space Regainer “Banded Helical Retractor” in Space Management: A Case Report. *Int J Clin Pediatr Dent* 2019; 12(5):467-9. [DOI: 10.5005/jp-journals-10005-1677]
- Tatiya N, Kesri R, Pattanshetti K, Sankalecha S. Banded Helical Space Regainer—an Innovative Approach for Management of Space Loss: A Case Report. *Int J Clin Pediatr Dent* 2023; 16(6):868-70. [DOI: 10.5005/jp-journals-10005-1677]
- Khanna S, Rao D, Panwar S, Pawar BA, Ameen S. 3D Printed Band and Loop Space Maintainer: A Digital Game Changer in Preventive Orthodontics. *J Clin Pediatr Dent* 2021; 45(3):147-9. [DOI: 10.17796/1053-4625-45.3.1]
- Cenzato N, Crispino R, Gatto MRA. Clinical effectiveness of space regaining techniques for missing molars: A review. *Eur J Paediatr Dent* 2023; 24(1):33-40. [DOI: 10.23804/ejpd.2023.24.01.05]
- Ahmed M, Williams J. Review of space maintainers and space regainers in pediatric dentistry. *Br Dent J* 2020; 228(2):145-50. [DOI: 10.1038/sj.bdj.2020.202]
- Singh PH, Naorem H, Chaoba T. Modern concepts of space maintainers and space regainers: a review article. *Eur J Pharm Med Res* 2020; 7:176-8.
- Jitesh S, Mathew MG. Space maintainer - A review. *Drug Invent Today* 2019; 11:21-5.