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Case Report

Clear Aligner Therapy as a Conservative Approach for Midline Diastema Closure: A Case Report

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Abstract

Background: Midline diastema is a frequent esthetic concern, particularly among young adults, and can impact smile harmony and self-confidence. Clear aligner therapy offers an esthetic and comfortable alternative to conventional fixed appliances, making it an attractive option for patients seeking minimally visible orthodontic treatment.

Case Presentation: This case report describes the orthodontic management of a 19-year-old male patient presenting with a maxillary midline diastema. Clinical examination revealed a Class I dental relationship with no underlying pathology. A customized clear aligner plan consisting of 20 sequential maxillary aligners was developed to close the diastema and enhance anterior alignment. No treatment was performed in the mandibular arch. The treatment protocol included selective interproximal reduction (IPR) to optimize space and improve tooth proportions.

Results: The midline diastema was completely closed within an eight-month treatment period. Significant improvements were observed in tooth alignment, smile esthetics, and overall dental symmetry. Periodontal health remained stable throughout treatment, with no signs of inflammation or recession. The patient demonstrated excellent compliance, which contributed to effective aligner tracking and predictable outcomes.

Conclusion: This case highlights the effectiveness of clear aligners in managing isolated maxillary midline diastema in a young adult patient. Clear aligner therapy provided an esthetic, minimally invasive, and predictable solution while preserving periodontal health. Appropriate case selection, treatment planning, and patient compliance are essential to achieving successful outcomes.

Keywords: Clear aligners; midline diastema; ClearPath; orthodontic treatment; interproximal reduction; esthetic dentistry; young adult

Introduction

Midline diastema, defined as a space between the maxillary central incisors greater than 0.5 mm, is a common dental anomaly affecting both children and adults [1]. Although a small midline gap may be considered an esthetic variation in some cultures, its persistence in the permanent dentition is often regarded as unaesthetic and can adversely influence a patient's smile harmony and psychological well-being [2, 3].

The etiology of midline diastema is multifactorial. Common contributing factors include a hypertrophic labial frenum, supernumerary teeth such as mesiodens, congenitally missing lateral incisors, tooth size–arch length discrepancies, and parafunctional habits like tongue thrusting or thumb sucking [4-6]. A thorough diagnosis is therefore crucial to identify the underlying cause and determine an appropriate management plan.

Conventional orthodontic approaches for diastema closure typically involve fixed appliances, often supplemented by

frenectomy or restorative procedures when indicated [7]. However, relapse remains a frequent concern. Studies report that up to 60 % of patients experience partial reopening of the space following treatment, particularly when retention protocols are inadequate or the initial diastema width was large [8, 9].

In recent years, Clear Aligner Therapy (CAT) has gained significant popularity as a modern, conservative, and esthetically pleasing alternative to traditional fixed orthodontics. Clear aligners provide controlled tooth movement through sequential aligner sets, offering benefits such as improved oral hygiene, reduced chair time, comfort, and minimal interference with speech and daily activities [10, 11]. Moreover, aligners appeal to adult patients seeking discreet treatment options without the social or professional limitations associated with metal braces [12].

Although numerous studies have demonstrated the efficacy of clear aligners in managing mild to moderate malocclusions, literature describing their use specifically for midline diastema closure is still limited [13]. Reports suggest that with proper case selection, digital treatment planning, and patient compliance, predictable space closure can be achieved with stable outcomes [14].

This case report presents the successful orthodontic management of a midline diastema using the ClearPath Aligner System. The report highlights the clinical approach, treatment planning, and outcomes, demonstrating clear aligner therapy as a conservative, aesthetic, and effective modality for diastema correction.

Case Report

A 19-year-old male patient reported with a chief complaint of spacing between the upper front teeth accompanied by forwardly inclined maxillary anteriors. The patient was in good general health, and his medical and family histories were non-contributory. Extraoral examination revealed a mesocephalic head form and a mesoprosopic facial type with balanced facial symmetry. The facial profile was convex, characterized by average nasal proportions and competent lips, with no signs or symptoms suggestive of temporomandibular joint dysfunction (Figure 1).

Smile analysis showed satisfactory display of the maxillary incisors and a consonant smile arc, though mild dental misalignment was evident. Intraorally, the patient maintained fair oral hygiene with healthy gingival tissues. The occlusal assessment indicated a Class II subdivision (left) molar relationship with an excessive overjet of 5 mm and an overbite of 2.5 mm. The maxillary dental midline was deviated 1 mm to the left, while the mandibular midline was coincident with the facial midline.

An inter-dental spacing of approximately 4 mm was observed in the maxillary arch. The panoramic radiograph confirmed adequate alveolar bone support and revealed a carious lesion on the lower left molar. Cephalometric evaluation demonstrated a mild skeletal Class II pattern with a normodivergent growth tendency and an acute nasolabial angle.

Treatment Objectives

The primary goal of this orthodontic intervention was to resolve the patient's chief complaint through clear aligner therapy confined to the maxillary arch. Secondary objectives included achieving optimal occlusal function, maintaining periodontal health, and improving overall smile esthetics for long-term stability.

Treatment Options

Various treatment options were discussed with the patient, taking into account his chief concerns and aesthetic expectations. The patient expressed a preference for single-arch correction limited to the maxillary teeth. The first option presented was conventional fixed orthodontic therapy; however, the patient declined this approach due to its visible nature and potential impact on appearance during treatment. The alternative option proposed was clear aligner therapy, which aligned well with the patient's preference for an esthetic and comfortable treatment modality. Both treatment options were planned as non-extraction approaches aimed at achieving complete space closure and optimal alignment.

Treatment Procedure

Following the clinical assessment, comprehensive diagnostic records were obtained, including intraoral and extraoral photographs, as well as digital impressions captured with an intraoral scanner. These data were submitted to the ClearPath facility for formulation of a customized treatment plan. The panoramic radiograph demonstrated satisfactory periodontal support and acceptable oral hygiene, confirming the patient's suitability for orthodontic intervention without the need for additional dental procedures, thereby favoring clear aligner therapy.

Using the provided records, a three-dimensional virtual treatment setup was generated, outlining 20 sequential stages for the maxillary arch. A non-extraction strategy was selected, incorporating space closure and interproximal reduction (IPR) to address the existing concerns. A digital simulation of the anticipated treatment outcome (Figure 2) was shared with the patient, who approved the proposed plan.

The final treatment plan was prepared and confirmed within one week of submitting the records. The estimated treatment duration was approximately eight months, which the patient accepted, and aligner therapy was subsequently initiated.

IPR Technique

Interproximal reduction (IPR) is a widely utilized orthodontic technique designed to create space by selectively removing controlled amounts of proximal enamel. It is particularly advantageous for managing mild to moderate crowding, improving tooth proportions, and enabling proper alignment while avoiding extractions [15, 16]. Multiple instruments can be employed for IPR, such as diamond burs, abrasive discs, and manual abrasive strips, each offering varying degrees of precision and operator control [17].

In the present case, a thin, double-sided diamond-coated abrasive strip was used to perform IPR, allowing for controlled enamel removal with minimal risk of surface damage. The amount of reduction was confirmed using an IPR gauge to ensure accuracy and maintain the planned enamel limits. Following the procedure, topical fluoride was applied to the treated surfaces to promote remineralization and reduce postoperative sensitivity or caries risk [18, 19].

Figure 1: Pre treatment; extraoral & intraoral photographs.

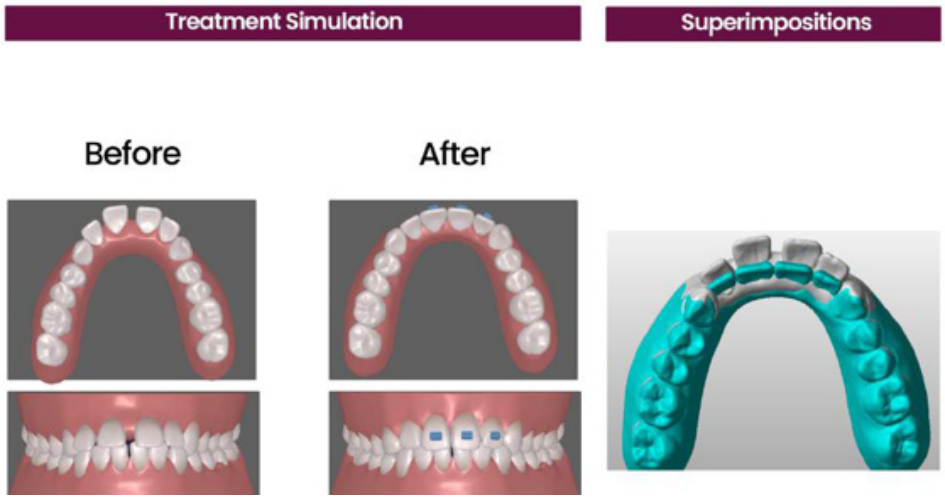

Figure 2: 3D treatment plan (a) Before & After, (b) Superimpositions.

Treatment Progress

After the digital treatment simulation was approved, the aligner provider supplied the instruction forms (Figures 3 and 4) along with 20 sequential maxillary aligner sets. Each aligner was recommended to be worn for approximately 22 hours per day and changed every 10 days. Before beginning active treatment, the patient received detailed guidance on maintaining proper oral hygiene and periodontal health. The first thirteen aligner sets were issued, and an appointment for interproximal reduction (IPR) was scheduled prior to initiating the fourteenth stage.

IPR was performed in the upper arch at two sites, with 0.5 mm of enamel reduction completed bilaterally between the canines and first premolars. The patient continued through the remaining aligners as planned and attended follow-up visits every three months to assess periodontal health and aligner tracking. Clinical evaluations consistently showed good alignment progress and stable periodontal conditions. The patient demonstrated excellent compliance, which significantly contributed to the overall treatment success. Fixed retention was given at the end of the treatment to ensure long term stability.

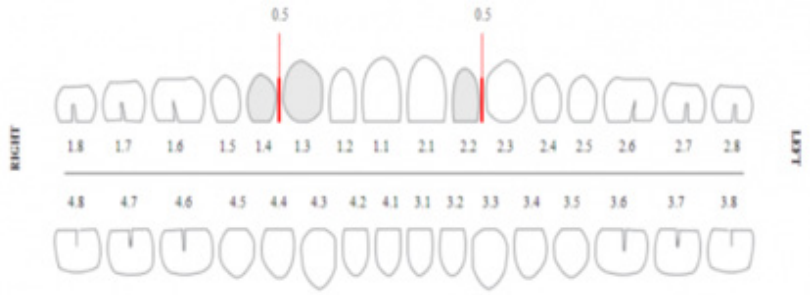

Figure 3: IPR form.

	Upper Right								Upper Left							
Stg. #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2								MTP	MTP							
3								MTP	MTP		DTP					
4							BTP	MTP	MTP		DTP					
5								MTP	MTP	MTP						
6						DTP		MTP	MTP	MTP						
7						DTP		LTP	LTP		DTP					
8						DRO		LTP	LTP	LTP	DRO					
9							MTP	LTP	LTP	LTP						
10							LTP	LTP	LTP	LTP						
11							LTP	LTP	LTP	LTP						
12							LTP	LTP	LTP	LTP						
13							BTO	LTP	LTP	LTP						
14						DTP	LTP	EXT	LTP	DTP						
15						DTP	LTP	LTP	LTP	DTP						
16							LTP	LTP	LTP	LTP						
17							LTP	LTP	LTP							
18							LTP	LTP	LTP							
19							DTO	LTP	LTP	LTP						
20						LTP	LTP	LTP	LTP	LTP						

*Please use EBT on specific tooth/teeth ONLY at the particular stage mentioned in MRF form.
*EBT technique has to be used wherever "EXT" code is written.

Code	Movement Detail	Code	Movement Detail	Code	Movement Detail
MTR	Mesial Translation	MTP	Mesial Tipping	DTO	Distal Torque
DTR	Distal Translation	DTP	Distal Tipping	MTO	Mesial Torque
LTR	Lingual Translation	BTP	Buccal Tipping	INT	Intrusion
BTR	Buccal Translation	BTO	Buccal Torque	EXT	Extrusion
LTP	Lingual Tipping	LTO	Lingual Torque	DRO	Distal Rotation
				MRO	Mesial Rotation

Figure 4: Movement Record Form.

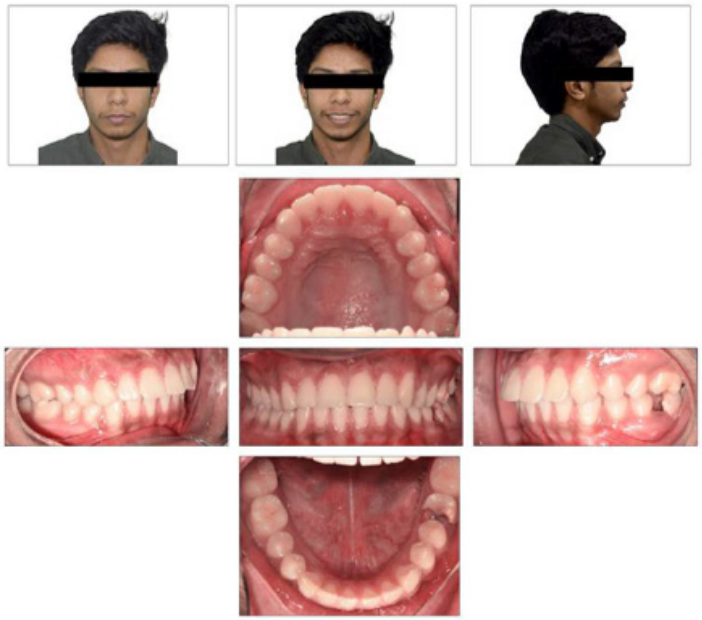

Figure 5: Post treatment records; extra oral and intra oral photographs.

Treatment Result

The overall treatment spanned eight months, with each aligner worn for approximately 22 hours per day and changed every 10 days. By the end of the treatment period, the midline diastema had been fully corrected, resulting in ideal overjet and overbite, well-aligned dentition, and a balanced, functional occlusion (Figure 5).

Improvement in the midline relationship also contributed to a significant enhancement in the esthetic appearance and functional harmony of the patient's smile. Periodontal status was closely monitored throughout the course of therapy, and no signs of gingival recession, inflammation, or periodontal pocket formation were observed, ensuring the maintenance of healthy supporting tissues and overall treatment stability.

Discussion

Midline diastema is a relatively common esthetic concern in adult patients and may arise from multiple etiologic factors, including tooth-size discrepancies, abnormal frenum attachment, habits, and spacing within the dental arch. Successful management requires accurate diagnosis and intervention directed toward the underlying cause to ensure long-term stability [2]. In the present case, the diastema was primarily the result of spacing and minor arch discrepancies, making it well-suited for clear aligner therapy.

Clear aligners have gained widespread acceptance as an effective modality for treating mild to moderate malocclusions, particularly in adult patients who prioritize esthetics and comfort. Several studies have demonstrated that aligners can achieve clinically acceptable outcomes in space closure, tooth alignment, and occlusal correction when case selection is appropriate [10, 20]. In this case, clear aligners successfully facilitated midline diastema closure and corrected minor midline deviation without the need for fixed appliances.

Interproximal reduction (IPR) was incorporated as part of the treatment plan to create controlled space and improve tooth proportions. IPR is considered a safe and predictable adjunct to orthodontic therapy when performed conservatively, with evidence showing minimal risk to enamel integrity or periodontal health when proper protocols are followed [17, 21]. The outcomes in this case align with the literature, as no adverse periodontal effects or enamel complications were observed.

Periodontal stability is of particular importance during adult orthodontic treatment. Clear aligners have been shown to offer advantages in periodontal maintenance due to their removability, which allows for more effective oral hygiene compared with fixed appliances [22]. Throughout the eight-month treatment period, the patient exhibited stable periodontal health with no signs of inflammation or recession, consistent with findings reported in previous studies evaluating aligners in adult populations [23].

This case also supports evidence that clear aligners can effectively manage esthetic concerns while promoting functional occlusal outcomes. The closure of the diastema, improvement in midline alignment, and establishment of ideal overjet and overbite illustrate the capacity of aligners to deliver predictable results in carefully selected cases. While clear aligners may have limitations

in managing complex tooth movements, growing research supports their effectiveness for mild to moderate spacing and alignment issues [20, 24].

Long-term stability remains a key consideration following diastema closure, as relapse has been documented when retention protocols are not strictly followed [25]. The structured retention regimen implemented for this patient aligns with established recommendations and contributes to maintaining treatment results.

Overall, this case reinforces the role of clear aligner therapy as a reliable, esthetic, and patient-friendly option for managing midline diastema, particularly in adults seeking minimally invasive treatment. Further longitudinal studies could help clarify long-term stability and compare effectiveness with other orthodontic techniques.

Conclusion

This case demonstrates that clear aligner therapy is an effective and predictable modality for managing midline diastema in adult patients. Through careful diagnosis, conservative interproximal reduction, and a well-structured treatment plan, complete closure of the diastema, improved midline alignment, and an ideal occlusal relationship were successfully achieved. The patient benefited from the esthetic, comfortable, and hygienic advantages of clear aligners, resulting in high compliance and stable periodontal health throughout treatment. Overall, this report reinforces the value of clear aligners as a minimally invasive and patient-friendly option for correcting esthetic spacing concerns while maintaining functional and periodontal stability.

Consent & Conflict of Interest

A written consent form was signed from the patient for use of the dental records for publications & social media marketing. Also, there is no conflict of interest with this paper.

References

1. Nainani P, Relan S (2011) Midline diastema—A review of etiology and treatment. Indian J Dent Sci 3(5): 11-14.
2. Edwards JG (1977) The diastema, the frenum, the frenectomy: A clinical study. Am J Orthod 71(5): 489-508.
3. Popovich F, Thompson GW (1979) Maxillary diastema: Morphologic feature indicative of midpalatal suture expansion. Am J Orthod 75(6): 677-691.
4. Bishara SE (1972) Management of diastema in orthodontics. Am J Orthod Dentofacial Orthop 61(1): 55-63.
5. Popovich F, Thompson GW (1973) Maxillary diastema: Its relationship to the labial frenum and intermaxillary suture. Am J Orthod 63(5): 469-478.
6. Kotwal R, Mathur R (2012) Etiology and management of midline diastema: A review. J Indian Orthod Soc 46(3): 208-214.
7. Shashua D, Artun J (1999) Relapse after orthodontic correction of maxillary median diastema: A follow-up evaluation of consecutive cases. Am J Orthod Dentofacial Orthop 116(4): 353-362.
8. Edwards JG (1993) Long-term stability of closed median diastemas. Am J Orthod Dentofacial Orthop 103(5): 423-430.
9. Tait BL, Short MB (2020) Midline diastema: Etiology, diagnosis, and management. Dent Update 47(8): 708-716.
10. Rossini G, Parrini S, Castroflorio T, Deregibus A, Debernardi CL (2015) Efficacy of clear aligners in controlling orthodontic tooth movement: A systematic review. Angle Orthod 85(5): 881-889.
11. Kesling HD (1945) The philosophy of the tooth positioning appliance. American Journal of Orthodontics and Oral Surgery 31(6): 297-304.
12. Mantovani E, Castroflorio T, Rossini G, Garino F, Cugliari G, et al. (2018) Scoping review of clear aligner treatment: Biological and mechanical considerations. Orthod Craniofac Res 21(1): 16-24.
13. Alajmi S, Almaiman S, Alhummayani F (2020) Management of midline diastema with clear aligners: A case series. Int Res J Med Sci 8(6): 18-22.
14. Jindal P, Juneja S, Sukhija U, Mahajan P (2021) Clear aligners in the management of midline diastema: A case report. J Clin Orthod 55(4): 234-238.
15. Zachrisson BU, Nyøygaard L, Mobarak K (2007) Dental health assessed more than 10 years after interproximal enamel reduction of mandibular anterior teeth. Am J Orthod Dentofacial Orthop 131(2): 162-169.
16. Danesh G, Hellak A, Mah J (2010) Analysis of enamel surface roughness after interproximal enamel reduction. J Dent Res 89(7): 722-726.
17. Sheridan JJ (1985) Air-rotor stripping. J Clin Orthod 19(1): 43-59.
18. Rossouw PE (2006) Enamel reduction procedures in orthodontic treatment. J Can Dent Assoc 72(2): 163-167.
19. Twesme DA, Firestone AR, Heaven TJ, Feagin FF, Johnston WM (1994) Air-rotor stripping and enamel demineralization in vitro. Am J Orthod Dentofacial Orthop105(2): 142-152.
20. Papadimitriou A, Mousoulea S, Gkantidis N, Kloukos D (2018) Clinical effectiveness of Invisalign® orthodontic treatment: A systematic review. Prog Orthod 19(1): 1-24.
21. Zachrisson BU (2004) Interproximal enamel reduction: Indications, biological limitations and long-term effects. World J Orthod 5(4): 305-313.
22. Miethke RR, Vogt S (2005) A comparison of the periodontal health of patients during treatment with removable and fixed orthodontic appliances. J Orofac Orthop 66(3): 219-229.
23. Karkhanechi M, Chow D, Sipkin J (2013) Periodontal status of adult patients treated with fixed and removable orthodontic appliances: A comparative study. Angle Orthod 83(1): 146-151.
24. Robertson L, Kaur H, Fagundes NCF, Romanyk D, Major P, et al. (2020) Effectiveness of clear aligner therapy for orthodontic treatment: A systematic review. Orthod Craniofac Res 23(2): 133-142.
25. Little RM (1990) Stability and relapse of dental arch alignment. Br J Orthod 17(3): 235-241.