



Aesthetic and Functional Rehabilitation with Pontic and Tooth Reshaping in Children with Malocclusion and Agenesis of Teeth 12 and 22: A Case Report

Aulia Riski*, Prima Andisetyanto

Universitas Padjadjaran, Indonesia

Email: auliabcd511@gmail.com*

Keywords:

Agenesis; Maxillary Lateral Incisor; Malocclusion; Orthodontic Treatment; Pontic

ABSTRACT

Maxillary lateral incisor agenesis is a developmental dental anomaly with significant esthetic, functional, occlusal, and psychosocial consequences during adolescence. Treatment planning in growing patients is challenging because definitive implant-supported rehabilitation is generally postponed until skeletal maturity is achieved. Therefore, an interim approach integrating orthodontic space management, tooth reshaping, and provisional pontic replacement may help preserve esthetics and function during active growth. A 14-year-old female presented with a chief complaint of irregular anterior teeth and decreased self-confidence. Clinical and radiographic examinations revealed bilateral agenesis of the maxillary lateral incisors (teeth 12 and 22), Angle Class II Division 1 subdivision malocclusion with a skeletal Class I relationship, maxillary anterior diastema, a mandibular midline deviation of 4 mm to the right, mild overjet and overbite, and anterior mandibular crowding. Comprehensive treatment consisted of oral preparation, fixed orthodontic therapy for alignment, leveling, diastema closure, and space redistribution using open-coil spring mechanics, followed by minimally invasive reshaping of tooth 13 to simulate the morphology of tooth 12 and provisional pontic replacement for tooth 22. Orthodontic alignment and leveling were achieved after approximately two years, resulting in improved anterior esthetics, midline correction, and more favorable occlusal relationships. Posterior interdigitation and definitive prosthetic rehabilitation remained under observation until completion of growth. In a growing patient with bilateral maxillary lateral incisor agenesis, a conservative multidisciplinary approach involving orthodontic space management, tooth reshaping, and provisional pontic placement can improve smile esthetics and oral function while maintaining future options for definitive prosthetic rehabilitation. Careful diagnosis, patient-centered treatment planning, and long-term follow-up are essential for achieving stability and esthetic refinement.

INTRODUCTION

Maxillary lateral incisor agenesis is a developmental dental anomaly with significant esthetic, functional, occlusal, and psychosocial consequences during adolescence. Treatment planning in growing patients is challenging because definitive implant-supported rehabilitation is generally postponed until skeletal maturity is achieved (Chatzistavrianou et al., 2019; Dharia & Dharia, 2026). Therefore, an interim approach integrating orthodontic space management, tooth reshaping, and provisional pontic replacement may help preserve esthetics and function

during active growth (Ahmed et al., 2021; LeSage & Bahat, 2025; Prummern, 2024; Rosa, 2020; Smith, 2025).

A 14-year-old female presented with a chief complaint of irregular anterior teeth and decreased self-confidence. Clinical and radiographic examinations revealed bilateral agenesis of the maxillary lateral incisors (teeth 12 and 22), Angle Class II Division 1 subdivision malocclusion with a skeletal Class I relationship, maxillary anterior diastema, a mandibular midline deviation of 4 mm to the right, mild overjet and overbite, and anterior mandibular crowding (Cunha et al., 2017; Thiesen, 2015). Comprehensive treatment consisted of oral preparation, fixed orthodontic therapy for alignment, leveling, diastema closure, and space redistribution using open-coil spring mechanics, followed by minimally invasive reshaping of tooth 13 to simulate the morphology of tooth 12 and provisional pontic replacement for tooth 22. Orthodontic alignment and leveling were achieved after approximately two years, resulting in improved anterior esthetics, midline correction, and more favorable occlusal relationships. Posterior interdigitation and definitive prosthetic rehabilitation remained under observation until completion of growth (Antonarakis & Carmichael, 2023; Ergun & Ataol, 2018; Iswati et al., 2023; Montanari et al., 2023; Noh et al., 2016).

In a growing patient with bilateral maxillary lateral incisor agenesis, a conservative multidisciplinary approach involving orthodontic space management, tooth reshaping, and provisional pontic placement can improve smile esthetics and oral function while maintaining future options for definitive prosthetic rehabilitation. Careful diagnosis, patient-centered treatment planning, and long-term follow-up are essential for achieving stability and esthetic refinement.

METHOD

Patient information and chief complaint

A 14-year-old female patient presented to the Dental Hospital of Universitas Padjadjaran accompanied by her mother. Her chief complaint was irregular anterior teeth that affected her confidence. The patient and her parent requested improvement in dental alignment and smile esthetics.

The patient was conscious, cooperative, and classified as ASA I. No systemic disease, congenital disorder, previous surgery, dental trauma, medication use, parafunctional habits, or relevant family history was reported. Extraoral examination revealed a symmetrical face, convex profile, normal lip tone, and normal lip relationship. Temporomandibular joint and craniomandibular musculoskeletal examinations showed no significant abnormalities.

Clinical and radiographic findings

Intraoral examination showed acceptable oral hygiene, no gingivitis or periodontitis, normal frenulum and palatal morphology, maxillary anterior diastema, anterior mandibular crowding, mandibular midline deviation of approximately 4 mm to the right, overjet of approximately 3 mm on the right central incisor relationship and 2.5 mm on the left central incisor relationship, and overbite of approximately 2 mm. Agenesis of teeth 12 and 22 was suspected clinically and confirmed radiographically.

Panoramic radiography demonstrated the absence of maxillary lateral incisors 12 and 22 and supported the diagnosis of bilateral maxillary lateral incisor agenesis. Cephalometric evaluation supported a skeletal Class I relationship. The working diagnosis was Angle Class II

division 1 subdivision malocclusion with skeletal Class I pattern, maxillary anterior diastema, agenesis of teeth 12 and 22, mandibular midline deviation to the right, anterior mandibular crowding, and convex facial profile.



Figure 1. Initial intraoral condition: frontal view showing anterior spacing and altered anterior tooth relationship (A); lateral view (B); maxillary occlusal view (C); mandibular occlusal view showing anterior crowding (D).



Figure 2. Redacted panoramic radiograph confirming agenesis of teeth 12 and 22 and supporting comprehensive orthodontic treatment planning.

Treatment objectives

Treatment objectives were to improve smile esthetics, correct anterior diastema, align and level the maxillary and mandibular arches, improve midline relationship, redistribute space in the maxillary anterior segment, restore the appearance of missing lateral incisors with conservative interim rehabilitation, maintain periodontal health, and preserve future options for definitive prosthetic replacement after growth completion.

Mouth preparation was planned before orthodontic therapy to optimize the oral environment. This included scaling of the maxillary and mandibular arches, fissure sealant for

susceptible molars, restoration of carious lesions, endodontic management where indicated, and topical fluoride application.

Treatment sequence

Following completion of the mouth preparation phase, which included scaling and polishing, preventive care, and management of existing dental conditions, comprehensive fixed orthodontic treatment was initiated. Fixed orthodontic appliances with a 0.022-inch slot prescription were bonded to the maxillary arch on **18 February 2025** and to the mandibular arch on **26 March 2025**. Initial alignment and leveling were started using **0.012-inch nickel-titanium (NiTi) archwires**, followed by sequential progression to **0.014-, 0.016-, and 0.018-inch NiTi archwires** to achieve gradual alignment, leveling, and arch coordination while minimizing excessive orthodontic forces. Throughout active treatment, the patient was scheduled for **monthly follow-up appointments** to monitor tooth movement, adjust orthodontic mechanics, reinforce oral hygiene instructions, and perform professional plaque control when indicated.

During the alignment phase, several auxiliary procedures were required to optimize tooth positioning. Repositioning of the brackets on teeth **11, 21, and 23** was performed to improve bracket positioning and enhance control of crown inclination and root angulation. Open-coil springs were subsequently inserted between **teeth 13-11 and 23-21** to create and maintain adequate space corresponding to the congenitally missing maxillary lateral incisors. The open-coil springs were periodically activated or maintained passively according to the amount of space achieved and the desired rate of tooth movement. As alignment progressed, progressively stiffer archwires were introduced to provide greater control during the transition from leveling to the working phase.

The working phase focused on orthodontic space redistribution and correction of anterior spacing. Diastemata between **teeth 14-13, 11-21, and 24-23** were gradually closed while maintaining the spaces required for prosthetic replacement of teeth **12 and 22**. Stainless-steel rectangular archwires were placed to improve torque control and provide a rigid working arch for space management. Passive ligation (segmental stabilization) was applied to selected posterior teeth to reinforce anchorage, whereas **power chains** were used to produce controlled mesial or distal tooth movement. Distalization of tooth **13** and controlled movement of tooth **23** were performed according to root position, available alveolar bone, and the final restorative plan. Periodic bracket repositioning and adjustment of active mechanics were carried out whenever necessary to improve root parallelism, optimize midline correction, and establish symmetrical spacing in the anterior maxilla.

As treatment progressed, the orthodontic mechanics were refined to achieve ideal anterior tooth proportions and esthetic space distribution. Passive open-coil springs were maintained after the desired space had been obtained to prevent relapse, while power chains were selectively applied to fine-tune the position of the central incisors and canines. Additional modifications, including **step-out bends**, localized composite attachments serving as crimpable hook substitutes, and segmental fixation, were incorporated to improve individual tooth movement and facilitate controlled force application. These finishing mechanics contributed to improved crown positioning, root alignment, and symmetry of the anterior dental arch before restorative procedures were undertaken.

Following satisfactory orthodontic space redistribution, **minimally invasive esthetic rehabilitation** was initiated. Direct composite resin was used to reshape **tooth 13** to resemble the morphology of a maxillary lateral incisor while preserving as much sound enamel as possible. In addition, a **provisional pontic** replacing tooth **22** was fabricated and attached during the active orthodontic phase to restore anterior esthetics, improve the patient's smile confidence, and maintain the orthodontically created space. The pontic also served as a space maintainer and provided soft tissue support until definitive prosthetic rehabilitation could be considered after completion of craniofacial growth.

The restorative strategy was intentionally conservative because the patient remained in the active growth period. Direct composite resin was selected instead of ceramic restorations because it provides a **reversible, repairable, and minimally invasive** treatment option that can be modified as the dentition and occlusion continue to develop. Definitive prosthetic rehabilitation, such as a resin-bonded fixed dental prosthesis or implant-supported restoration, was therefore postponed until skeletal maturity to ensure long-term functional stability, periodontal health, and optimal esthetic outcomes.

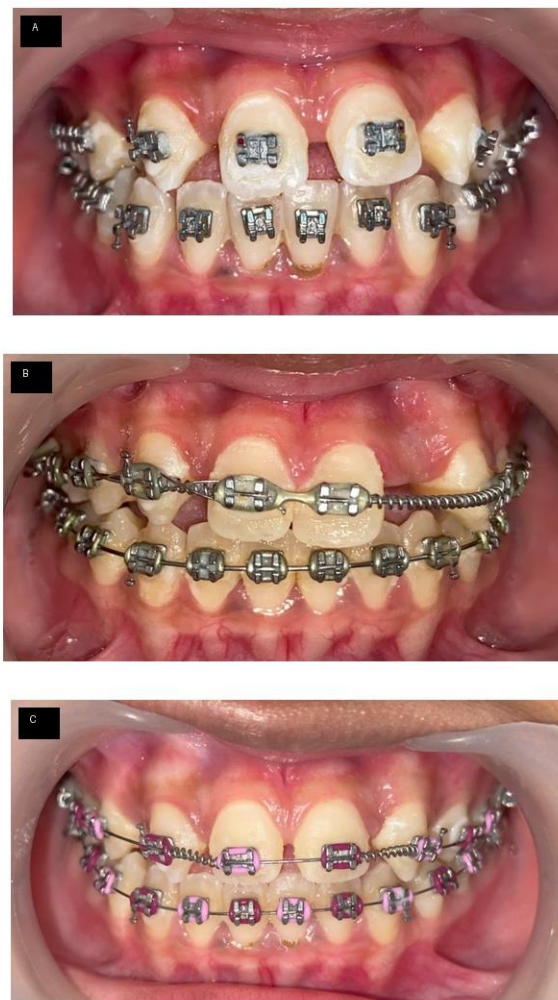


Figure 3. Orthodontic treatment progress showing fixed appliance therapy and open-coil mechanics for anterior space redistribution and correction of diastema.

Treatment outcome and follow-up

After approximately two years of fixed orthodontic therapy, alignment and leveling of the anterior maxillary teeth improved. The maxillary anterior diastema was substantially corrected, the midline relationship improved, and the patient showed enhanced smile esthetics. The combination of reshaping tooth 13 and placing a provisional pontic for tooth 22 provided an immediate esthetic improvement while preserving future prosthetic options.

At the latest evaluation, posterior interdigitation remained in refinement, and a residual posterior diastema in the right region required continued management. Long-term planning included maintaining the provisional restoration until growth completion and considering definitive rehabilitation, such as a resin-bonded fixed dental prosthesis or implant-supported restoration, after skeletal maturity.

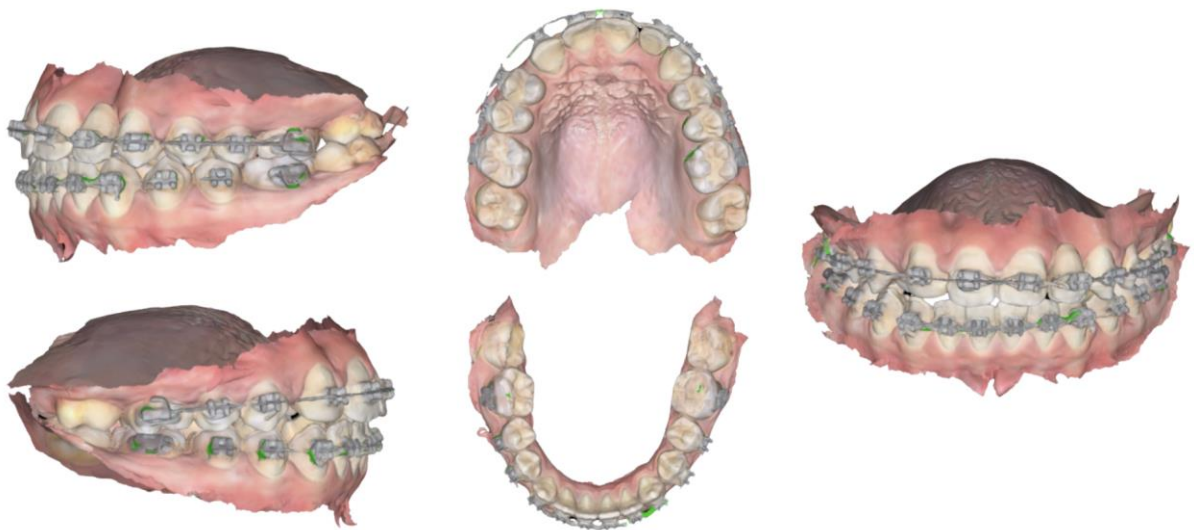


Figure 4. Post-treatment intraoral views showing improved anterior alignment, reduced diastema, and enhanced esthetic appearance after orthodontic space management, reshaping tooth and pontic with interim rehabilitation.

RESULTS AND DISCUSSION

This case demonstrates the successful multidisciplinary management of bilateral maxillary lateral incisor agenesis in an adolescent patient through comprehensive orthodontic treatment followed by conservative esthetic rehabilitation. The patient presented with bilateral absence of teeth 12 and 22, multiple anterior diastemata, Angle Class II Division 1 subdivision malocclusion, skeletal Class I relationship, and a convex facial profile. Comprehensive clinical examination, panoramic radiography, and cephalometric analysis confirmed that the missing lateral incisors were congenital rather than impacted or delayed in eruption, allowing an appropriate treatment plan to be established at an early stage. The primary treatment objectives were to obtain proper alignment and leveling, redistribute the anterior spaces, establish favorable root positioning, improve smile esthetics, and preserve future restorative options.

Bilateral maxillary lateral incisor agenesis presents a greater clinical challenge than unilateral agenesis because both esthetics and occlusion are simultaneously affected. The absence of both lateral incisors disrupts anterior tooth proportion, smile symmetry, canine guidance, and the distribution of occlusal forces. Consequently, treatment planning should not focus solely on replacing the missing teeth but should also consider facial profile, skeletal

relationship, arch length discrepancy, canine morphology, gingival architecture, overjet, overbite, and the patient's esthetic expectations before selecting either space closure or space opening as the definitive treatment approach (Jamilian et al., 2015; Meade & Dreyer, 2023).

Two principal treatment strategies have been described for patients with congenital absence of the maxillary lateral incisors: orthodontic space closure with canine substitution or orthodontic space opening followed by prosthetic replacement. Both approaches have demonstrated favorable long-term outcomes when appropriately indicated. The selection depends on several factors, including the patient's skeletal pattern, occlusion, facial profile, tooth size discrepancy, canine morphology, periodontal condition, remaining growth potential, and anticipated restorative requirements (Castellucci & Mathias, 2021; Meade & Dreyer, 2023; Park et al., 2011).

In the present case, space opening was selected because preservation of the lateral incisor space provided a more favorable esthetic and functional outcome. Maintaining the canine in its natural position preserved canine guidance, avoided excessive modification of canine anatomy, and facilitated future prosthetic rehabilitation after skeletal growth is complete. Furthermore, cephalometric findings, the patient's facial profile, and the distribution of the anterior spaces supported maintenance of the lateral incisor spaces rather than complete orthodontic space closure. This treatment philosophy is consistent with current recommendations that emphasize individualized treatment planning instead of adopting a universal approach for all patients with lateral incisor agenesis (Castellucci & Mathias, 2021; Meade & Dreyer, 2023).

Comprehensive orthodontic treatment was therefore initiated to establish an optimal dental foundation before restorative intervention. Orthodontic treatment should precede restorative rehabilitation because appropriate crown position alone is insufficient; adequate root parallelism, symmetrical spacing, and proper occlusal relationships are also essential for achieving stable esthetic and functional outcomes. Alignment and leveling using sequential nickel-titanium archwires allowed controlled correction of tooth irregularities while minimizing excessive orthodontic forces. Progressive wire advancement provided improved control of tooth movement before transition to rectangular stainless-steel working archwires for space redistribution and torque control.

Open-coil springs placed between teeth 13-11 and 23-21 played a critical role in regulating the spaces corresponding to the congenitally missing lateral incisors. The continuous light expansive force generated by nickel-titanium open-coil springs gradually separated adjacent teeth, permitting controlled redistribution of the anterior spaces while minimizing unwanted tipping. As the spaces approached the desired dimensions, passive open-coil springs were maintained to preserve the created spaces while other orthodontic mechanics were directed toward root alignment and finishing. This biomechanical approach enabled controlled tooth movement while providing sufficient restorative space for future prosthetic rehabilitation.

Additional orthodontic mechanics were required throughout treatment to optimize tooth positioning. Bracket repositioning, segmental fixation, power chains, and localized step-out bends were periodically employed to improve crown angulation, root parallelism, and anterior symmetry. Controlled distal movement of tooth 13 and adjustment of tooth 23 were performed according to root position, available alveolar bone, and restorative requirements. These

refinements are particularly important because inappropriate root angulation may compromise prosthetic space, gingival contour, and long-term esthetic outcomes.

The choice of conservative interim rehabilitation was strongly influenced by the patient's age and active skeletal growth. Implant-supported restoration was intentionally postponed because continued craniofacial growth may produce infraocclusion, marginal discrepancies, and unfavorable gingival architecture if implants are placed prematurely. Vertical eruption of adjacent teeth and ongoing alveolar development frequently continue throughout adolescence, whereas osseointegrated implants remain ankylosed within the bone. Consequently, early implant placement may result in progressive esthetic discrepancies that require additional corrective treatment later in adulthood (Kotecha et al., 2013; Meade & Dreyer, 2023).

Instead, a minimally invasive restorative approach was adopted. Composite resin was selected because it preserves sound tooth structure, can be repaired or modified easily, and accommodates changes associated with continuing growth. Direct composite restorations also allow periodic refinement of tooth anatomy and color without sacrificing additional enamel, making them particularly suitable for adolescent patients whose definitive treatment has not yet been completed.

Tooth reshaping represented another important component of the esthetic rehabilitation. The maxillary canine differs considerably from the lateral incisor with respect to crown width, cusp morphology, labial convexity, cervical contour, and gingival zenith. Therefore, conservative enamel recontouring combined with direct composite addition can effectively simulate the morphology of a lateral incisor while preserving natural tooth structure. In this patient, reshaping of tooth 13 successfully approximated the appearance of tooth 12, contributing to improved anterior symmetry and smile harmony without extensive prosthodontic intervention.

The provisional pontic replacing tooth 22 served multiple purposes during active orthodontic treatment. Besides restoring the patient's smile and improving psychosocial confidence, it maintained the orthodontically created space, preserved soft-tissue support, and facilitated visualization of the anticipated final esthetic outcome. Such interim restorations are particularly valuable in adolescents because they provide acceptable esthetics throughout the prolonged orthodontic phase while allowing modification or replacement as treatment progresses. Nevertheless, pontics require careful monitoring because plaque accumulation, rotational instability, loss of retention, and occlusal interference may negatively influence orthodontic mechanics and periodontal health if not adequately controlled (Sharma, 2013).

An equally important aspect contributing to treatment success was regular patient compliance. Monthly follow-up appointments enabled continuous monitoring of orthodontic tooth movement, reinforcement of oral hygiene instructions, professional plaque control when necessary, and timely adjustment of orthodontic mechanics. Good patient cooperation is especially critical in prolonged multidisciplinary treatment because inadequate oral hygiene or missed appointments may delay treatment progress and compromise periodontal stability as well as restorative outcomes.

The principal strength of this case lies in the successful integration of pediatric dentistry, orthodontic biomechanics, and minimally invasive restorative dentistry within a single comprehensive treatment plan. Early diagnosis, appropriate orthodontic space management, conservative esthetic rehabilitation, and preservation of future restorative options collectively

provided satisfactory functional and esthetic outcomes while respecting the biological limitations associated with ongoing craniofacial growth.

However, several limitations remain. The patient continues to require long-term follow-up until skeletal maturity before definitive prosthetic rehabilitation can be considered. The provisional pontic is intended only as an interim restoration, while composite resin may undergo wear, marginal discoloration, or color instability over time. Furthermore, future treatment decisions—including resin-bonded fixed dental prostheses, Maryland bridges, or implant-supported restorations—will depend on craniofacial growth completion, periodontal status, alveolar bone volume, and the patient's esthetic expectations. Continuous evaluation of occlusion, periodontal health, and skeletal development therefore remains essential to ensure favorable long-term prognosis.

Overall, this case highlights that successful management of bilateral maxillary lateral incisor agenesis extends beyond simple replacement of the missing teeth. Comprehensive diagnosis, meticulous orthodontic biomechanics, conservative restorative planning, and interdisciplinary collaboration are fundamental for achieving predictable esthetic, functional, and long-term outcomes in growing patients.

CONCLUSION

Bilateral maxillary lateral incisor agenesis in an adolescent patient requires individualized multidisciplinary planning that considers esthetics, function, growth status, and long-term restorative needs. In this case, orthodontic space management combined with tooth reshaping and provisional pontic replacement improved anterior alignment, smile esthetics, and functional relationships while preserving future definitive treatment options.

Conservative interim rehabilitation is a practical approach for growing patients because it is minimally invasive, repairable, and adaptable to ongoing craniofacial development. Long-term monitoring remains necessary until skeletal maturity is achieved and definitive prosthetic rehabilitation can be appropriately planned.

REFERENCES

- Ahmed, W. M., Alalola, B., Alsaloum, M., Verhaeghe, T., Andrew, J., & Abdallah, M.-N. (2021). 3D prosthodontic treatment planning for orthodontic patients: Interdisciplinary approach. In *3D diagnosis and treatment planning in orthodontics: An atlas for the clinician* (pp. 299–317). Springer.
- Antonarakis, G. S., & Carmichael, R. P. (2023). Management of missing teeth, dental implants, and prosthetic restoration in orofacial clefts. In *Cleft and craniofacial orthodontics* (pp. 517–541).
- Castellucci, M., & Mathias, P. (2021). Planning and orthodontic preparation for maxillary incisors reshaping. *Dental Press Journal of Orthodontics*, 26(4), e21spe4. <https://doi.org/10.1590/2177-6709.26.4.e21spe4>
- Chatzistavrianou, D., Wilson, P. H. R., & Taylor, P. (2019). A guide to implant dentistry part 1: Treatment planning. *Dental Update*, 46(5), 412–425.
- Cunha, A. C. da, Lee, H., Nojima, L. I., Nojima, M. da C. G., & Lee, K.-J. (2017). Miniscrew-assisted rapid palatal expansion for managing arch perimeter in an adult patient. *Dental Press Journal of Orthodontics*, 22(3), 97–108.
- Dharia, A., & Dharia, M. (2026). Timing of implant placement in growing patients with congenital tooth agenesis: A systematic review and developmentally guided clinical

- framework. *Journal of Oral Medicine and Dental Research*, 7(1), 1–14.
- Ergun, G., & Ataol, A. S. (2018). An interdisciplinary approach for hypoplastic amelogenesis imperfecta: A case report. *The Open Dentistry Journal*, 12, 466.
- Iswati, R., Farmasyanti, C. A., Ayub, A., Kuijpers-Jagtman, A. M., & Alhasyimi, A. A. (2023). Interdisciplinary management of Class III malocclusion with cleft lip and palate. *Dental Journal*, 56(1), 7–12.
- Jamilian, A., Perillo, L., & Rosa, M. (2015). Missing upper incisors: A retrospective study of orthodontic space closure versus implant. *Progress in Orthodontics*, 16, 2. <https://doi.org/10.1186/s40510-015-0072-2>
- Kotecha, S., Turner, P. J., Dietrich, T., & Dhopatkar, A. (2013). The impact of tooth agenesis on oral health-related quality of life in children. *Journal of Orthodontics*, 40(2), 122–129. <https://doi.org/10.1179/1465313312Y.0000000035>
- LeSage, B. P., & Bahat, O. (2025). Interdisciplinary approaches to restoring single-tooth implants in the esthetic zone. *Journal of Esthetic and Restorative Dentistry*, 37(5), 1219–1232.
- Meade, M. J., & Dreyer, C. W. (2023). Tooth agenesis: An overview of diagnosis, aetiology and management. *Japanese Dental Science Review*, 59, 209–218. <https://doi.org/10.1016/j.jdsr.2023.07.001>
- Montanari, M., Grande, F., Lepidi, L., Piana, G., & Catapano, S. (2023). Rehabilitation with implant-supported overdentures in preteens patients with ectodermal dysplasia: A cohort study. *Clinical Implant Dentistry and Related Research*, 25(6), 1187–1196.
- Noh, K., Kwon, K., Ahn, H., Paek, J., & Pae, A. (2016). Prosthetic rehabilitation of a cleidocranial dysplasia patient with vertical maxillofacial deficiency: A clinical report. *Journal of Prosthodontics on Complex Restorations*, 153–160.
- Park, J. H., Kim, D. A., & Tai, K. (2011). Congenitally missing maxillary lateral incisors: Treatment. *Dental Today*, 30(5), 81–84.
- Prummern, P. T. (2024). *Ankylosed teeth in orthodontics: Interdisciplinary treatment approach*. Vilniaus universitetas.
- Rosa, M. (2020). Adhesive restorative options for restorative space management in the anterior zone with or without orthodontic pretreatment: Some clinical considerations and case presentations. *International Journal of Esthetic Dentistry*, 15, S68.
- Sharma, N. S. (2013). Riding pontic: A tool to keep patients smiling. *International Journal of Clinical Pediatric Dentistry*, 6(2), 127–131. <https://doi.org/10.5005/jp-journals-10005-1204>
- Smith, E. L. (2025). Provisionals for resin-retained bridges: Case selection and effect on the final restoration. *Dental Update*, 52(4), 276–280.
- Thiesen, G. (2015). Agenesis of maxillary lateral incisor in an Angle Class II, Division 1 malocclusion patient. *Dental Press Journal of Orthodontics*, 20(5), 108–117.