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EARLY MANAGEMENT OF A HIGH MAXILLARY LABIAL FRENAL ATTACHMENT WITH CONCURRENT EARLY CHILDHOOD CARIES IN A 3-YEAR-OLD CHILD — A CASE REPORT

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ABSTRACT Median diastema is a physiological occurrence that is frequently seen in the maxillary jaw during the developing dentition. Patient esthetic and functional demands are both negated by the labial frenum's abnormal location in relation to the maxillary anterior teeth, which results in diastema, restricted upper lip mobility, and, as recent evidence suggests, an increased risk of early childhood caries. Lasers are now being used in several fields of dentistry as an alternative to conventional scalpel operations. The right time to intervene in a high maxillary labial frenal attachment has remained a subject of debate: conventional teaching favors deferring frenectomy until after eruption of the permanent canines, but persistent functional symptoms, parental concern, and an associated caries risk may lead to early intervention during the primary dentition. In this specific scenario, a 3-year-old female child presenting with irregular spacing between the upper front teeth, history of habitual upper lip pulling, a Kotlow Class III papillary-type frenal attachment, and concurrent early childhood caries underwent a diode laser frenectomy with adjunctive low-level laser therapy.

KEYWORDS : High labial frenum, frenectomy, diode laser, early childhood caries

INTRODUCTION

The maxillary labial frenum is a fibromucosal band connecting the inner aspect of the upper lip to the underlying periosteum, alveolar mucosa, or gingiva [1]. Its position migrates apically as the alveolar process grows and the dentition matures; failure of this migration results in a persistently high, thick, or fibrous attachment [2,3]. Placek et al. classified such attachments by the most apical extent of fibre insertion — mucosal, gingival, papillary, and papillary-penetrating — with the latter two categories most often implicated in midline diastema and gingival recession [4]. Kotlow later proposed a functional grading (Class I–IV) of the maxillary lip-tie based on the degree of restriction of upper lip mobility, which is particularly useful when the presenting complaint includes a functional component such as lip pulling rather than diastema alone [5].

Beyond diastema, recent cross-sectional evidence has associated the papillary type of MLF attachment with early childhood caries, with some studies reporting both a higher prevalence and greater severity of carious lesions among children with this attachment type, although the underlying mechanism (mechanical trapping of food/plaque versus a co-occurring risk-behaviour pathway) remains incompletely understood [6,7]. The 2025 American Academy of Pediatric Dentistry (AAPD) Policy on Management of the Frenulum favours an individualised, symptom- and risk-based approach to timing rather than a fixed age or dentition milestone, given the still-limited high-quality evidence base [8]. Soft-tissue diode lasers are now widely favoured for paediatric frenectomy because they achieve hemostasis without sutures, cause less discomfort than scalpel technique, and permit adjunctive low-level laser therapy (LLLT) to support post-operative healing [9,10].

We report a case in which a high, papillary-type, Kotlow Class III maxillary labial frenal attachment presented with the combination of diastema and habitual lip pulling in a 3-year-old child, together with concurrent early childhood caries and notched maxillary central incisors - illustrating a comprehensive, minimally invasive, laser-assisted approach to management in the primary dentition.

CASE PRESENTATION

Patient Information

A 3-year-old female patient presented for her first dental visit. The mother's chief complaint was irregular spacing between the child's upper front teeth and a habit of pulling the upper lip, both noted for approximately one year. Identifying details are withheld in accordance with patient-confidentiality requirements for case report publication.

Clinical Examination

A high maxillary labial frenal attachment of the papillary type (Placek classification) was noted, corresponding to a Kotlow Class III maxillary lip-tie [FIGURE 1]. ICDAS-II scores of 3 were recorded with respect to 51 and 61, and scores of 2 with respect to 52, 53, 62, 64, 74, and 83. The maxillary central incisors (51, 61) showed a notched incisal appearance.

FIGURE 1: PRE-OPERATIVE CLINICAL PHOTOGRAPH SHOWING HIGH LABIAL FRENAL ATTACHMENT

Diagnosis

Kotlow Class III maxillary labial frenal attachment; smooth-surface caries with respect to 51, 52, 53, 61, 62, 83; pit-and-fissure caries with respect to 64, 74; and dental dysplasia with respect to 51, 61 of uncertain aetiology. The notched appearance of the maxillary central incisors raised two differentials: congenital syphilis (Hutchinson-type dysplasia) and post-traumatic breakdown of the incisal edge.

Treatment Plan

Treatment was planned in two phases.
Phase I (preventive): dietary counselling targeting the identified sugar-exposure pattern.

Phase II (dental): labial frenectomy with a 980 nm diode laser; composite restoration with respect to 51, 52,61,62 and glass ionomer cement (GIC) restoration with respect to 64, 74. No medical treatment was required. Given the child's age and to limit chair-time at the first visit, restorative treatment was staged to follow the frenectomy.

Treatment Course

First visit: dietary counselling was reinforced, followed by labial frenectomy performed with a 980 nm diode laser under topical/local anaesthesia, without sutures, followed immediately by gentle lip-stretching exercises to discourage reattachment [FIGURE 2]

FIGURE 2: IMMEDIATE POST-OPERATIVE PHOTOGRAPH

Second visit (3 days post-operative): the surgical site was reviewed and low-level laser therapy (LLLT) was applied to the healing frenectomy wound as a biostimulatory adjunct.

Third visit (1 week post-operative): follow-up examination showed favourable healing progress of the labial frenum, with no signs of infection, excessive discomfort, or bleeding.

Composite restorations w.r.t 51,52,61,62 ad GIC restorations w.r.t 64,54.

At three weeks post-operatively, the labial frenum showed complete healing, with a well-epithelialised site and no recurrence of the restrictive attachment [FIGURE2].

FIGURE 2: COMPLETELY HEALED LABIAL FRENUM AT 1 MONTH FOLLOW UP

DISCUSSION

This case differs from the majority of reported paediatric frenectomy cases in two respects: the patient's very young age (3 years, full primary dentition) and the combined presentation of diastema, functional lip pulling, and concurrent early childhood caries. The papillary (Placek) / Kotlow Class III designation identifies both a diastema-associated and a functionally restrictive attachment, which supported the decision to intervene rather than defer, consistent with the AAPD's current individualised, risk-based approach to timing rather than a fixed age or dentition milestone [5,8].

The term "laser" stands for Light Amplification by Stimulated Emission of Radiation, and it refers broadly to any device that amplifies light into a highly focused, coherent beam [9]. Lasers used in medicine and dentistry generally fall into two categories: soft (low-level) lasers and hard (high-power) lasers. Soft lasers operate at cooler energy levels and are believed to stimulate cellular activity; most are diode-based, and manufacturers suggest they may support tissue healing by reducing pain, swelling, and inflammation. The helium-neon (He-Ne) and gallium-arsenide (Ga-As) lasers are common examples of this category.Within dentistry specifically, the most widely used laser types are holmium yttrium aluminum garnet (Ho:YAG), neodymium-doped yttrium-aluminum-garnet (Nd:YAG), carbon-dioxide (CO2), erbium-doped yttrium aluminum garnet (Er:YAG), diode, and argon lasers [10].

A defining feature of the diode laser is its capacity to selectively remove a thin layer of the upper epithelium, triggering a controlled, sterile inflammatory response. This approach is also minimally invasive, with little effect on the underlying bone and periosteum beneath the treated gingival tissue. In laser-assisted frenectomy specifically, postoperative benefits have included less discomfort, minimal bleeding, reduced scar tissue formation, and improved tissue healing.

The co-existence of a papillary-type MLF attachment with multiple active carious lesions in this case is consistent with recent cross-sectional evidence linking this specific attachment type to both the presence and severity of early childhood caries. Yilgör et al. (2025) found significant association between MLF attachment type and anterior caries; papillary type most common among children with ECC and linked to more severe cavitated lesions. Kalaivanan et al. (2025), explored whether MLF attachment influences severity of early childhood caries and found that papillary type of maxillary frenum attachment is associated with increased severity of caries. While a causal, mechanistic relationship (e.g., food/plaque stagnation from restricted lip and cheek clearance, or difficulty maintaining oral hygiene around a tethered frenum) is plausible, both cited studies caution that shared behavioural or dietary risk factors may also contribute, and a papillary attachment should not be treated as an isolated causal explanation for caries [11,12]. In this case, the additional caries-risk factors identified on dietary history — frequent sugar exposure and a 'watch-out zone' sweet score — support a multifactorial aetiology, and management was planned accordingly with combined preventive counselling, minimally invasive and definitive restoration, staged across visits appropriate to the child's age and cooperation [11].

Taken together, this case supports a comprehensive, individualised model of care in which a high maxillary labial frenal attachment presenting with functional symptoms in early childhood is managed on its clinical merits rather than deferred by age alone, while concurrently screening for — and addressing — the caries risk with which this specific attachment type may co-exist.

CONCLUSION

Laser-assisted frenectomy is a dependable option for early childhood frenum excision. It minimizes surgical time, eliminates the need for sutures, and is associated with minimal post-operative pain or discomfort. It also tends to leave little to no visible scarring, with a low likelihood of recurrence. Given these advantages, laser frenectomy is considered a safe, effective, and well-tolerated approach for soft tissue procedures in children, making it a favorable choice for minor pediatric surgical interventions.

REFERENCES

1. Priyanka M, Sruthi R, Ramakrishnan T, Emmadi P, Ambalavanan N. An overview of frenal attachments. J Indian Soc Periodontol. 2013;17(1):12-15.
2. Santa Maria C, Aby J, Truong MT, Thakur Y, Rea S, Messner A. The superior labial frenulum in newborns: what is normal? Glob Pediatr Health. 2017;4:2333794X17718886.
3. Richardson ER. Development of the anterior segment of the maxillary deciduous dentition. Am J Orthod. 1972;62(3):227-235.
4. Placek M, Skach M, Mrklas L. Significance of the labial frenum attachment in periodontal disease in man. Part I. Classification and epidemiology of the labial frenum attachment. J Periodontol. 1974;45(12):891-894.
5. Kotlow LA. The influence of the maxillary frenum on the development and pattern of dental caries on anterior teeth in breastfeeding infants: prevention, diagnosis, and treatment. J Hum Lact. 2010;26(3):304-308.
6. Yilgör NY, Şimşek Derelioğlu S, Eser Tuna P, Şengül F, Aslan İnce NN. Association between maxillary labial frenum attachment types and early childhood caries: a cross-sectional study. Oral Health Prev Dent. 2025;23:569-575.
7. Kalaivanan D, Alagarsamy L, Das M, et al. Does maxillary labial frenal attachment in children influence the severity of early childhood caries: an exploratory cross-sectional study. J South Asian Assoc Pediatr Dent. 2025;8(3):170-174.
8. American Academy of Pediatric Dentistry. Policy on management of the frenulum in pediatric patients. The Reference Manual of Pediatric Dentistry. Chicago, IL: AAPD; 2025:80-85.
9. Patil RS, Rahate I, Fulzele P, Dubey R, Yeluri R, Solanki D. Pediatric high labial frenum management: utilizing a diode laser for the transformation of the smile of an eight-year-old child. Cureus. 2024;16(6):e63346.
10. Convissar RA. Principles and Practice of Laser Dentistry. 2nd ed. St. Louis: Mosby Elsevier; 2016.
11. Baxter RT, Zaghi S, Lashley AP. Safety and efficacy of maxillary labial frenectomy in children: a retrospective comparative cohort study. Int Orthod. 2022;20(2):100630.
12. Feroze KB, Wang J. Dental stigmata of congenital syphilis: a historic review with present day relevance. Head Neck Pathol. 2016;10(2):190-191.
13. Hutchinson's triad and Hutchinson's teeth. In: Rapini RP, Bolognia JL, Jorizzo JL, eds. Dermatology. St. Louis: Mosby; 2007.
14. Viet DH, Ngoc VT, Anh LQ, Son LH, Chu DT, Ha PT, Chu-Dinh T. Reduced need of infiltration anesthesia accompanied with other positive outcomes in diode laser application for frenectomy in children. J Lasers Med Sci. 2019;10(2):92-96.