

Clinical and Timing Considerations for Surgical Removal of Mesiodens: Early vs Late Treatment

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<https://doi.org/10.58624/SVOADE.2026.07.025>

Received: June 01, 2026

Published: June 23, 2026

Citation: Mazzocchi A, Mazzocchi S, Floria G. Clinical and Timing Considerations for Surgical Removal of Mesiodens: Early vs Late Treatment. *SVOA Dentistry* 2026, 7:3, 189-195. doi: 10.58624/SVOADE.2026.07.025

Abstract

Background: The management of impacted mesiodens represents a significant challenge in pediatric oral and maxillofacial surgery. The optimal timing for surgical intervention remains a subject of clinical debate, balancing the benefits of preventing eruption disturbances against potential surgical risks to developing adjacent structures. This study evaluates the outcomes of early versus late surgical removal of mesiodens over a 30-year period.

Methods: A retrospective analysis was conducted on 50 healthy pediatric patients who underwent surgical extraction of mesiodens between 1989 and 2018. All surgical procedures were performed exclusively under local anesthesia (4% articaine) combined with non-pharmacological behavioral management strategies. Patients were stratified into two groups based on age at the time of intervention: an early intervention group (6–8 years old) and a late intervention group (>8 years old). Diagnostic and surgical planning utilized intraoral radiographs, panoramic films, and Cone-Beam Computed Tomography (CBCT) for complex cases. Surgical approaches included 20 palatal flaps, 1 buccal flap, and 29 cases managed with specialized pediatric extraction techniques. Adjacent teeth eruption and the need for subsequent orthodontic traction were monitored.

Results: Early surgical intervention (6–8 years of age) yielded a 100% rate of spontaneous eruption of the adjacent permanent maxillary incisors, completely eliminating the need for postoperative orthodontic traction. In contrast, delayed intervention (>8 years of age) was significantly associated with permanent incisor impaction, root dilaceration, and a high requirement for complex orthodontic traction. All procedures were successfully completed under local anesthesia; no severe intraoperative or postoperative complications were recorded, and no patient required general anesthesia.

Conclusions: Early surgical removal of mesiodens between 6 and 8 years of age significantly optimizes clinical outcomes by ensuring the spontaneous eruption of adjacent permanent teeth and preventing the need for orthodontic traction. Furthermore, pediatric oral surgery for supernumerary teeth can be safely and effectively executed under local anesthesia alone, provided it is supported by tailored behavioral guidance techniques, thereby reducing systemic risks and healthcare costs associated with general anesthesia.

Keywords: *Mesiodens; Supernumerary Teeth; Early Intervention; Local Anesthesia; Behavioral Management; Eruption Disturbance.*

Introduction

The management of impacted teeth is always an important challenge in paediatric oral and maxillofacial surgery. As mesiodens, like other supernumerary impacted teeth may prevent eruption of the permanent maxillary incisors, these supernumerary teeth are removed to ensure safety of the normal permanent teeth and prevent interference with their eruption (1).

According to some authors in the past years, these supernumerary teeth are best removed when the permanent incisors exhibit 50 percent of their root development (1), but today the clinical dilemma centers again on a fundamental question: should surgical intervention be performed early to prevent interference with normal tooth development or should clinicians wait until root formation is more completed to minimize surgical complications? (2)

The age period represents a critical decision point where benefits of early intervention (6-7 years of age) typically outweigh surgical risks. (2)

Due to their low prevalence, literature often presents clinical advice, based on personal clinical experience, which can be optimized when there is cooperation between orthodontists and maxillofacial surgeons.

The aim of this study is to discuss timing decisions opposing risks with long-term consequences.

Materials and Methods

From 1989 to 2018, 50 healthy patients with mesiodens were examined. The number of mesiodens per patient, position, eruption status and complications (delayed eruption of adjacent teeth, diastema, displacement, rotation, root resorption of adjacent teeth) were investigated.

Age and sex distribution were also reported.

Orthopantomographic X rays were taken, before operations, in 49 cases. In 1 case, a 17-yrs-old patient, CBCT X rays were chosen to detect the impacted mesiodens.

Supernumerary tooth extractions were performed by the same surgeon, always using local anesthesia (articaine 4%). Palatal muco-gingival flap was required in 20 cases. Vestibular muco-gingival full thickness flap was performed in 1 case.

Finally, spontaneous eruption, after mesiodens removal, was investigated.

Results

The age of the patients ranged from 6 to 17 years (mean 10.12 years). Sex distribution had a male/female ratio almost the same: 27 males (54%) and 23 females (46%). Mesiodens were single and located palatally in 49 cases (98%) and labially in 1 case (2%). 14 patients were with permanent teeth and 36 with primary teeth. Crown shape of the mesiodens was mainly conical (94%). Eruption of most mesiodens was observed in patients with primary dentition 6-8 yrs old (80%). Older patients mainly showed impacted supernumerary teeth.

Complications were recorded in less than 50% of the cases: midline diastema (15%) adjacent tooth displacement or rotation (30%). No root resorption was observed. The mesiodens located in the middle showed a greater frequency of complications than those in other locations.

Spontaneous eruption was observed in 40 cases (80%). In this last group, 100% eruptions were recorded in children between 6 and 8 years old.

Discussion

Mesiodens are the most common supernumerary teeth, occurring in lower prevalence of the population, with an apparent higher frequency in males than females. These teeth can be present as part of a different syndromes, such as Gardner syndrome, or with facial fissures; however, they can appear in patients without any pathology (3). Their prevalence oscillates to 0.5-3.8% in patients with permanent teeth and to 0.35-0.6% in patients with primary teeth (3,4).

According to Hyun who investigated 919 patients, 71.38% had 1 mesiodens, 27.75% had 2, 0.65% had 3 and 0.22% had 4 mesiodentes. Most mesiodens were located in the palatal area (91.50%). According to the same authors, 56.58% mesiodens were in inverted position and 16.08% were horizontal. Therefore, most of the mesiodens were in an inverted direction (5).

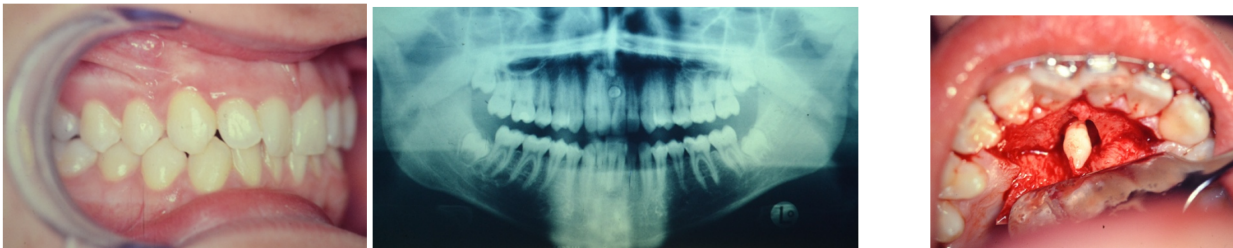
Usually, the shape is conical and mesiodens is smaller than the neighbouring incisor (6). Several hypotheses have been suggested for the formation of supernumerary teeth. The cause of mesiodens is not fully understood, although proliferation of the dental lamina and genetic factors have been implicated (4). A mesiodens is often diagnosed coincidentally during a radiological or a clinical examination (2). Since 2012, CBCT investigations were proposed for impacted mesiodens. This radiological examination should be recommended only in older patients (8).



Case 1. Mesiodens in a 2.1 palatal position without any complication.

Case 1. X Rays

However, a mesiodens may also be diagnosed in relation to a clinically identified central diastema and an eruption disturbance, or a rotation of a central incisor, even if, in some cases, they have not presented any sign for years (2).



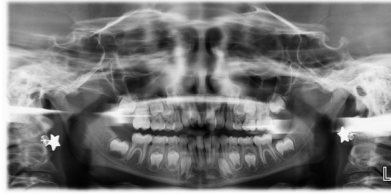
Case 2. E.R. 13-yrs-old. 1.1 rotation and midline palatal mesiodens.

Case 2. Surgical removal



Case 2. 1year follow up

In our study, associated complications were observed in less than 50% of cases although other authors reported them in 72% of the patients. Usually, removal of the mesiodens in children and adolescents results in spontaneous recovery of the complications even though in our study spontaneous eruption was observed mainly in patients with primary dentition (7).



Case 3. M.G. 8-yrs-old: central diastema and mesiodens.

Case 3. Mesiodens extraction.



Case 3. 10 months follow up and spontaneous diastema correction.



Case 3. 6-yrs-old follow up after orthodontic functional treatment.

According to some authors, the majority of delayed permanent teeth would erupt spontaneously if sufficient space is available or created at the time of the unerupted supernumerary extraction (9,10,11). The angulation of impaction of the permanent incisor is associated with a delay in eruption. Eruption of the impacted tooth within eighteen months following removal of the supernumerary was observed in 91% of cases in a 120 patients' study who were treated in general anesthesia (12). Our cases confirm 100% eruptions of adjacent teeth when the supernumerary tooth was extracted in children between 6 and 8 years. Late removal probably interferes with the normal process of maturation and eruption of the teeth next to the supernumerary.



Case 4. C.S. 6-yrs-old central diastema.



Case 4. Palatal view and mesiodens after extraction.



Case 4. 1-year follow up with spontaneous correction of the diastema.

Early removal of unerupted maxillary supernumerary teeth seems to be advantageous with a cutoff point of approximately 6 to 7 years old, after which more complications are expected (11,12,13,14).

Patient cooperation represents a critical factor during surgical planning.

Patients in younger age (3-10 years) are often supposed to require general anesthesia to ensure their safety and surgical success, minimizing problems regarding children cooperation and reducing the possibility of damage to adjacent permanent teeth or blood vessels during the surgical procedure.

Leyland reported a mean age of referral of 9.1 years in 120 patients operated in general anesthesia (12).

Though the general anesthetic approach should always consider the child's general health, its procedural complexity (hospitalization, costs etc.) and family preferences, the general anesthesia could represent a risky procedure in comparison with the morbidity of a supernumerary tooth.

Local anesthesia (articaine 4%) has a low impact on children's health (15). Compared with lidocaine, articaine was associated with slightly faster onset and longer anesthetic duration in both infiltration and nerve block anesthesia, and with lower pain scores in infiltration anesthesia (16).

Local anesthesia in children requires: time, patience, empathy and some technical skills (15). As palatal injection is painful, a very small amount of local anesthetic cream could reduce this discomfort, before using needles. Tell-show-do procedures are useful to create cooperation between surgeon and child (17). Patience is always the key to perform the extraction. A child is not a half-adult. Children have to understand how to control and reduce their fears. In our experience every extraction was successfully performed using local anesthesia.

Conclusions

Based on the findings of this 30-year retrospective study, the following conclusions can be drawn:

-Optimal Timing for Intervention: Early surgical removal of mesiodens in patients aged between 6 and 8 years significantly optimizes clinical outcomes. In this younger cohort, the rate of spontaneous eruption of adjacent permanent teeth reaches 100%, effectively eliminating the need for subsequent complex orthodontic traction. Conversely, delayed surgical intervention interferes with the physiological maturation and eruption of neighboring teeth.

-Efficacy of Local Anesthesia: Local anesthesia (specifically utilizing 4% articaine) represents a safe, reliable, and highly effective alternative to general anesthesia for pediatric oral surgery. When supported by dedicated behavioural management strategies—such as the "Tell-Show-Do" technique, patience, and a proper psychological approach—surgical success can be routinely achieved while minimizing procedural complexity, systemic risks, and hospitalization costs.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgements

None

References

1. Kaban LB Pediatric Oral and Maxillofacial Surgery. W.B.Saunders Company, Philadelphia 1990
2. Adachi M. Mesiodens removal: resolving the early versus late intervention dilemma. *J Oral Maxillofac Surg.* 2026 Feb;84(2):225-232. doi: 10.1016/j.joms.2025.09.014.
3. Montenegro PF, Castellón EV, Aytés LB, Escoda CG. Retrospective study of 145 supernumerary teeth. *Med Oral Patol Oral Cir Bucal.* Jul 1;11(4):E339-44, 2006
4. Russell KA, Folwarczna MA. Mesiodens--diagnosis and management of a common supernumerary tooth. *J Can Dent Assoc* 69:362-366, 2003
5. Hyun et al. Characteristics and Complications of Mesiodens. *J Oral Maxillofac Surg* 67>2639/2643, 2009
6. Van Buggenhout G, Bailleul-Forestier I. Mesiodens. *Review Eur J Med Genet* Mar-Apr;51(2):178-81, 2008
7. Anthonappa, R. P., King, N. M., & Rabie, A. B. (2012). Cone-beam computed tomography for the localization of supernumerary teeth: a clinical study. *International Journal of Paediatric Dentistry*, 22(4), 274-281.
8. Baart JA, Groenewegen BT, Verloop MA. Correlations between the presence of a mesiodens and position abnormalities, diastemas, and eruption disturbances of maxillary frontal teeth. *Ned Tijdschr Tandheelkd* Aug;116(8):399-402, 2009.
9. Bryan RA, Cole BO, Welbury RR. Retrospective analysis of factors influencing the eruption of delayed permanent incisors after supernumerary tooth removal. *Eur J Paediatr Dent.* Jun;6(2):84-9, 2005.
10. Cochrane, S. M., Clark, J. R., & Clark, N. P. (2010). Predictors of spontaneous eruption of occluded permanent incisors following excision of associated supernumerary teeth. *Journal of Orthodontics*, 37(1), 11-17.
11. Omer RS, Anthonappa RP, King NM. Determination of the optimum time for surgical removal of unerupted anterior supernumerary teeth. *Pediatr Dent* Jan-Feb;32(1):14-20. 2010

12. Leyland L, Batra P, Wong F, Llewelyn R. A retrospective evaluation of the eruption of impacted permanent incisors after extraction of supernumerary teeth. *J Clin Pediatr Dent Spring*;30(3):225-31, 2006
13. Mason C, Azam N, Holt RD, Rule DC. A retrospective study of unerupted maxillary incisors associated with supernumerary teeth. *Br J Oral Maxillofac Surg Feb*;38(1):62-5. 2000
14. Foley J. Surgical removal of supernumerary teeth and the fate of incisor eruption. *Eur J Paediatr Dent Mar*;5(1):35-40, 2004
15. Mazzocchi A, Clini L, Ferdeghini R, Rebaudi A. Approccio del chirurgo orale al paziente pediatrico: anestesia locale contro anestesia generale. From: *Atti del VII Congr. Nazionale Chir Maxillofac, Ischia 1991: 1547-1551*
16. Hongjun Gong, Qi Wu, Qingping Wu, Yanan Hu, Bo Men. Efficacy Comparison of Articaine versus Lidocaine in Dental Anesthesia: A Meta-analysis of Randomized Controlled Trials. *BMC Anesthesiology*. <https://doi.org/10.1186/s12871-026-03831-x>, 2026
17. American Academy of Pediatric Dentistry (AAPD). (2020/2025). Behavior guidance for the pediatric dental patient. *The Reference Manual of Pediatric Dentistry*. Chicago, Ill.: AAPD.

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