

Australian Society
of Orthodontists



THE UNIVERSITY OF
SYDNEY



Ectopic Eruption of Permanent First Molars

*Creating **B**righter Futures*

Ectopic Eruption of Permanent First Molars

Ectopic permanent first molar eruption is most commonly seen as incomplete eruption and meso-angular impaction beneath the distal of the deciduous second molar.¹ The upper first molars are most commonly affected and can present with an atypical resorption of the distal root of the second deciduous molar.

Bjerklin used the term 'reversible' to describe ectopic upper molars that self corrected and 'irreversible' for those that did not. He noted that most instances of self-correction occur by age 7, with only a few resolving themselves thereafter.²

Rates of self-correction from 39.3% to 69.4% have been observed.³⁻⁶ Mild (cemental), and moderate (dental resorption without pulp exposure) impaction displayed a greater likelihood of self-correction compared to more severe forms of impaction.⁶

Maxillary first molars are the most commonly affected with reported rates from 1.8% to 6%.^{2, 4, 7-10} Mandibular first molars have an affected rate of 0.75%.⁸ There is an increased bilateral vs. unilateral occurrence (63.6% vs. 36.4%) with increased frequency in males.^{6, 11, 12}

Bjerklin's study indicated an increased prevalence in children with clefts of 21.8% vs 4.3% in unaffected patients, whereas Carr and Mink reported 25%.^{13, 14} Kuroi observed a significant familial tendency with occurrence of ectopic eruption in 19.8% of siblings of affected individuals.¹⁵ No difference in rates between Caucasian, African-American, Hispanic or Asian populations have been noted.⁹

Associations with other dental anomalies

Bektor found an association of impacted canines, causing root resorption on centrals and laterals, with ectopic molar eruption and resorption on second primary molars.¹⁶ Bacetti noted reciprocal associations with ectopic maxillary molars and small sized laterals and infraoccluded second molars.¹⁷ Similarly Bjerklin reported an increased reciprocal association with ectopic eruption and infraoccluded deciduous second molars and premolar aplasia. Maxillary canine impaction was also associated with molar ectopia.¹⁸

Mooney also found an increased association with molar infraocclusion and cleft lip and palate.³

The presence of molar ectopia may provide an early indication for the future presence of other associated dental anomalies. Whether they are part of the same genetic syndrome with variable penetrance or as a symptom of wider local or systemic factors is debatable.

Clinical and radiographic features

Clinical features that ectopic maxillary molar eruption display may vary from early signs such as canting of the upper second deciduous molar occlusal plane,¹⁹ through to an asymmetric (left vs. right) molar eruption pattern, or overt impaction with the distal cusps only visible through the mucosa and the mesial marginal ridge gingival to the maximum bulbosity of the second deciduous molar.² Later presentation may involve the presence of premature mobility, acute pain and/or infection related to the resorption of the second deciduous molar.

Radiological diagnosis is usually definitive and demonstrates the mesial part of the maxillary first molar crown impacted against the distal surface of the second deciduous molar. Varying degrees of root resorption may exist.³ An 'enamel ledge' in the second deciduous molar may prevent normal eruption of the first molar and result in space loss due to the resultant mesial impaction.¹⁹

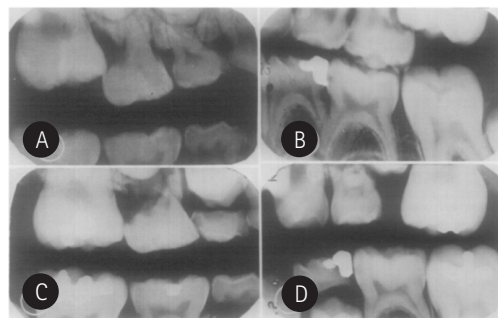


Fig. 1. Reversible (A, C). Irreversible (B, D). Radiographs and diagnosis and 1 year followup.²⁰

Colgate

CARE COLUMN

Promoting Oral Health and Your Practice

As the New Year kicks off you may want to keep in mind opportunities to promote oral health and your practice during the year. A couple of dates to put in your diaries are August 6th -12th which is the Australian Dental Association's Dental Health Week, and the 14th Oct which is World Cavity Free Future Day organised by the Alliance for a Cavity Free Future (ACFF). Colgate supports the ADA and the ACFF with packs of products and materials for use in projects that will benefit your communities during these campaigns. Look out for the application forms which will be sent out by the ADA prior to these dates and join in the fun!

This year World Cavity Free Future Day reached 1.4 million people in Australia with the message #ChooseWater to encourage people to replace sugary drinks with water to help prevent dental decay. Hopefully this year we will reach even more people, with your help.



COLGATE IS THE PREFERRED BRAND OF THE ASO NSW



Sequelae

Sequelae of unmanaged ectopically placed first molars may include: continued resorption of the second deciduous molar, consequences related to the premature loss of the upper second deciduous molar such as localised space loss, impaction of the second premolar due to tipping of the upper first permanent molar, altered molar buccal occlusion and vertical occlusal plane discrepancies due to over-eruption of unopposed teeth.

Management

Treatment objectives may include:

- Distalisation of ectopic molars into a normal antero-posterior relationships
 - Maintenance of buccal segment integrity
 - Maintenance of favourable exfoliation sequence
 - Prevention of vertical occlusal irregularities due to supra-eruption of unopposed molars
- Maintenance of overall arch dimensions

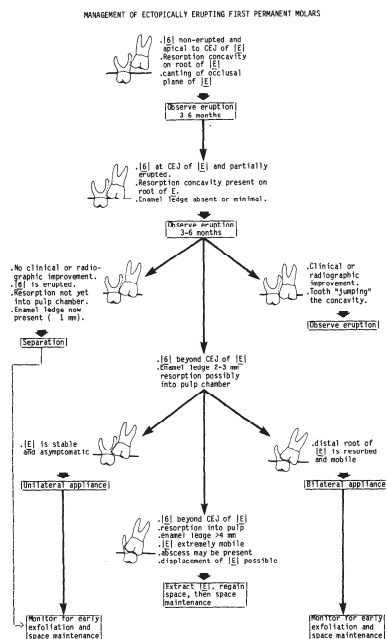


Fig.2. UCLA flowchart showing guidelines of managing ectopically erupting first molars (attached full size at the end of this issue).

Important modifying factors that may affect management include:

- 1) The likelihood of self correction
- 2) The prognosis of the second deciduous molar in the short and midterm (ie, will it survive to normal exfoliation?)
- 3) Whether distalisation, mesialisation or maintenance of the upper first molar position is desired in the overall treatment plan with regard to the patient's occlusion and profile.

Self Correction

Favourable factors for self correction are: age less than seven,²⁰ resorption of cementum or dentine only without progression into the pulp chamber of the second deciduous molar,⁶ first molar position apical to the CEJ of the second deciduous molar with minimal resorption present.¹⁹

Unfavourable factors include an age greater than 8 years²⁰ and increased resorption into the pulp chamber of the second deciduous molar.⁶

Kennedy described a protocol of radiographic monitoring for a period of 3-6 months with assessment for first molar vertical position change. Improvement without further resorption would prompt continued monitoring. Lack of

vertical improvement without further resorption would prompt intervention and possibly exposure of the tooth if it has not erupted sufficiently for treatment. Worsening resorption would be an indication to intervene.¹⁹

Other indications for intervention despite a favourable age may include the level of the lower first molar relative to the occlusal plane. Intervention may be necessary to normalize the vertical position of the upper first molar and to minimise lower molar supra-eruption. In addition if intervention is as simple as placing a separator then even if self correction is likely the placement of a separator may significantly increase the prognosis of correction.

Excess mobility of the second deciduous molar or signs and symptoms of infection may necessitate its extraction or allowing it to be exfoliated.

Intervention

If intervention is indicated, it should be determined whether arch length regaining is appropriate or if minimal arch length loss can be accepted.

Considerations in arriving to this conclusion should include: the skeletal base, amount of crowding, whether an extraction or non extraction approach is planned, confirming there is no agenesis of the second premolar, incisal proclination as well as the patient's profile.

Dis-impaction by molar distalisation

In most instances, the aim would be arch length preservation or space regaining. There are several techniques available from simple separation to distalisation procedures.

Separation

Factors determining the viability of separation include: access to the contact area for placement of separators and degree of molar impaction. Elastomeric separators, separating springs, brass wires or a combination thereof can be utilised.

Elastomeric separators may be placed between the first permanent molar and the second deciduous molar and renewed every 2-3 weeks, or less often if the patient and parent can be relied on to monitor the presence of the separator. Their advantages include a low cost, no anaesthesia required and minimal occlusal interference. Disadvantages are the occasional need for frequent follow-up, their limited application to mild impaction and sometimes the difficulty of their placement in more severe impactions.

Prefabricated separating springs offer ease of placement. However, drawbacks include the potential occlusal interference and that local anaesthesia may be required for insertion. Limited access may hinder their insertion and there are additional safety concerns regarding the loss of the spring.

The brass ligature technique involves threading a brass wire beneath the contact point whilst the other end crosses occlusally. A separating force is created by twisting the wire to form a ligature. These may be difficult to place and may also require local anaesthesia. Following the development of elastomeric and spring separators brass wire is rarely used.



Fig 3. (a) Elastomeric separators (before and after disimpaction), (b) separating spring and (c) brass wire ligature.²¹

is published by the Australian Society of Orthodontists (NSW Branch) Inc. in conjunction with the Orthodontic Discipline at the University of Sydney.

The newsletter is intended to help keep the dental profession updated about contemporary orthodontics, and also to help foster co-operation within the dental team.

Without the generous support of Henry Schein Halas and Colgate, who are an integral part of the dental team, this publication would not be possible.

The statements made and opinions expressed in this publication are those of the authors and are not official policy of, and do not imply endorsement by, the ASO (NSW Branch) Inc or the Sponsors.

Correspondence is welcome and should be sent to:

Department of Orthodontics
University of Sydney
Sydney Dental Hospital
2 Chalmers Street,
Surry Hills NSW 2010

AUTHOR & EDITORS

Dr Chun M. Ang-Khaw
PRINCIPAL AUTHOR

Dr Chrys Antoniou
Dr Dan Vickers
Prof M Ali Darendeliler
Dr Ted Peel
Dr Ross Adams
Dr Susan Cartwright
Dr Vas Srinivasan

www.aso.org.au

Distalisation procedures

This procedure is indicated in cases of more severe impaction when a separator cannot be fitted or when the use of separators has failed. It involves the use of various orthodontic appliances to distalise, upright and dis-impact the ectopic first molar.



Fig. 4. Halterman appliance (elastomeric distalisation), Humphrey appliance (spring distalisation).²¹

Often unilateral anchorage will be sufficient if the second deciduous molar is stable, however, additional anchorage teeth (ipsilateral or contralateral) may be required if there is mobility of the second deciduous molar, or the likelihood of it developing, due to resorption and the addition of orthodontic forces.

Methods described vary from: sectional fixed appliances and coil spring,²² use of a Nickel Titanium wire bonded to the second deciduous molar and activated against the first molar,²³ removable or fixed appliances with finger springs for first molar distalisation (Humphrey appliance),^{19, 24, 25} to fixed unilateral or bilateral appliances with a distal hook from which elastic is run to a bonded button on the first molar (Halterman appliance).^{19, 26}

One of the simplest methods of distalisation is the use of bonded brackets and an archwire with a compressed coil spring. Where possible the second deciduous molar is not bracketed to reduce the chance of it being loosened by the orthodontic force.

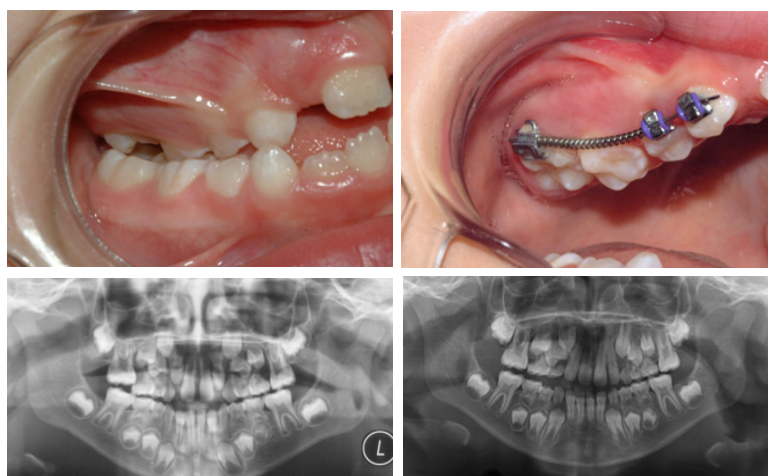


Fig.5. Left, photo and OPG before distalisation of the upper right first molar. Right, post distalisation with bonded brackets, archwire and coil spring.

Note on both OPGs the resorption of the distal of the upper left second deciduous molar indicating that at one time the upper left first molar was also impacted and self corrected itself.

Once corrected, the potential for premature exfoliation of the second deciduous molar, and other problems, should be monitored. Survival until normal time for exfoliation has been anecdotally reported by many practitioners, however, the need for space maintenance should be considered if the early loss of the second deciduous molar occurs.¹⁹

If the second deciduous molar is symptomatic and extraction is indicated, space regaining and or maintenance should be assessed based on desired arch length requirements. However the extraction of the second deciduous molar should usually be a 'last resort' as the deciduous molar is by far the most practical space maintainer.

Mesialisation of the first molar

In situations where some loss of arch length can be accepted or is planned, minor disking of the distal surface of the second deciduous molar may be undertaken in conjunction with the use of separators. This may include reciprocal or minimum anchorage situations such as premolar extraction cases.

If second premolars are congenitally missing, extraction of the second deciduous molar to allow mesialisation of the first molar should be considered.

Conclusion

Early diagnosis will allow timely intervention to prevent the disruption of local occlusal relationships and reduce or prevent the need for much more complicated treatment in the future if the second deciduous molar is lost prematurely leading to significant space loss and second premolar impaction. A diagnosis may also instigate greater vigilance in siblings due to a familial tendency, as well as increased observation for other potential dental anomalies. Simple management options have been described.

References upon request



Australian Society
of Orthodontists

HENRY SCHEIN® | HALAS

Rely on Us

MANAGEMENT OF ECTOPICALLY ERUPTING FIRST PERMANENT MOLARS

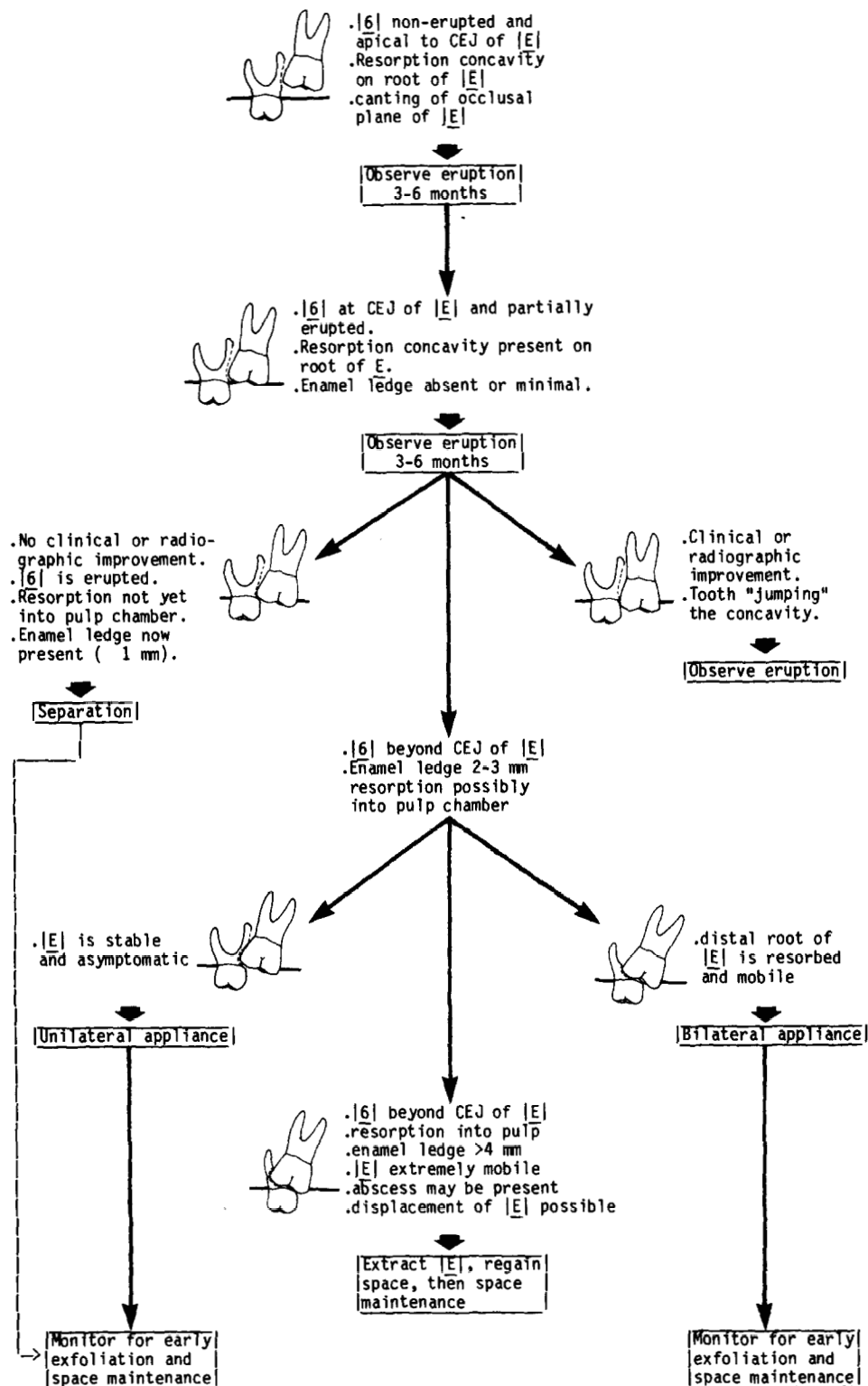


Fig. 1. UCLA flowchart showing guidelines for management of ectopically erupting first permanent molars.