

Australian Society
of Orthodontists



University of Sydney



Early Orthodontic Treatment

PART 2

Creating Brighter Futures

Early Orthodontic Treatment

PART 2

Begun in Part 1, this issue continues the discussion of orthodontic problems that are usually better treated early prior to the early permanent dentition stage of development.

SPACE MAINTENANCE

The premature loss of primary teeth due to caries, trauma, ectopic eruption or loss of tooth width due to interproximal caries, can lead to a range of undesirable tooth movements of primary and/or permanent teeth. This loss of arch length can result in crowding, rotations, ectopic eruption, crossbite, excessive overjet and overbite, and unfavourable molar relationships⁽⁷⁾. Space maintainers are often advisable to mitigate these adverse effects.

Factors to consider when deciding if space maintenance is required are dental age, eruption pattern and sequence, bony covering of the unerupted teeth, available space, interdigitation, time elapsed since tooth loss, the overall malocclusion, future growth, likely future treatment, tooth agenesis and the presence of anomalies. There are numerous designs for space maintainers, some of which are displayed in Figure 10.



Fig 10 Examples of space maintainers.

Ectopic eruption of the permanent first molar under the distal curvature of the second deciduous molar crown is not uncommon. This painless and often unrecognised condition occurs more often in the maxilla than the mandible. Lack of timely intervention can result in premature exfoliation of the primary second molar, followed by rapid mesial movement of the permanent molar and significant space loss. Spontaneous correction of ectopic eruption is possible⁽⁸⁾, however treatment is indicated if the mesial impaction persists for 6 months or significant deciduous molar distal root resorption is already evident. Where possible the permanent molar should be disimpacted and the deciduous second molar left in place as it is the best space maintainer. Only where it cannot be retained should it be removed and consideration given to regaining lost arch length and/or space maintenance.

Where the mesial impaction is relatively minor it is sometimes possible to place a separator between the teeth to free the impaction and allow the permanent molar to fully erupt into occlusion. However, if it is more significant it will be necessary to distalise the molar with, for example, sectional fixed appliances.

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All materials are supplied free of charge. Hopefully, together we can continue to improve oral health!!

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You may wish to share this issue of **Brighter Futures** with your hygienists and other staff members.

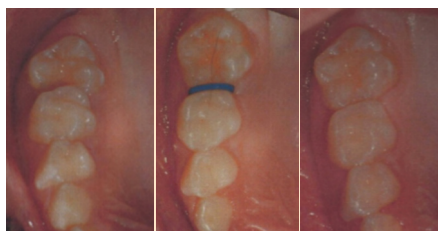


Fig 11 Molar impaction before, during and after disimpaction using an orthodontic separator.



Fig 12 More severe impaction corrected by distalisation of the permanent molar using sectional fixed appliances. Second radiograph was taken twelve months after disimpaction showing the second deciduous molar still in place maintaining space for the second premolar.

SPACE REGAINING

Following the loss of space in the dental arch, or when there is a natural lack of space for satisfactory eruption, early treatment to regain space can sometimes be beneficial. For example, in Figure 13 a supernumerary tooth impeded the eruption of the upper left central incisor so that, in time, the adjacent incisors drifted into the space. Treatment involved the surgical removal of the supernumerary, bonding a gold chain to the unerupted central incisor, and partial upper fixed appliances to regain space for the central incisor so that traction could be applied to bring it into place.

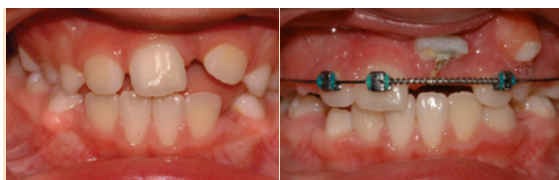


Fig 13 Space regaining and traction to bring down an unerupted incisor

Fixed appliances are very useful and practical for regaining space; however removable appliances can also be used in some situations when patients are deemed co-operative. Figure 14 shows a plate having almost completed space regaining where upper second deciduous molars were lost early and the first permanent molars experienced significant mesial drift. Distalisation of the first permanent molars will allow the second premolars to erupt more favourably.



Fig 14 Removable appliance being used to regain space for the unerupted second premolars.

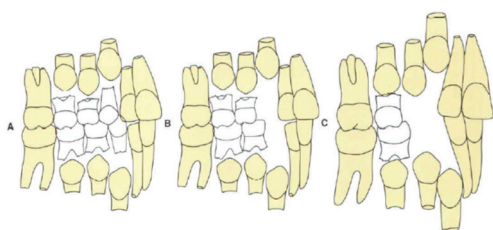
SERIAL EXTRACTIONS

Serial extraction is defined as the timely removal of specific deciduous and permanent teeth⁽⁹⁾ in the mixed-dentition to alleviate crowding of anterior teeth facilitate guided eruption of permanent teeth and to reduce the period of full fixed appliance therapy.

Proffit⁽¹⁰⁾ suggested that cases with no skeletal disproportions, Class 1 skeletal and dental relationships, normal overbite, severe arch perimeter deficiency (>10mm) & favourable axial inclinations of teeth can be treated with serial extraction.

In the classic serial extraction sequence:^(12, 13)

1. Deciduous upper and lower canines are removed after eruption of the lower lateral incisors but before eruption of the upper lateral incisors at 8-9years of age.⁽¹¹⁾
2. Deciduous lower first molars are extracted at 9-10years.⁽¹¹⁾
3. Deciduous upper first molars are extracted once the lower first premolars emerge.
4. Lower first premolars are extracted when the crown has reached the occlusal plane.
5. Permanent upper first premolars are extracted when the crown has reached the occlusal plane.



- A. Initial diagnosis of severe space deficiency
- B. Primary canines extracted to provide sufficient space for alignment of incisors
- C. Primary first molars extracted when $\frac{1}{2}$ - $\frac{2}{3}$ first premolar root formed to hasten eruption

BRIGHTER FUTURES

Brighter Futures 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.

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There are a number of variations to this classic sequence due the individual variations in growth and eruption patterns of teeth. Although serial extraction can make subsequent comprehensive treatment easier and often quicker, without follow up fixed appliance therapy ideal tooth alignment and occlusion and residual extraction space closure cannot be assured. It is now viewed as an adjunct to, not a substitute for, comprehensive therapy⁽¹⁴⁾. Further, it does not increase post-retention stability⁽¹⁵⁾.

Due to changing concepts in facial balance, treatment outcomes and improvements in orthodontic brackets and wires, the use of serial extraction treatment has greatly diminished. Nevertheless there are still some children who can benefit from early extractions, even if not a full serial extraction programme.

MOLAR INCISOR HYPOMINERALISATION

Molar Incisor Hypomineralisation (MIH) is a relatively common developmental condition characterised by hypomineralisation defects of the enamel on the first permanent molars and the permanent incisors⁽¹⁶⁾. In northern Europe the prevalence of MIH ranges from 3.6-25%. Jalevik assessed 8 year old Swedish children born in 1990 and found MIH affected molars in about 18.4% of the children⁽¹⁷⁾. These patients often require multi-disciplinary dental care.



Restoration and retention of the first permanent molars is the treatment of choice where MIH is mild. However, where they are severely affected extraction may be desirable or even necessary. Indications for extraction of compromised first permanent molars can also include orthodontic cases with arch-length discrepancies, presence of a full complement of permanent teeth of healthy and normal form and position, presence of deciduous molars, increased vertical growth with high maxillary/mandibular plane angle and anterior open bite cases^(18,19).

Timing of molar extractions is critical where extraction space is to be used to relieve anterior crowding or to retract anterior teeth. The first molars may need to be retained until the second molars have erupted so that resolution of the crowding and/or overjet can be achieved before the second molars mesialise.

Where spontaneous mesial movement of second molars is desired timing in the maxilla is not too critical; however, this is not so in the mandible. The ideal time to extract mandibular first permanent molars is well before eruption of the second permanent molar, usually at a chronological age of 8-9 years when the bifurcation dentine on the second molars is calcifying and the roots are half formed or less. The second molar might then erupt early and proximal contact may eventually be established with the second premolar. Failure to achieve correct timing is more likely to result in poor spontaneous space closure so that the patient may finish with such undesirable consequences as posterior arch collapse, over-eruption of the opposing first permanent molar, poor proximal contact with plaque stagnation, and atrophy of the alveolar bone (making later space closure difficult or impossible to achieve). Again, therefore, if early removal of compromised lower first molars is not possible or practical their extraction should be delayed until just prior to commencement of orthodontic treatment.

Even with favourable spontaneous mesial movement some modest orthodontic treatment may be required. However, this is usually more minor in nature when compared to the treatment required to bring second molars forward as much as a centimetre immediately after first molar extraction.

CONCLUSION

Although the efficacy of mixed dentition orthodontic treatment for developing malocclusions remains a contentious issue, there is general agreement that certain problems will benefit from early intervention. This Newsletter (Parts 1 and 2) has reviewed some of the more common situations that should be considered. However, not all children will be suitable candidates for early treatment as there are a number of individual factors to consider. When deciding on early orthodontic treatment it is paramount that the clinician assess whether the treatment will provide any significant benefit to the child, especially in the long term. Early intervention is appropriate only where a problem is likely to deteriorate to the extent that correction in the permanent dentition will be compromised, or irreversible damage is likely while waiting to start treatment later.



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