The Effect of Lower Second Molar Extraction on Late Lower Arch Crowding

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A preliminary study, finding distal movement of buccal teeth and reduced anterior crowding following lower second molar extraction. Third molar occlusion is not evaluated.

Extraction of lower third molars is sometimes recommended by orthodontists to reduce the likelihood of later development of crowding. There is considerable controversy about the role of the third molar in late crowding and in posttreatment relapse. A Consensus Conference on removal of third molars (1979) concluded that there was insufficient evidence to validate the extraction of third molars "solely to minimize present or future crowding." Nevertheless, they agreed that there are "cogent orthodontic reasons for early removal of third molars."

Woodside (1970) repudiated the concept of the developing third molar causing forward pressure on the dental arch, but recommended its early removal to allow the dentition to settle distally.

Graber (1981) expressed the belief that the third molar area acts as a safety valve in the final stages of horizontal mandibular growth. In the absence of a third molar, there is room for adjustment at the end of the alveolar arch in response to anterior growth changes.

Those are widely accepted concepts that do provide some cogent orthodontic reasons for early extraction of third molars to prevent the development of crowding.

Extraction of third molars is not a pleasant experience for the patient, and removal of second molars is a much simpler procedure. Theoretically, this could also relieve any possible pressure on the dental arch from a developing third molar and provide the safety valve at the back of the arch in response to pressures exerted by growth changes or soft tissues.

The disadvantage in second molar extraction lies in the uncertainty of the final position of the third molar. Although it will almost certainly not become impacted in the usual way, its relationships with adjacent and opposing teeth may be compromised.

The following is a preliminary investigation to examine the effect of second molar extraction on the development of late lower arch crowding.

Material

A small group of 10 subjects, 4 male and 6 female, enrolled in a longitudinal study of third molar development, had lower second molars extracted as a part of their orthodontic treatment. Three had a unilateral extraction and 7 bilateral.

These subjects were matched in sex and space condition of the lower arch in the early permanent dentition with others selected from 51 in the longitudinal study who had no teeth removed from the lower arch.

It was not possible to match the bilateral extraction cases with other individuals because of differences in space condition on left and right sides. Each bilateral extraction case was paired with two non-extraction cases, one matching the left-side space and the other the right-side space. The right side could be matched quite closely, but some of the extraction cases were so crowded on the left side that none of the non-extraction cases could match them. Even using the most crowded non-extraction subjects, the original space condition on the left side differed significantly at the 5% level (Table 1).

Measurements

1. Space condition (arch length minus tooth size) was measured with a vernier microscope on plaster casts of the early permanent dentition (complete anterior to the first molar), and five years later.

TABLE 1

Mean Differences between Extraction and Non-extraction Groups

		Extraction 1 *Mean* *mms*	*Non-extraction 2* *Mean* *mms*	*Mean* *Diff* *1-2*	*S.E.* *Diff*	*t*
Original Space	L	−2.3	−1.0	−1.3	0.4	−3.1*
Condition	R	−1.3	−1.2	−0.1	0.1	−1.0
Change in	L	−2.1	1.0	−3.1	0.8	−3.8**
Space Condition	R	−1.0	1.3	−2.3	0.5	−5.1***
Change in	L	−1.4	2.4	−3.8	0.6	−6.3***
position $\bar{6}$	R	−1.2	−2.6	−3.8	0.7	−5.2***

2. Change in space condition was calculated by subtracting the space measured on casts taken five years later from the original space. Increase in crowding was recorded as a positive change.

3. Change in antero-posterior position of the lower first molar was measured on 60° angulated left and right cephalometric radiographs taken at the same time as the casts. The distance between the mesial contact points of the lower first molars on successive films was measured along a line drawn through the maxillary plane, with the films superimposed on the inner outline of the mandibular symphysis and the inferior dental canal (Richardson 1979).

Results

The extraction and non-extraction groups were compared for each of the variables using paired 't' tests. Left and right sides were treated separately (Table 1). There were significant differences between the two groups on both sides for the change in space condition and the change in first molar position.

The non-extraction group showed a mean increase in crowding and a mean forward movement of the first molar over the five-year period. The mean values of these changes were very similar to those found for the larger group of 51 non-extraction subjects (Table 2).

In contrast, the extraction group showed an average decrease in crowding, with distal movement of the lower first molar during the same period.

These findings complement those of Schwarze (1973), who found more crowding of anterior teeth and forward movement of first molars in a group of 49 non-extraction cases compared with 56 subjects whose third molars had been removed.

This is an extremely small sample, not adequate for drawing firm conclusions. Nevertheless, the results show a very clear trend which suggests that there may be some justification for extraction at the back of the lower arch as a prophylactic measure against the development of late crowding.

It would be useful to confirm these results on a larger sample and to this end, another group of second molar extraction cases is being recorded.

Conclusion

Extraction of a lower second molar can reduce the possibility or severity of late lower arch crowding. Other possible consequences of such extraction should also be considered.

TABLE 2

Mean Changes in Variables in Large and Small Non-extraction Groups

		N = 10 Mean mms	*N = 51* Mean mms
Change in Space Condition	L	1.0	1.1
	R	1.3	1.2
Change in Position $\bar{6}$	L	2.4	2.2
	R	2.6	2.0

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