Original Article

Opinions of American and Swedish Orthodontists about the Role of Erupting Third Molars as a Cause of Dental Crowding

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ABSTRACT

Objective: To compare the opinions of Swedish orthodontists and American orthodontists regarding the association between third molar eruption and dental crowding.

Materials and Methods: A survey was distributed to Swedish orthodontists (n = 230) asking their views on the force exerted by erupting third molars, its relationship to crowding, and their recommendations for prophylactic removal. Results were compared with those from a similar study conducted in the United States. Chi square analysis was used to determine differences in responses to questions between Swedish and American orthodontists. $P \leq .05$ was considered significant.

Results: Both Swedish and American orthodontists believed that lower third molars were more likely than upper third molars to cause force (65% and 58% for Swedish and American orthodontists, respectively) and crowding (42% and 40%, respectively). No statistically significant differences were seen between the answers of American and Swedish orthodontists regarding the role of upper and lower third molars in causing crowding. Although only 18% of Swedish orthodontists ''generally'' or ''sometimes'' recommended prophylactic removal of mandibular third molars, 36% of American orthodontists ''generally'' or ''sometimes'' recommended removal ($P < .0001$).

Conclusions: Most orthodontists in the United States and Sweden do believe that erupting lower third molars exert an anterior force; however, they also believe that these teeth ''rarely'' or ''never'' cause crowding of the dentition. The reason that more American orthodontists recommend prophylactic removal of mandibular third molars remains unexplained. (*Angle Orthod.* 2009;79:1139–1142.)

KEY WORDS: Third molars; Crowding; Anterior forces

INTRODUCTION

Late mandibular incisor crowding is a well-recognized clinical problem. The role of erupting third molars as a cause of such dental crowding has been the subject of controversy over the years. Although several studies have reported no relationship between erupting third molars and late anterior crowding, others state that there is a definite association. For example, according to Richardson,[1] third molar impaction is one of the causative factors because anterior crowding is present more often in patients with third molars than in subjects with these teeth absent. In another study, Sidlauskas and Trakiniene[2] evaluated the correlation between third molar presence and lower incisor crowding in 91 subjects. They reported that although differences between the groups were not statistically significant, a greater number of tendencies for crowding in the mandibular anterior teeth were expressed in groups with third molars present than in groups with these teeth missing, supporting the concept of an anterior component of force. In 2005, Niedzielska[3] reported that if sufficient space is not available for the third molars to erupt, these teeth exert forces on the other teeth, causing crowding. It is only when space is adequate that the tooth gains a normal position in the arch without causing any disadvantageous effect on the other teeth.

On the other hand, a study by Ades[4] reported no

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differences in dental arch length and crowding in the presence or absence of third molars in orthodontic patients 10 years post retention. Therefore, it was concluded that removal of third molars to alleviate anterior crowding may not be justified. In another study, Harradine et al[5] randomized 44 of 77 patients to have their third molars removed after completion of retention after orthodontic treatment. Sixty-six months later, their start and finish study casts were digitized on a reflex microscope to determine Little's index of irregularity, intercanine width, and arch length. When third molars were extracted, the mean increase in lower labial segment irregularity was reduced by 1.1 mm from a mean of 2.1 mm for the group in which third molars were retained. This difference was not considered clinically significant. Moreover, based on an extensive literature review, Bishara[6] in 1999 also concluded that, according to the available data, third molars do not play a significant role in mandibular anterior crowding.

In 1971, Laskin[7] surveyed American orthodontists and oral and maxillofacial surgeons on their opinions about the role of erupting third molars in causing anterior tooth crowding. This study showed that about 65% of orthodontists and oral and maxillofacial surgeons recommended removal of third molars to prevent crowding because they believed that erupting third molars generate an anterior force. Because of considerable variation in the management of asymptomatic third molars and ongoing controversy, Mettes et al[8] in 2005 conducted an extensive review to evaluate the effects of prophylactic removal of asymptomatic impacted wisdom teeth in adolescents and adults compared with retention of these wisdom teeth. They concluded that no evidence supported or rejected prophylactic removal of asymptomatic impacted wisdom teeth in adults. However, some evidence suggested that removal of these teeth in adolescents did not have an effect in terms of reducing or preventing late incisor crowding. Furthermore, Mettes et al[8] recommended that clinicians should inform patients of the lack of evidence on this controversial issue.

Zadik and Levin[9] investigated the effect of place of graduation on the decision-making process regarding removal of third molars. They showed that removal of mandibular third molars was recommended more often by Israeli graduates than by South American clinicians and concluded that decision making in third molar treatment is not undertaken on a rational basis and is not evidence based.

In 2007, Lindauer et al[10] published the results of their study that evaluated and compared the current opinions of American orthodontists and oral and maxillofacial surgeons regarding the relationship between erupting third molars and anterior crowding of the dentition. They reported that a smaller percentage of orthodontists than surgeons (58% vs 78%) now believe that mandibular third molars produced anterior forces during eruption. Orthodontists also are less likely to think that mandibular third molars frequently or sometimes cause anterior crowding (40% vs 64%) and therefore are less likely, generally or sometimes, to recommend prophylactic removal of these teeth to prevent such problems (36% vs 57%).

Because this study showed a substantial decline in the number of American orthodontists who currently believe that erupting mandibular third molars cause anterior tooth crowding and who therefore do not recommend prophylactic removal, it would be of interest to know whether this change has occurred in other countries. The present study compared the results from a similar survey of Swedish orthodontists conducted in 2004 vs those from the study by Lindauer et al,[10] also conducted in 2004.

MATERIALS AND METHODS

A short survey consisting of questions related to the role of third molars as a cause of dental crowding was developed with the use of an Internet survey tool called Textalk AB and was distributed to all practicing orthodontists in Sweden in 2004. E-mail addresses of orthodontists ($n = 230$) were obtained from the webpage of the Swedish Orthodontists Society. In the United States, the questionnaire was sent out to 871 orthodontists who were randomly selected from the 2004 American Association of Orthodontists Directory.[11]

Respondents in both countries were asked whether they believed that upper/lower third molars produce an anterior component of force during eruption, whether erupting upper/lower third molars cause crowding of the anterior dentition, and whether prophylactic removal of upper/lower third molars is recommended to avoid dental crowding. Chi square analysis was used to determine differences in responses to questions between Swedish and American orthodontists. $P \leq .05$ was considered significant.

RESULTS

Of 230 Swedish surveys that were e-mailed, 30 were returned because of invalid addresses. One hundred sixty-five of the 200 surveys that were distributed successfully were answered, yielding a response rate of 82.5%. In the American study, of 871 surveys sent to orthodontists, 393 were returned, for a response rate of 45%. A follow-up questionnaire was not administered, and data collected from the first mailing were analyzed. Some respondents in both the American and Swedish studies chose not to answer all of the questions.

Table 1 shows the results when respondents were

Table 1. Answers of the American and Swedish Orthodontists to the Question: ''Do erupting third molars exert anterior force?'' Yes ____ No ____

	American Orthodontists		Swedish Orthodontists		
	Yes	No	Yes	No	*P* Value
Maxillary	112 (29.6%)	266 (70.4%)	62 (38.8%)	98 (61.2%)	.04*
Mandibular	218 (57.7%)	160 (42.3%)	104 (65%)	56 (35%)	.11

* Statistically significant difference, $P < .05$.

Table 2. Answers of the American and Swedish Orthodontists to the Question: ''Do erupting third molars cause anterior crowding?'' Frequently _____ Sometimes _____ Rarely _____ Never _____

	American Orthodontists		Swedish Orthodontists		
	Frequently/ Sometimes	Rarely/ Never	Frequently/ Sometimes	Rarely/ Never	*P* Value
Maxillary	56 14%	332 86%	22 14%	138 86%	.89*
Mandibular	154 40%	234 60%	68 42%	92 58%	.57*

* Not significant.

asked whether they believed that upper/lower third molars produce an anterior component of force during eruption. Thirty-nine percent of Swedish orthodontists vs 30% of American orthodontists indicated that upper third molars produce force during eruption ($P = .04$). However, no significant difference was noted between Swedish orthodontists (65%) and American orthodontists (58%) regarding lower third molars producing force during eruption ($P = .11$).

Results obtained when questions were asked about the role of upper/lower third molars in anterior crowding of the respective dentitions are provided in Table 2. Most Swedish and American orthodontists answered that upper third molars ''rarely'' or ''never'' (86%) cause crowding of the maxillary anterior dentition. However, 14% of Swedish and 14% of American orthodontists indicated that maxillary third molars ''frequently'' or ''sometimes'' cause anterior crowding. Forty-two percent of Swedish and 40% of American orthodontists believed that mandibular third molars cause anterior crowding ''frequently'' or ''sometimes''; 58% of Swedish orthodontists vs 60% of American orthodontists said that mandibular third molars cause anterior crowding ''rarely'' or ''never.'' No statistically significant differences were observed between the answers of American orthodontists and those of Swedish orthodontists regarding the role of upper ($P = .89$) and lower ($P = .57$) third molars in causing crowding.

Table 3. Answers of the American and Swedish Orthodontists to the Question: ''Do you recommend removal of mandibular third molars to prevent anterior crowding?'' Generally _____ Sometimes _____ Rarely _____ Never _____

American Orthodontists		Swedish Orthodontists		
Generally/ Sometimes	Rarely/ Never	Generally/ Sometimes	Rarely/ Never	*P* Value
140 (36%)	253 (64%)	29 (18%)	131 (82%)	.0001*

* Statistically significant difference, $P < .05$.

Table 3 shows the results when the question was asked regarding prophylactic removal of mandibular third molars to prevent crowding of the anterior dentition. Although only 18% of Swedish orthodontists ''generally'' or ''sometimes'' recommended prophylactic removal of mandibular third molars, 36% of American orthodontists ''generally'' or ''sometimes'' recommended removal. Eighty-two percent of Swedish orthodontists vs 64% of American orthodontists ''rarely'' or ''never'' recommended prophylactic removal of mandibular third molars to prevent crowding. A significant difference was seen between American and Swedish orthodontists regarding the recommendation of prophylactic removal of mandibular third molars to prevent crowding ($P < .0001$).

DISCUSSION

In 2007, Lindauer et al[10] reported significant differences between the opinions of American orthodontists and those of oral and maxillofacial surgeons regarding the role of erupting third molars in causing crowding of anterior teeth. More surgeons than orthodontists generally believed that erupting third molars produce an anterior component of force and cause crowding of the anterior dentition; thus they were more likely to recommend prophylactic removal of third molars to prevent such problems. In a Swedish study, 20% of third molar extractions in young adults were carried out prophylactically based on no definite diagnosis, and only 10% were based on orthodontic indications.[12] Moreover, in Sweden, the decision of oral and maxillofacial surgeons regarding the prophylactic removal of mandibular third molars has not changed toward a more noninterventional attitude over the years.[13]

In 2001, Knutsson et al[14] conducted a study to compare the decisions of dentists vs those of oral and maxillofacial surgeons regarding prophylactic removal of mandibular third molars in Sweden and Wales—two locations with similar frequencies of third molar removal by general practitioners. In that study, participants were asked to decide whether or not each dis-

ease-free third molar should be removed upon examination of clinical and radiographic material. Swedish surgeons were found to schedule a significantly greater number of third molar extractions than surgeons in Wales. It was concluded that the less interventionist approach among surgeons in Wales was due to the development and application of written guidelines, whereas such criteria were not widely accepted in Sweden.

The purpose of the current study was to evaluate and compare the current opinions of orthodontists in America vs orthodontists in Sweden, where differences in orthodontic education, culture, and economics could play a role in the decision-making process. Both Swedish and American orthodontists indicated that lower third molars were more likely than upper third molars to cause force (65% and 58% for Swedish and American orthodontists, respectively) and crowding (42% and 40%, respectively). However, it is interesting to note that even though most orthodontists from both countries shared the same belief that mandibular third molars do cause an anterior force but do not contribute to anterior crowding, the number of orthodontists in the United States who ''generally'' or ''sometimes'' recommended lower third molar removal was double that in Sweden (36% vs 18%, respectively).

A significantly greater number of orthodontists in the United States recommended third molar removal; this suggests that factors such as reimbursement methods and practice environment might affect their opinions. Richmond and Daniels[15] reported that clinical judgments were significantly affected by the culture of the country, payment methods, and the practice environment when orthodontic treatment outcomes were evaluated. However, because mandibular third molar removal is one of the most common treatments carried out at oral and maxillofacial surgery clinics in Sweden,[16] such factors may not completely explain this difference. Another consideration is that, because of the high volume of third molar removal in Sweden, these teeth are already being extracted for other reasons, and orthodontists do not have to make the recommendation. Because questions related to economic characteristics were not included in the current survey, it is not possible to draw definitive conclusions regarding their role. It would be beneficial to include such questions in future studies so as to explore further the influence of payment methods, type of health insurance, and type of practice on third molar extraction decisions.

CONCLUSION

- Most orthodontists in the United States and Sweden indicated that erupting lower third molars exert an anterior force, but they also believed that these teeth ''rarely'' or ''never'' cause crowding of the dentition.

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