

Do wisdom teeth induce lower anterior teeth crowding?

A systematic literature review

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SUMMARY

Objective. Individuals with dental crowding are the most frequent patients in the orthodontic practice. The purpose of this article is to find out if the lower third molars are the main reason of crowding in the lower dental arch. As well to find out other factors which can influence the lower incisors crowding.

Methods. The aim was to identify studies and reviews related to the effect of the lower third molars on the lower dental arch crowding. A literature survey was performed using Medline database. Used key words were lower third molar, influence of wisdom teeth, wisdom teeth and anterior crowding, lower dental arch changes. The articles from 1971 to 2011 related to topic were identified. Selected articles were published in dental journals in English. Full texts of the selected articles were analyzed. Articles about the dental crowding after orthodontic treatment were not included. All studies accomplished with human participants.

Results. It was found 223 articles but only 21 articles corresponded to selected criteria and were analyzed. This review is based on the investigations of 12 laboratory researchers, 4 clinical researches, 2 questionnaires and 3 literature reviews.

Conclusion. The results are quite contradictory: some authors support the opinion that lower third molars cause teeth crowding, the others confirm conversy. Exist other factors affecting the mandibular incisors crowding: dental (teeth crown size, dental arch length loss, poor periodontal status and primary teeth loss), skeletal (growth of the jaws and malocclusion) and general (age and gender).

Key words: lower third molar, wisdom teeth and anterior crowding, lower dental arch changes.

INTRODUCTION

Each human facial part of the skull and dental arches undergo major changes during adaptation to the environment and through growing with age. Relatively extensive and rapid changes occur on the mixed dentition period, that continues until all the permanent teeth appear. Age-related changes in the dental arches do not cease with the onset of adulthood, but continue at a slower rate, throughout all adult life (Figure 1) (1).

More than a century scientists tried to find out the influence of lower third molars to mandibular incisors irregularity. Third molars are the most common discussion influencing teeth crowding (2).

In 1971 Laskin reported that approximately 65 % of orthodontists and oral surgeons support the idea that unerupted third molars produce an anteriorly directed force and cause crowding of the mandibular incisors (3). Surgeons were significantly more likely to believe that erupting third molars can cause crowding in the anterior region, and were therefore more likely to recommend prophylactic removal of third molars to prevent crowding (4). 36% of American orthodontists and only 18 % of Swedish orthodontists believed that mandibular third molars were more likely to produce anterior force and cause crowding of lower incisors (5). The aim of this study was to identify studies and reviews related to the effect of the lower third molars on the lower dental arch crowding.

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Fig. 1. Initial clinical (A) and radiological (B) view of the anterior crowding in the lower anterior segment

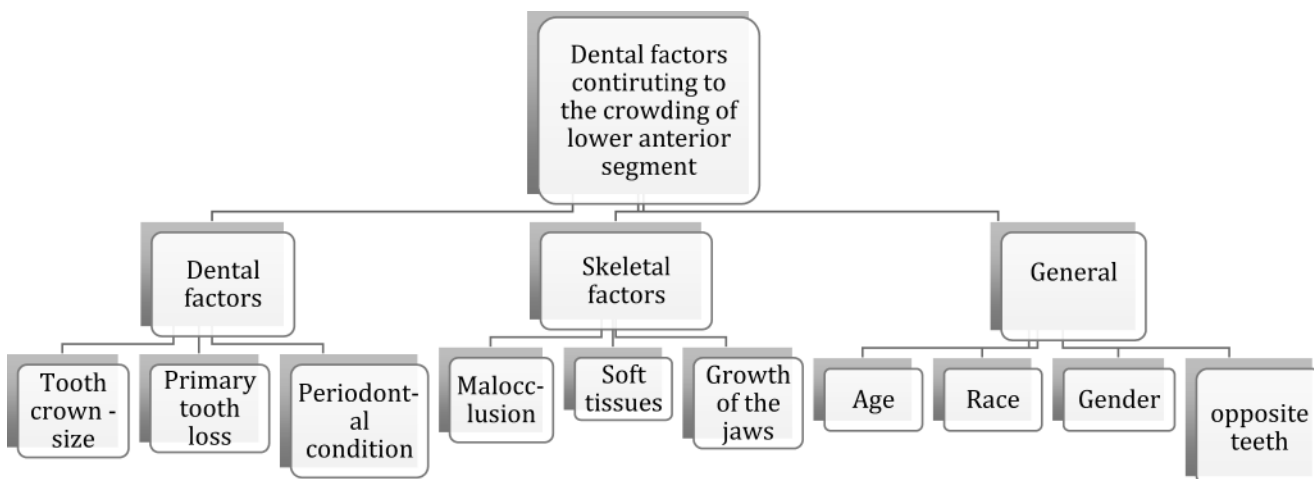


Fig. 2. Dental factors contributing to the crowding of lower anterior segment

MATERIALS AND METHODS

A literature survey was performed using Medline database. The articles from 1971 to 2011 related to topic were identified. Selected articles published in dental journals in English. Full texts of the selected articles were analyzed. The following data was extracted: publication date, author, setting of the study, type of the study. 21 article were selected and analyzed for data collection. The review included studies analyzing lower third molar influence on anterior teeth crowding, examining other factors which may cause the lower dental arch changes: development stage and position of permanent teeth, priority of teeth eruption, position of the opposite teeth, periodontal status, teeth crown size, patient age, gender, jaw growth, early loss of first or second mandibular molar, malocclusion, dental arch length loss. All studies were accomplished with human subjects only.

RESULTS

During the search 223 articles were found. 21 articles were selected and analyzed: 12 laboratory

studies accomplished dental casts analysis or dental casts and X-ray data. In 1 clinical study was measured mesial force, caused by lower third molars to the dental arch, 2 studies evaluated periodontal status of teeth and mandibular arch length changes before and after third lower molars surgery, 1 study evaluated the influence of gender and age to changes in dental arches and crown size. 2 studies used questionnaire to orthodontists and oral surgeons to evaluate their opinion about the influence of the lower third molars to the lower dental arch crowding. The results are controversial (Figure 2), some authors support the theory that lower third molars produce dental crowding, others confirm disagreement.

Several authors believe that lower third molars can produce mesial force and cause lower incisor crowding. Iwona Niedzielska measured lower dental arch length and width changes and evaluated the influence of third molars for irregularity of incisors. Study confirmed that third molars decreased dental arch width, length and increased dental crowding in both lower and upper arches (6). Lindquist and Thilander removed lower third molar on one side and observed 70 % teeth crowding in the other lower dental arch side without third molar removal

(7). Richardson (1979) observed that not only the forces from eruption of third molars are associated with crowding of lower incisors but also buccal and lingual angulation of lower first molars. The mesial contact point of the first molar was used to measure the change in position of the first molar. This point was projected onto a horizontal drawn through the maxillary plane and by superimposing the first and second films on mandibular structures (8).

Another group of authors believe that lower third molars are not the main reason of lower incisor crowding. Ades tried to investigate the influence of third molars to mandibular dental arch and compared different groups of patients: with erupted third molars, loss of third molars and after or without removal of premolars in mandibular dental arch. In many cases crowding of mandibular incisors was observed but there were no recommendations to remove third molars in order to reduce anterior crowding (9). Pirttiniemi evaluated unerupted mandibular third molars removal effect to lower dental arch in older than 30 years patients. One year later author concluded that slight inclination of the second molars to mesial direction could be seen after removal of third molars, but it does not affect the anterior teeth crowding (10). In Sidlauskas study crowding of lower incisors was compared in groups with lower third molars and without them. There were no significant statistical differences in lower anterior crowding in both groups (11). Kumico Okazaki found no lower third molars interproximal dental pressure to lower anterior teeth (12). Noriko Shigenobu observed changes of erupting dentition in the dental arches and concluded that the pressure force is not transmitted through molars to anterior teeth (13).

DISCUSSION

Factors affecting the mandibular incisors irregularity

There is no union opinion about lower third molars influence to the anterior crowding. Therefore other factors are found which can cause lower anterior crowding: dental factors (tooth crown size and primary tooth loss), skeletal factors (growth of the jaws and malocclusion) and general factors as age and gender (Figure 2).

Dental factors contributing to the crowding of lower anterior segment

Garn and Lewis concluded that early loss of mandible deciduous first or second molars influence the formation of third molar (14-16). These findings suggest that congenital absence or early loss of some deciduous and permanent teeth might have

some effect on the emergence time and formation stage of the other teeth. Although all teeth have different eruption and formation timing, they are all connected and reacts on each others changes (15).

There are evidences that condition of periodontium may influence stability of lower incisors. A balance between the forces of tongue on one side and the lips and cheeks on the other is normally present. The teeth are stabilized by forces produced in the periodontal membrane by active metabolism. The destructive changes in the periodontium may allow for unbalanced muscular forces to produce some pressure on the lower incisors. Bone loss as a result of aging or periodontal disease may allow teeth to move under pressure that they previous resisted (17). Bishara mentioned age as the main reason that increases the destruction of periodontium, because there are regular changes that occur in bone and cause natural resorption (1).

Skeletal factors affecting crowding of lower incisors

Growth of the jaws is another cause of teeth crowding. Since the ancient times people explored the growth characteristics of the face observed that growth is unique and constantly volatile process of each person. If the mandibular incisors are not free to move forward because of the restraining influence of the upper arch, it is likely that they will become retroinclined and crowded. As the mandible increases in size, the lips exert greater pressure than the tongue creating a lingually directed force. It counteracts mesial forces and causes incisor crowding (11). N. Shigenobu confirmed the influence of soft tissues to dental crowding and concluded that the greatest influence on the dental crowding had cheeks pressure (13). Malocclusion as well can cause changes in the lower dental arch. Ades *et al.* reported that overbite, overjet, intercanine and intermolar width changes all the time and influence lower incisors position (9). Correct molars occlusion is one of the factors which stabilize the position of lower incisors (18, 19).

General factors contributing to the crowding of lower incisors

Age is one of the factors influencing mandibular dental arch crowding. Bishara *et al.* found decreasing the length and teeth size of the mandible with age (1). Author also concluded that intercanine arch width and total arch length decreases as well as increases in mandibular anterior total tooth size-arch length and total discrepancy in both arches in males and females (1). Mochizuki and Machida reported that more than 58 % of dental crowding was observed in the lower

anterior region at the period of third molars eruption (19). The dental arch becomes narrow and arch length decreases during time, because reduces the density of alveolar bone and increases bone resorption. That is the reason why the mandibular dental arch dimensions and dental crowding decrease with age (20). Blake and Bibby observed that the intermolar width remains stable from 13 to 20 years and the reduction of mandibular arch length with time occurs because of active muscles (20). Shigenobua *et al.* identified factors that influence dental crowding: position of permanent tooth germs, the time of deciduous teeth loss and permanent tooth eruption, the soft tissue pressure and the position of the opposite teeth (13). In general, males have significantly longer and wider dental arches than females, except for mandibular intercanine width, which was not significantly different (1). Peter H. Buschang in his paper stated that not only gender, age and absence/presence of first and second molars, but also race is associated with crowding of lower incisors (21). More frequently crowded teeth are identified in black people than white or Asian people (21).

CONCLUSIONS

Lower third molars influence on dental crowding is still controversial. Other factors which may cause mandibular incisors crowding could be divided into dental, skeletal and general. The main dental factors are position of the permanent tooth germs, the timing of the loss of deciduous teeth and permanent tooth eruption, the soft tissue pressure and the position of the opposite teeth. Skeletal factors such as: periodic recurrent mandible growth in later period of life and processus condylaris growth in vertical direction affects the mandibular third molars irregular position in the jaw, which causes negative influence on the dental arch. General factors such as age and gender influence mandibular dental arch crowding. Tooth size-arch length discrepancy increases with age. Dental crowding is more frequent in females, because males had significantly longer and wider dental arch dimensions than females.

To our mind third molars do not cause tooth crowding, as there are always more than one factor influencing it. Wisdom teeth are only one of many factors that may cause crowding.

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