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Research Article

To Extract or Not to Extract and What We Can Learn from Social Media

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Abstract

The relationship between the presence of third molars and late lower incisor crowding is a topic that remains controversial to this day. Controversy exists as to whether there is a positive correlation between the two or if late lower incisor crowding can be attributed to several other external factors. This calls into question whether asymptomatic wisdom teeth should be extracted prophylactically to prevent orthodontic relapse down the line. On the other hand we need to consider what influences the common person's clinical decision making? Which resources does the public turn to for answers to their relevant questions? In contemporary times, individuals seek immediate answers right at their fingertips, particularly when making decisions about their personal healthcare. The purpose of this study is to explore the debate surrounding third molars and incisor crowding, while also examining the influence of social media and artificial intelligence on clinical decision-making in this context.

ChatGPT, Google Gemini, and Tik Tok posts were investigated to compile common schools of thought from both artificial intelligence chat boxes and influencers to research the clinical question: What is the impact of third molars on late lower incisor crowding? At first look, these platforms noted the overarching controversy. However, they also detailed theories such as late mandibular jaw growth, lack of retainer use and aging that can coincide with subsequent late lower incisor crowding. There was a lack of references to check regarding the subject at hand which provided to be a limitation of this research. Also, Tik Tok posts can be deleted and edited by users which created a lack of reliability in terms of information output.

Keywords: Extraction; Wisdom Teeth; Orthodontics; Third Molars; Lower Incisor Crowding; Lower Anterior Crowding; Social Media; Tik Tok; Google Gemini; Chat GPT

Abbreviations

CBCT: Cone Beam Computed Tomography

Introduction

The impact of mandibular third molar eruption on late lower incisor crowding remains controversial to this day. In Evaluation of the Third Molar Problem [1] published in April 1971, Dr. Daniel Laskin noted that the removal of unerupted or impacted third molars is often recommended in patients during or after orthodontic treatment. He goes on to mention that these teeth can produce an anterior force that can cause contact point separation and eventual mandibular incisor crowding. He also mentioned the condition of lower incisor crowding develops during the eruption period of the third molar, but whether the two events are related remains controversial. Ultimately, he concluded that the orthodontist has a key role in judging the correct time of the prophylactic extraction of third molars.

In a more recent study, Husain., *et al.* [26] aimed to investigate the correlation between mandibular third molars and mandibular incisor crowding using Cone-beam computed tomography. Forty CBCTs were analyzed in the axial view to calculate the amount of crowding using Little's Irregularity Index in patient groups with and without third molars. In conclusion, there was a positive correlation between mandibular third molars and mandibular incisor crowding which suggested an association between the two. However, more prospective longitudinal studies on this association with

larger sample sizes would be necessary to provide more established evidence and conclusions.

On the other hand, in a three-year longitudinal study conducted by Lindquist and Thilander [3], impacted third molars were removed on one side while the third molar on the opposite side of the same arch was retained. They found that after three years, the removal of mandibular third molars did not impact anterior crowding. In Sidlaukas., *et al*. [3], there was a quantitative analysis of crowding based on measuring the mesiodistal width of teeth as related to dental arch length between groups with erupted, unerupted, and missing third molars. There was no statistically significant difference between the three groups regarding the effect of lower third molars on lower dental arch crowding.

In Issues in Contemporary Orthodontics Chapter 8: A State-of-The-Art Analysis and Prediction of Eruption [30], the association of lower incisor crowding with wisdom teeth eruption was suggested as a "contentious and mythical concept in orthodontics." [30] It was found ultimately that considering current evidence, the presence of third molars has no significant effect on incisor crowding and prophylactic extraction to prevent anterior tooth crowding or relapse is not supported.

The overarching controversy surrounding the topic is crucial to understand because comprehensive orthodontic treatment is a large investment for patients in terms of both costs and time. A 2021 study by Hung., *et al*. [34] examined orthodontic expenditures and trends in the United States from 1996 to 2016. They found that total orthodontic expenditures in the United States almost doubled from 11.5 billion dollars in 1996 to 19.9 billion dollars in 2016. They also found that out-of-pocket expenses represented the highest total expenditures.

Orthodontic treatment is a large investment for patients in terms of both costs and time. If there is statistically significant correlation between anterior crowding and third molar retention, it could be factored into a patient's treatment plan to maximize the effect of their treatment and oral health outcomes. Instead, it can be built into the treatment plan and explained to patients in their first phase of treatment.

Also, a systematic review by "Zawawi., *et al*. [31] that evaluated the role of mandibular third molars on lower anterior crowding and relapse after orthodontic treatment suggested that a definite conclusion cannot be drawn. They noted the high risk of bias in most of their trials which led to inconsistent outcomes. Ultimately, they did not support prophylactic extraction due to lack of a direct cause and effect relationship between third molars and lower anterior crowding.

Another study [32] that investigated this topic was a 2004 pilot study by Dr. Khalid M. Al-Balkhi, where the effect of lower third molars on the re-crowding of lower anterior teeth was analyzed in the absence of tight interproximal contacts. The study involved the removal of tight interproximal contacts and absence of retainer use on thirty-two newly debonded orthodontic patients. The third molar conditions varied between erupted, unerupted, and missing third molars with or without sufficient eruption space. The cases were followed up for one year and the results showed that there was no significant correlation between these varied third molar conditions and lower anterior re-crowding in the absence of tight interproximal contacts. A limitation of this study is the small sample size. A larger sample size with a longer follow up period is crucial to drawing more accurate and verifiable conclusions.

The aforementioned studies essentially disagree on the prophylactic extraction of third molars to alleviate the potential etiology to poor long term orthodontic treatment outcomes. It is up to the patient to consent to any treatment such as third molar tooth extractions and use their health literacy to make their own decisions relating to healthcare. This calls into question: How do we consume information as a society? How does the public acquire "answers" that influence their personal clinical decision making? Where does the public receive answers to their relevant questions regarding oral health and medicine in general? Often, the method of information consumption influences health decisions and outcomes.

Today, media platforms such as Tik Tok and YouTube and AI search engines like Google Gemini and ChatGPT dominate the general public's school of thought often graduating to doctoral titles such as "Dr. Tik Tok" [28]. In a blog post by healthcare research market team, Hall and Partners, they refer to "Dr. TikTok" [28] as the "new player in medical information and healthcare advice." In a 2022 "Patient Trendscoping" [28] online survey [28] amongst 10,500 participants over 18 across the United States, China, Germany, United Kingdom and Japan by Hall and Partners, they found that when it comes to patients with chronic conditions 30% are not seeing their doctor as a regular information source [28]. Furthermore, when they visit a doctor 20% of Gen Z are asking to be given a treatment they had heard from another patient or influencer [28]. Popular AI and social media platforms were researched to gain an understanding of user popularity. As of Feb 2, 2024, Chat GPT has over 180 million users [35]. As of Feb 15th, 2024, Tik Tok

has over one billion monthly active users [36]. Google Gemini, formerly known as Google Bard, had a total of 330.9 million visits as of January 2024 [29]. The "answers" are a few taps away and often, people look to these sources. People want answers fast. Social media's strength is the power of influencing heavily in a matter of seconds relying on ratings, likes, comments, and subscriptions to flourish. Social media feeds off constant validation and attention to gain traction and be heard. It is important as healthcare providers to be keenly aware of the information that is circulating online to better tailor patient centered care and to be knowledgeable of the most common search strategies. An enormous part of our culture and social network is the world of influencing. It's necessary to consider that although influencing is popular, with anyone having access to creating an account, it creates a lack of control in terms of fact checking, reliability, and accuracy into what information is released online.

Post orthodontic treatment alignment maintenance is crucial to retaining long term success of orthodontic treatment and to avoid relapse. Due to the controversy and contrasting results in studies regarding the relationship of third molars to lower incisor crowding, artificial intelligence chatbots such as Chat GPT and Google Gemini and Tik Tok social media posts were analyzed against one another, factoring in bias and confounding variables to address the following clinical question; What is the impact of third molars on late lower incisor crowding?

Materials and Methods

Four platforms were used to conduct this study: Pubmed, ChatGPT, Google Gemini, and Tik Tok. PubMed was used to gather scientific literature to ground the background information as well as to see what scholarly articles exist relating to the clinical question at hand. For the PubMed search, the key words: [third molars and incisor crowding] were searched which yielded 72 results and [third molars and lower incisor crowding] which yielded 33 results. Chat GPT, Google Gemini, and Tik Tok were used because of their focus on succinct explanations from platforms the public often turns to.

ChatGPT was asked the questions: "Does third molar eruption cause lower incisor crowding?" and "What is the relationship between wisdom teeth and incisor crowding?" were asked. Chat GPT listed several explanations for the questions at hand as well as noted the controversy and generated an overall conclusion. Google Gemini, formerly known as Bard, is another artificial intelligence platform used to conduct this study. Google Gemini was asked the questions "What's the influence of third molars on late lower incisor crowding?" and "Does third molar eruption cause lower incisor crowding?" Several conclusions were generated in response. On Tik Tok, the key search terms, [wisdom teeth and lower incisor crowding], [third molars and incisor crowding] and [third molars and crowding] were searched. The Tik Tok search did not quantify the number of relevant videos. The "Top" tab was investigated to see the most popular videos and the "Videos" tab was investigated to see all other results as well.

Results and Discussion

Tik Tok

Many Tik Tok creators have created a space in their personal feed to educate the public on their school of thought regarding the relationship between third molar eruption and subsequent lower incisor crowding. Findings were grouped based on authors who had similar sentiments and explanations regarding the clinical question at hand. Quotes chosen were relevant to this topic but also were engaging and polarizing in a way that would grasp the attention of the common reader.

Relating Late Lower Incisor Crowding to Aging

One Tik Tok user[8] sought to "bust the most common ortho myth" by discussing how wisdom teeth do not cause incisors to push together. Instead, the user clarified that this compression is simply a result of aging and that is important to differentiate this from orthodontic relapse. Overall, it's important to see how late lower incisor crowding is influenced by aging and a decrease in intercanine width, resulting in less space for the teeth to occupy.

Blatant Truths V Controversy

Some creators have adamantly dismantled the idea that third molar eruption can cause crowding, while other creators note the controversy at hand. For example, a user[10] pointed out the assumption that wisdom teeth cause anterior crowding but then stated that this "simply isn't true"[10]. In contrast, another user[18] states reasons to remove third molars such as "pain, risks of cysts and/or tumors, facial space infections, gum infection and/or swelling, and prevent damage to adjacent teeth and for orthodontic purposes and to prevent shifting of other teeth but the controversy still remains".

Retainer Compliance

Another user [11] discussed how wisdom teeth get blamed for crowding all the time and how retainers are the way to keep teeth straight. They go on to mention how there are people who have had their wisdom teeth removed or were born without wisdom teeth and still experience post orthodontic crowding due to lack of re-

tainer compliance. Another user [15] discussed how teeth want to go back to their original position due to patients not wearing their retainer and not necessarily because of the force of an erupted wisdom tooth. A user [19] concretely mentioned that the only causes of late lower incisor crowding are aging, and lack of retainer use and anything else is not true. Another user [22] brought up a social aspect as a potential cause to late mandibular incisor crowding. They mentioned that third molars are too distant from the area where crowding occurs in the front and then suggested that when wisdom teeth emerge, individuals often enter college or similar situations where they wear their retainers less frequently. These viewpoints focus on patient retainer compliance and accountability in preventing orthodontic relapse. It stresses the significance of follow-up appointments and the maintenance of prior orthodontic treatment. This proactive approach helps monitor issues like incisor crowding and other concerns post-treatment completion.

Late Mandibular Jaw Growth

A user [13] noted the controversy and went on to discuss how wisdom teeth won't necessarily exert pressure to the front, leading to such crowding and then explained that the problem is attributed to the late growth of the mandibular jaw. Another user [12] explains how late growth changes are when the lower jaw grows more than the upper jaw, and this is what causes the lower incisors to crowd up. A user [20] also explains how wisdom teeth erupt between the ages of 17-23, on average. As they are erupting, it is also around the same time when teeth are naturally going to want to start moving forward and upward. This user regards the two as more of a coincidence than a cause or effect. Another user [9] discusses this topic further. They go on to explain how the primary reason for crowding among front teeth often stems from a process known as late mandibular jaw growth. During the late teenage years and early twenties, the lower jaw experiences active growth, leading to tooth rotation in many instances. In summary these users do not see wisdom teeth as a direct cause of lower incisor crowding, but rather a result of the normal pattern of jaw growth. During the late teenage years and early twenties, the lower jaw experiences active growth, leading to tooth rotation in many instances. In summary these users do not see wisdom teeth as a direct cause of lower incisor crowding but rather a result of the normal pattern of jaw growth.

Chat GPT

Another popular tool that the public uses to answer questions today is ChatGPT. When asked: Does third molar eruption cause lower incisor crowding?" [21] to ChatGPT it stated that traditional theories saw wisdom teeth as the cause for incisor crowding, but more recent research created controversy. It stated: "Several studies have failed to find a consistent and signifi- cant association between the presence or eruption of third molars and lower incisor crowding. Some researchers argue that other factors, such as genetic factors, changes in soft tissue, and the natural aging process, may play more significant roles in incisor crowding" [21]. The overall conclusion was that "regular consultation with dental professionals can help monitor the development of wisdom teeth to identify potential crowding issues" [21]. When asked: Does third molar eruption cause lower incisor crowding?" [21] to ChatGPT it stated that traditional theories saw wisdom teeth as the cause for incisor crowding but more recent research created controversy. It stated "Several studies have failed to find a consistent and significant association between the presence or eruption of third molars and lower incisor crowding. Some researchers argue that other factors, such as genetic factors, changes in soft tissue, and the natural aging process, may play more significant roles in incisor crowding [21].

Google Gemini

Google Gemini was asked: What is the influence of third molars on late lower incisor crowding? It mentioned that historically it was a common belief that third molar eruption pushing forward caused lower incisor crowding, but our current understanding is that there is no direct causal relationship between third molars and lower incisor crowding. It noted that a coincidental correlation can be created due to timing. The text goes on to state that based on current evidence, removing third molars to prevent crowding in healthy individuals is not justified. At the bottom of the search, there is a disclaimer stating to remember that this information should not be considered medical advice and to always seek professional consultation [27]. Google Gemini was also asked: "Does third molar eruption cause lower incisor crowding?". This search also noted that this topic is not as simple as a yes or no answer and it is a complex debate. They listed arguments against a direct relationship and arguments for a potential link. The arguments against a direct causal relationship mentioned how genetics, jaw size, tooth size, and jaw development play bigger roles in crowding. Arguments for a potential causal link suggested that during eruption, third molars do exert some force but it's unclear whether it's enough to significantly cause incisor crowding. Ultimately, this search noted to not use it as medical advice but to get a personalized assessment from a qualified dentist or orthodontist [27].

It is important to isolate the topic at hand and realize other variables that may be at play. There are several factors that can contrib-

ute to the crowding of the lower anterior segment including dental factors such as tooth crown size, primary tooth loss, and periodontal condition. Skeletal factors such as malocclusion, soft tissue, and jaw growth should be considered as well as age, race, and gender [6]. It is important to understand that this is not a black and white scenario. Confounding factors create a gray area that heightens the controversy regarding this clinical question. The controversy behind this topic can be attributed to the presence of confounding variables such as differences in crown size, dental arch length loss, primary teeth loss, growth of the jaws, malocclusion, age, gender, and periodontal disease [6].

The majority of relevant Tik Tok findings were attributed to late lower incisor crowding due to the lack of retainer use. Those posts served as health promotion to maintain long term orthodontic outcomes with patient compliance as opposed to blaming the eruption of third molars. The challenge with retainer use is the ability to quantify and accurately record patient compliance. Teeth tend to move back to their original positions of malocclusion due to periodontal, gingival, occlusal and growth-related factors [25]. It is easy to chastise an erupted third molar on late crowding, but it is also important to note that it is crucial to wear retainers to avoid orthodontic relapse and keep patients stable in general. A point to consider with Tik Tok is the power the user has on what information they put out into the world and how quickly they can take it away. Tik Toks can be deleted and edited by users and thus they hold less reliability in terms of having consistent and unchanged access to resourceful information.

Chat GPT and Google Gemini gave light to the controversy at hand and laid out confounding factors such as genetics, soft tissue changes, and spatial concerns that can interplay with malocclusion. Ultimately both searches felt the need to plead with the public to consult with healthcare professionals to monitor orthodontic outcomes.

Conclusion

In conclusion, the controversy regarding the relationship between incisor crowding and third molar eruption remains. There are several unknown variables and confounding variables that must be considered before a cause-and-effect relationship can be drawn. However, social media users on platforms such as Tik Tok tend to lean towards lower incisor crowding being a result of aging, lack of retainer compliance, and later mandibular jaw growth. Open artificial intelligence chatbots such as ChatGPT and Google Gemini had similar notions and ultimately promoted close follow up with healthcare professionals to monitor wisdom tooth development and orthodontic relapse.

Ultimately, although social media and AI platforms give regards to the controversy at hand, the prophylactic removal of wisdom teeth should be further investigated longitudinally on a wider scale and with large sample sizes to draw more accurate and concrete conclusions. Also, because there are many factors that can contribute to malocclusion such as varied skeletal patterns and different dental and soft tissue conditions, the user should consult their orthodontist for a tailored treatment plan to be able to treat them comprehensively and address concerns related to post-orthodontic relapse. It is pertinent to see a qualified dentist and/or an orthodontist to get a personalized assessment. In this way, patients will be evaluated clinically and radiographically for their specific diagnoses.

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