

Influence of orthodontic premolar extraction therapy on the eruption of the third molars

A systematic review of the literature

Damien Brezulier, DDS, MSc; Victor Fau, DMD;
Olivier Sorel, DDS, PhD

Tooth eruption is defined as the emergence of a tooth from within its follicle in the alveolar process of the maxilla or mandible into the oral cavity, according to Boucher's Clinical Dental Terminology.¹ This definition is also used by MEDLINE's Medical Subject Heading.

The third molars (M3) erupt in the oral cavity at a time when basal growth reaches its latest stages or is almost completed. According to a 2016 meta-analysis² they have a higher impaction rate of 24.40%. In the mandible, this rate is as high as 57.58%. Their eruption normally takes place from 18 through 24 years of age.³ At the beginning of orthodontic treatment, they are at an early stage of their development and their eruption is difficult to predict. The implementation of the correct position depends on numerous factors: the development of facial structures, the sagittal growth of the skeletal bases, the resorption of the anterior border of the ramus, the mesial displacement of the posterior teeth, the increase in retromolar space, the vertical uprighting, and the mesiodistal dimension of the tooth.⁴⁻⁶

In the 20th century, some authors believed that premolar extraction improved the prognosis of M3 eruption into correct position.^{7,8} Others, on the contrary, defended the idea that these extractions

ABSTRACT

Background. Through a systematic literature review, the authors assess the effect of premolar extractions on third-molar (M3) eruption considering eruption rate, retromolar space, and molar angulation.

Types of Studies Reviewed. The authors performed a systematic search using MEDLINE and Web of Science databases up through April 2017 to identify quality studies available comparing M3 eruption between a group with premolar extraction and a group without premolar extraction.

Results. Twelve comparative retrospective cohort studies met all the inclusion criteria. The authors found in 5 studies comparing the rate of M3 eruption that there were significantly higher results in the group with extractions. They found in 5 studies comparing the evolution of the retromolar space significantly higher results in the group with extractions. Lastly, concerning the uprighting of the M3 during treatment, the authors found only 2 studies showing significant differences between the 2 groups, each time in favor of the group with extractions.

Conclusions and Practical Implications. The dental literature on premolar extraction related to the eruption of the M3 is composed of average-quality retrospective studies. Premolar extraction significantly improves the chances of M3 eruption, but the level of evidence of comparative retrospective cohort studies is low. Clinicians must continue to rely on their judgment regarding premolar extraction on a case-by-case basis until the evidence is stronger. Retrospective studies with standardized protocols and more detailed methodologies are required to obtain higher levels of evidence.

Key Words. Premolar extraction; wisdom teeth; eruption rate; angulation; retromolar space; orthodontics.

JADA 2017;■(■):■-■

<http://dx.doi.org/10.1016/j.adaj.2017.07.023>

had no influence on the M3s.^{6,9} There were, however, no comparative studies on the subject.

This issue remains relevant today as premolar extractions provide extra space to treat severe tooth–arch discrepancy (TAD) or to correct certain cases of sagittal dysmorphosis. According to a 2017 study, since 2006, between 22.9% and 24% of orthodontic treatments included extractions (M3 excluded).¹⁰

Impacted M3s can lead to eruption incidents such as radicular resorption or caries on the second molars (M2s), pericoronitis, pain, or even follicular cysts,¹¹ and surgical extraction of M3s is not exempt from iatrogenic risk.¹² To prevent these side effects—and also to reduce economic spending in public health—the American Association of Oral and Maxillofacial Surgeons recommends surgical intervention or extractions of the M3s before the development of pathology in patients lacking space for correct eruption and maintenance.¹³ The consequence is that around 10 million M3s are extracted in the United States each year.

Beyond these considerations, when proposing a treatment with premolar extraction, the orthodontist is systematically faced with a question, which is sometimes also formulated by the patient: “Will this extraction treatment lead to the eruption of my wisdom teeth?” For some patients, the decision to extract 4 premolars, along with the possible M3 extraction at the end of orthodontic treatment, represents a loss of one-eighth of total teeth, which may seem undesirable.

In this systematic review of the literature, we aimed to assess the influence of premolar extraction orthodontic therapy on M3 eruption.

METHODS

We performed this systematic review from January 1990 to April 2017. We structured this study design according to the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement.¹⁴ No ethical approval was required considering the type of study.

Selection criteria applied for the review. Inclusion criteria. The inclusion criteria were that the articles had to be prospective and retrospective controlled clinical studies comparing a group with premolar extraction versus a group receiving treatment without extraction. The type of intervention was tooth extraction and orthodontic treatment with fixed appliances. The outcomes were the M3 eruption rate, the changes in retromolar space, and the angulation of M3 after treatment, tested for statistical significance. Only studies written in English or French were included.

Exclusion criteria. The exclusion criteria were those articles reporting studies with control group without extraction, case reports, case series, or reviews and studies without statistical significance tests.

Search strategy. A systematic review of the literature was conducted on the MEDLINE and Web of Science databases to identify the studies published up to April 30, 2017. The electronic research strategy was based on the association of key words (“premolar extraction” OR “removal premolar” OR “orthodontic extraction”) AND (“third molar” OR “wisdom teeth”) AND (“impaction” OR “eruption” OR “evolution” OR “unerupted” OR “angulation” OR “position”).

Data extraction and management. Articles were selected independently by 2 of us. A customized collection form was completed based on

- study title, authors, and date of publication;
- number, sex, age, and duration of time patients were studied;
- orthodontic diagnosis including malocclusion type, TAD, and anchorage requirement;
- treatment characteristics including orthodontic technique, number of extractions, and teeth extracted.

We assessed the methodological quality of the studies based on 11 of the 14 criteria of the assessment scale of the quality of cohort and cross-sectional studies of the National Heart, Lung, and Blood Institute¹⁵ (Table 1¹⁵⁻²⁷). We adapted this assessment tool to analytical comparative retrospective studies included in our literature review. The 3 criteria concerning the measurement and analysis of the degree of exposure as well as its repetition over time—analysis of the different levels of exposure to results, measurement method of exposure defined and uniformly applied, exposition assessed more than once over time—were not applicable given the strictly binary and irreversible nature of the type of exposure studied (extraction or nonextraction of premolars). Each study was assessed independently by 2 of us. The studies obtaining a score lower than 7 of 11 were considered as being of poor methodological quality and thus were excluded due to an overly high risk of bias. Studies responding favorably to between 7 and 9 criteria were considered as being of average methodological quality, whereas those with a score higher than 9 of 11 were considered as being of high methodological quality.

RESULTS

Inclusion of studies. Our electronic search identified 325 articles. After removing duplicates and analyzing titles, we selected 44 articles to have their summary read. Twenty-four seemed to be eligible, thus justifying a full reading. We excluded 12 articles: 5 noncomparative cohort studies,^{5,28-31} 2 comparative studies whose control group was made up of patients with no orthodontic

ABBREVIATION KEY. HP: Horizontal plane. MP: Mandibular plane. M3: Third molar. M2: Second molar. OP: Occlusal plane. PP: Palatal plane. TAD: Tooth–arch discrepancy. T1: Treatment starts. T2: Treatment ends.

Download English Version:

<https://daneshyari.com/en/article/8698431>

Download Persian Version:

<https://daneshyari.com/article/8698431>

[Daneshyari.com](https://daneshyari.com)