

Removal of Asymptomatic Third Molars: A Supporting View

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Attendees at the 2004 American Association of Oral and Maxillofacial Surgeons (AAOMS) Annual Meeting Symposium on Third Molars were surveyed about a variety of issues related to third molars. In answer to a question regarding asymptomatic third molar treatment, 95% responded that it is not in the patient's best interest to wait for symptoms to occur before removing such teeth.¹ Although this reflects a strong opinion on the part of clinicians, controversy remains.

Historically, the debate about asymptomatic third molar decision making has been greatly influenced by the mindset and interests of various parties. A relative lack of evidence to answer questions about what happens to third molars over time contributed to the discord. Over the past decade, however, important articles have appeared in the literature that have allowed us to better identify third molar pathology and understand its consequences. As a result, we are better able to "connect the dots" of information in a manner that has considerably narrowed the difference between what clinicians have intuitively believed and what we now know to be supported by evidence.

Before examining this information, it is worth addressing 2 peripheral matters that have contributed to the confusion about third molar decision making. First, the use of the word asymptomatic with third molars is misleading. Strictly interpreted, it refers to third molars that lack clinical symptoms. Popular use has extended its meaning to include those teeth that lack overt signs of pathology, such as radiographic changes secondary to an enlarged follicle. Unfortunately, neither definition recognizes the important role that the presence of associated pathology should play in decision making. Because pathology always

precedes symptoms and may not be associated with them for some time, perhaps until irreversible damage has occurred, decision making should be based on the presence of or likely development of pathology.

Another confounding issue is the assumption on the part of many that third molars are the same as other teeth. Rather, they are different in many ways. They have the highest rate of developmental abnormalities and, most importantly, are last in the eruption sequence. This leaves them to assume a compromised position in the dental arch due to limited anatomic space, unsuitable soft tissue environment, and poor access for hygiene. They are the "victims" of public health initiatives and improved access to care that have contributed to the retention of first and second molars, resulting in this lack of physiologic space for eruption. Further, when there is judged to be adequate space for their eruption, Sandhu and Kaur found that in some cases their eruption could not be guaranteed.²

Problems With the Literature

Historically, most of the literature on third molars focused on limited pieces of the third molar puzzle, such as the rate of complications or case reports. Missing was a convincing well-designed study comparing the long-term consequences of retention versus removal. By nature, such investigations are expensive and difficult to conduct let alone interpret. Although some long-term nonintervention studies were attempted, they were limited to measuring the most basic of outcome variables such as the presence or absence of teeth. For example, the study by Venta et al³ followed third molars of patients from the ages of 20 to 38 and documented slow changes in the position of these teeth over time. They reported that 73% of the initially unerupted third molars and more than half of those partially erupted were removed during the study period, which leaves the impression that the remaining third molars were healthy.³ They did not evaluate for the presence of associated soft tissue pathology or its consequences. As a result of inherent problems like these, clinicians have had to

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rely on their experiences perhaps even more than on the literature.

Before examining some of the current evidence on the topic, it is worth acknowledging 2 previous efforts to develop a consensus on this issue. The first was the 1979 National Institutes of Health (NIH) conference, a gathering of 200 practicing dentists and scientists from multiple disciplines.⁴ Among other things, they concluded that impacted teeth represent an abnormal state, that morbidity and serious complications are reduced when impacted teeth are removed at an early age, and they emphasized important role that soft tissue support plays when considering the health of third molars. In the end, they recommended further long-term studies.

The second noteworthy effort was the 1993 AAOMS-sponsored workshop of prominent clinicians and researchers who conducted an extensive literature review on the topic.⁵ Although they did not specifically address the question of the appropriateness of early removal of nonpathologic third molars, they concluded that additional research would be helpful to assist in evidence-based decision making.

In response to the recognized need for a comprehensive research effort, the AAOMS sponsored the "Third Molar Clinical Trials," a prospective, longitudinal study design led by Dr Raymond White and conducted by investigators from multiple disciplines and at multiple sites. Their studies have brought significant new evidence to the discussion; the greatest of which has been the ability to better identify third molar pathology and understand the associated consequences. As a result, there has been a quantum shift in the way we look at the issue of third molars.

Soft Tissue Pathology

Clinical research has identified a high incidence of subclinical pathology associated with asymptomatic third molars. Previous studies by both Ash⁶ and Kugelberg et al⁷ described periodontal defects in patients without symptoms. The Third Molar Clinical Trials have built on these findings. Blakey et al⁸ documented a significant percentage of asymptomatic patients had at least 1 probing depth (PD) equal to or greater than 5 mm on the distal of a second molar or around a third molar. These patients were found to have an associated loss of periodontal attachment equal to or greater than 2 mm 97% (80/82) of the time. Epidemiologic studies validate these findings. Data collected from 5,831 patients in the Third National Health and Nutrition Examination Survey (NHANES III) study show an association between visible third molars (VTM) and periodontal pathology.⁹ Another survey of 6,793 middle age and older patients in the Atherosclerosis Risk in Communities Study confirmed a statistically

significant link between periodontal disease and the presence of a third molar in the same quadrant.¹⁰

White et al¹¹ amplified these findings when they showed that patients with periodontal probing depths equal to or greater than 5 mm in the third molar region had increased levels of pathogenic periodontal microorganisms despite a lack of symptoms. Subgingival plaque was sampled from the distal of second molars, before probing, and identified "red" or "orange" complex micro-organisms similar to those described by Socransky et al,¹² who associated these specific bacteria with periodontitis. In fact, even when patients did not have PD equal to or greater than 5 mm, the associated pockets were still found to have elevated levels of the gingival crevicular fluid (GCF) inflammatory mediators that predict worsening of periodontal disease.¹³ Based on these findings and others, Blakey et al¹⁴ proposed that periodontitis first presents in the third molar region, a view that is supported by investigations into the etiology and development of periodontitis.¹⁵

It is important to recognize that third molar pericoronal pathology is a persistent problem.¹⁶ In a study of patients with a history of pericoronitis, half reported that they experienced symptoms in the same area during the prior 12 months, more than a third reported at least 2 episodes, and more than half described symptoms associated with the contralateral third molar. It is noteworthy that although removal of third molars improves the local bacterial flora, it does not seem to return to normal levels.¹⁷ Further, studies show that although removal of third molars before the age of 25 generally results in good healing, treatment after age 25 is a significant risk factor for incomplete healing with the potential need for additional treatment.^{18,19} These findings support the wisdom of removing third molars before this biofilm develops.

Systemic Implications

Although the above findings document some of the adverse local effects of periodontal pathology associated with asymptomatic third molars, their impact may not be limited to the oral cavity. It has long been understood that inflammation serves a valuable purpose in response to local tissue injury. In the normal state, it is limited to that location and concludes when the inciting problem resolves. However, we now know that the effects of inflammation can involve other areas of the body and may not resolve when the inciting problem has. When inflammation follows this inappropriate and persistent pattern, it promotes disease rather than healing.

It is recognized that there is a connection between oral soft tissue infection and systemic inflammation, which can be associated with a variety of systemic

diseases. Investigators have associated cardiovascular disease, cerebrovascular disease, diabetes mellitus, and pregnancy outcomes with periodontal inflammation.²⁰⁻²⁸ Although these relationships have not yet been shown to be causal, the diverse backgrounds and reputations of the investigators involved in this research underscores the fact that the connection between oral infection and systemic disease must be taken seriously.

Case studies have linked the presence of subgingival pathogens with myocardial infarction, which seems plausible given the fact that oral bacteria have been identified in carotid atheromas.²⁷ Desvarieux et al²⁸ identified a direct relationship between periodontal microbiology and thickening of the carotid artery intima-media even when adjusted for age, ethnic origin/ethnicity, gender, education, body mass index, smoking, diabetes, systolic blood pressure, and LDL and HDL cholesterol. Slade et al²² found an association between C-reactive proteins (CRP) and periodontal disease severity, which is significant because elevated CRP levels have been associated with significantly higher rates of peripheral vascular disease independent of other factors such as hypercholesterolemia, hypertension, and diabetes. It is important to recognize that these associations are not limited to generalized periodontal disease. In a recent study, Ruvo et al²⁹ found that although adverse pregnancy outcomes were associated with the presence of periodontal disease, this association was only significant when third molars were present.

Other Considerations

AGE

When asked about the effects of age on third molar surgery, 92% of attendees at the 2004 AAOMS Symposium on Third Molars responded that age had a moderate or dramatic adverse impact on healing.¹ The literature supports their experience. It is known that the cellular response to extraction is less intense with aging. This results in clinical delays in recovery and complications in wound healing including diminished bone volume and loss of alveolar height compared with younger patients.^{30,31} These biologic effects translate into patient outcomes, as seen in the work of Kugelberg et al¹⁸ mentioned previously.

More than 4 of 5 symposium attendees also believed that age had a moderate or dramatic impact on the incidence of postoperative complications; no one thought there was no adverse impact.¹ Evidence supports these beliefs as well, consistently demonstrating a higher incidence of complications after third molar removal in older patients.³²⁻³⁴

It is also known that the incidence of pathology associated with third molars increases with age. For

example, there is a documented increase in the incidence of third molar caries and periodontal disease with age.^{8,35} Third molars are also more likely to be associated with other pathologies. A retrospective histopathologic study of more than 2,600 pericoronal lesions obtained from extracted unerupted teeth showed a correlation between pathologically significant disease and age.³⁶

The above supports the recommendation issued by the AAOMS Workshop on Third Molars: "Given the goal to limit surgical side effects, a decision should be made by the middle of the third decade as to whether a third molar tooth should be electively removed."⁵

MORBIDITY

Concern regarding the morbidity of third molar treatment has been used as a rationale to support the retention of third molars. Risk versus benefit analysis must play a part in making treatment decisions. However, research, technology, and technical improvements have allowed us to minimize risks and improve outcomes to the extent that concerns about morbidity in most cases are overshadowed by our new appreciation of the risks of retaining third molars.

Studies have enabled us to better identify those at risk for complications and delayed recovery.^{37,38} Among other things, we know there is a positive correlation between age, medical history, and tooth position with the incidence of complications, allowing us to tailor our advice and therapy to patients. We are also well informed about strategies to improve recovery. Preemptive analgesics, anti-inflammatory protocols, and the skilled use of sedative agents can minimize morbidity and improve quality of life during recovery.³⁹⁻⁴² Further, the use of antibiotics for at-risk patients improves some parameters of recovery.⁴³

The recent AAOMS outcome study on age-related third molar treatment supports the fact that oral and maxillofacial surgeons are now able to treat older patients with a low incidence of adverse outcomes.⁴⁴ It is noteworthy that of the 16,664 third molars examined in patients with a mean age of 41 years, 10,139 were indicated for removal. This is even more significant considering that this group of study subjects excluded patients whose third molars had been removed. These findings further question the strategy of retaining teeth that have such a high probability of developing pathology and providing little functional benefit.

The removal of third molars not only limits the development of pathology, but can result in an improved quality of life.⁴⁵ According to McGrath et al,⁴⁵ 6 months after third molar removal, there was measurable improvement in patients' perceptions regarding quality of life in several areas.

COST

Cost savings has been used to justify the retention of third molars. A 1995 estimate put the cost of removing impacted teeth at more than 2 billion dollars annually, a figure that has no doubt risen. However, Flick pointed out that this amount is not excessive when compared with other health care expenses during the same time (120 billion spent on infectious disease, 5 billion on influenza, and 5 billion on sexually transmitted diseases), and in light of the fact that we do not know the long-term cost of retaining such teeth.⁴⁶

The United Kingdom's clinical guidelines for third molar treatment represents an example of an effort to restrain third molar treatment based on cost savings. Jamileh and Pedlar⁴⁷ documented that restrictive guidelines can reduce the number of third molars removed; however, they did not measure clinical outcomes, and there was no follow-up to determine what happened to those who retained their teeth.

A more appropriate way to evaluate the cost of third molar treatment decisions is to include the economic impact over time. Indresano et al⁴⁸ looked at the costs associated with the treatment of patients with deep space infections caused by third molars. Based on their 1992 estimate, extrapolated costs for admission, operating room time, laboratory fees, and medications would add up to 93 million dollars annually, excluding surgical and consultation fees. It is significant that none of the patients in their study had a postoperative infection after removal of a tooth that had not been infected before treatment. Even this approach neglects the indirect costs associated with treatment decisions, such as lost time from work or the consequences of pathology. Ultimately, any responsible analysis of costs should take into account the impact of decisions on outcomes and not just the effects on short-term balance sheets.

RETENTION

Given what we now know about the presence of pathology associated with third molars, it is clear that any decision to retain these teeth has consequences. Accordingly, such decisions should be supported by evidence that shows value to retention and include a strategy for monitoring. However, those who argue for the retention of third molars lack clinically generated evidence to justify their position. Flick effectively addressed the fallacies of the nonclinical third molar studies that argue against prophylactic removal, pointing out that they are generally based on statistical models that do not translate to the clinical setting.⁴⁶ Anecdotal stories and speculation aside, the reality is that patients with even reasonably intact dentitions gain little if any functional benefit from third molars.

As pointed out in the Surgeon General's report of 2000, dentistry has done well in its efforts to prevent oral disease and its sequelae.⁴⁹ The opportunity to extend the benefits of disease prevention should not overlook the treatment of third molars. As a result of new information about the presence of pathology associated with retained third molars and our better appreciation of the potential long-term consequences of retention, it is clear that removal should be done before the onset of symptoms. Although exceptions should be recognized, the elective removal of asymptomatic third molars limits the establishment of pathology and minimizes adverse outcomes.

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