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Evaluation and management of asymptomatic third molars: Lack of symptoms does not equate to lack of pathology

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Because most adolescents and young adults have at least 1 third molar, and three quarters have 4, clinicians are often faced with advising their patients about third molar management.¹ The term “asymptomatic” as applied to third molars continues to be a source of confusion for those confronted with a decision on treatment. A few clinicians and the public have assumed that “asymptomatic” infers “pathology free” today and for the future. Some patients have third molars that are “symptom free and pathology free.” More often, however, third molars are “symptom free, and pathology exists,” requiring a clinical or radiographic examination for confirmation. The source of this current conundrum for clinicians and patients can be traced back at least 5 decades.

In 1962, Ash et al² cautioned that the association between third molars and periodontal pathology affecting the adjacent second molars had been overlooked. Subsequently, to preserve the periodontal health of adjacent second molars, Ash³ suggested that third molars should be removed in young adults before root formation is complete. Since then, many clinicians have heeded this advice and urged patients to have their third molars removed to prevent pathology, including periodontal inflammatory disease, from developing, although the third molar had no symptoms. Without acknowledging that only a clinical exam can confirm the absence of pathology affecting the third molars, others have questioned the wisdom of removing “asymptomatic” third molars.⁴

SYMPTOM FREE VS PATHOLOGY FREE

Young adults with “symptom-free” third molars would like to know whether their third molars are “pathology free” and, if so, the likelihood of their third molars remaining free of pathology if the third molars are retained for a lifetime. Data on the prevalence of pathology with retained third molars, particularly periodontal inflammatory disease and caries experience, have been limited because third molar data are often not collected from subjects enrolled in clinical or population studies, or third molar data are excluded in the analyses.^{5,6} A recent report by Eke et al⁷ suggested that the limited periodontal examination for the prevalence of periodontal pathology in the United States in the National Health and Nutrition Estimates Survey, compared with full-mouth periodontal probing on all teeth

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present, underestimated the prevalence of periodontal disease. In both analyses by the National Health and Nutrition Estimates Survey and Eke et al, the periodontal status of the third molars was excluded. An additional comment by Eke et al is instructive; they stated that exclusion of third molars possibly contributed to the underestimation of the prevalence of periodontitis.

Retained third molars with no symptoms can be associated with cysts or tumors, increased susceptibility to jaw fractures, and malpositions of posterior teeth. Most clinicians would agree that the prevalence of these conditions is limited, probably less than 5%. In addition, some patients do have symptomatic third molars, most often pericoronitis or symptomatic periodontal inflammatory disease. This chronic condition with recurring acute episodes has a prevalence not greater than 10%.^{8,9} The treatment for these conditions almost always involves third molar removal.

PREVALENCE OF THIRD MOLAR PATHOLOGY

A series of recent reports based on an exploratory, longitudinal study conducted at 2 academic centers, the University of North Carolina and the University of Kentucky, has begun to better define the prevalence of third molar pathology in the remaining 85% of the population—those with no third molar symptoms yet with possible detectable caries experience or periodontal pathology. These current data confirm that “symptom-free” third molars do not equate to “pathology-free” third molars today, or for the person’s lifetime.

Data at enrollment from 409 healthy young adults, who averaged 25 years of age, with 4 retained asymptomatic third molars, suggested that periodontal pathology, defined as at least 1 probing site with at least 1 periodontal probing depth (PD) greater than 4 mm (PD4+), was prevalent on the third molars and the distal aspect of the adjacent second molars; 65% of the subjects were affected.¹⁰ The third molars at the occlusal plane or in the mandible were more likely to have a PD4+ than those below the occlusal plane or in the maxilla. A few subjects, 15%, had periodontal PD4+ sites anterior to the molars. Conversely, caries experience on third molars was less prevalent than on first or second molars, and only 1% of the subjects had caries experience on a third molar without first or second molar involvement. Caries experience overall was less than periodontal pathology. However, only 16% of subjects with 4 asymptomatic third molars at the occlusal plane, a useful functional position, were free of both periodontal pathology and caries.

More than a third of the 106 subjects with asymptomatic third molars that were free of periodontal pathology at enrollment developed a PD4+ in at least 1 third molar region within the next 4 years.¹¹ The periodontal pathology was significantly more likely to be in the mandibular third molar region. Affected mandibular third molars tended to be vertical or distal and at the occlusal plane.

For the 194 subjects in the longitudinal study, who were followed for an average of 6 years, if 1 PD4+ was detected in a third molar region at enrollment, odds were 12-fold that at least 4 PD4+ would be found in a third molar at follow-up ($P < 0.01$).¹² If the subjects had 1 PD4+ in a third molar region at enrollment, odds were 5-fold greater that at least 1 PD4+

would be detected on teeth more anterior in the mouth at follow-up in subjects with no anterior teeth involved previously ($P < 0.01$).

DATA ON VISIBLE THIRD MOLARS

A recent review of available third molar data from clinical studies and studies conducted for other purposes suggested that having a visible third molar might be a risk indicator by itself for an anaerobic environment conducive to periodontal inflammatory disease.¹³ Deeper mean periodontal PDs in the first and second molar regions were detected more often in patients retaining third molars, and third molar mean PDs were greater than mean PDs on other teeth more anterior in the mouth.

Are these data biologically plausible? Once teeth are exposed to the oral cavity and can be probed, oral flora colonize on the tooth surfaces in a nonshedddable biofilm.¹⁴ Third molars are the most posterior teeth in each jaw; on average, they erupt at age 19, after jaw growth is complete.¹⁵ Mandibular third molars are situated anatomically in alveolar bone in the jaw at the junction of the horizontal body and the vertical ramus. The combined impact of erupting at a later age than other teeth and the anatomic location in the jaw might be why a greater prevalence of PD4+ is found around mandibular third molars.

BIOFILM GINGIVAL INTERFACE

Periodontal PDs, measured at 6 sites per tooth, provide an estimate of the total surface area of the biofilm gingival interface (BGI).¹⁶ A greater BGI surface area increases the potential for anaerobic conditions, colonization of anaerobic pathogens, and severity of periodontal inflammatory disease.¹⁶ Deeper PDs, which tend to be detected around third molars as soon as the teeth are exposed, are associated with colonization of subgingival anaerobic pathogens at the BGI.¹⁷ The magnitude and quality of the local inflammatory response at the BGI to the pathogens colonized adjacent to a single gingival epithelial cell layer are reflected in the production of gingival crevicular fluid inflammatory mediators, chiefly from immune-system cells: neutrophils, lymphocytes, and monocytes. The resulting chronic inflammatory process is the source of tissue destruction with time. Once established, the bacteria around third molars are difficult to eradicate with mechanical debridement alone, and pathogens in deeper third molar probing sites can serve as a potential reservoir for pathogens colonizing in other sites on teeth more anterior in the mouth, particularly the adjacent second molars.¹⁸

Are treatment options to third molar removal possible in the future? Considerable research is being conducted on methods to moderate both the interaction among bacteria in the biofilm by altering the crosstalk among bacteria that is known as quorum sensing, and the responses from the immune system to the presence of pathogens. A recent report based on an experimental model suggests that specific small organic molecules can alter the expression of virulence factors by the bacteria, reducing the host inflammatory response.¹⁹ In the future, interventions such as these could result in a lowered expression of tissue-destructive inflammatory mediators from a patient's immune system without altering the composition of the biofilm.

ADVISING PATIENTS ABOUT THIRD MOLARS

How should clinicians use these most recent data in advising adolescents and young adults? At the outset, patients and the public at large must understand that “symptom free” does not indicate “pathology free.” Having no symptoms does not equate to no disease. Clinical risk markers, such as PD4+ around third molars in a clinical examination in a young adult, indicate periodontal pathology and should not be ignored even though no symptoms accompany these findings. Odds are that even without symptoms, third molar periodontal pathology will worsen with time, and teeth located more anteriorly will be affected.¹²

The prevalence of caries experience (decayed tooth surfaces or restorations) has a different pattern; ie, third molars are rarely affected without first or second molars being involved, so a negative prediction for third molar caries experience might be accurate. Third molar caries could be particularly unlikely if no caries were detected on more anterior teeth. A positive prediction is less certain. If teeth anterior to the third molars do have caries experience, the third molars might also be affected with time.

How should impacted teeth with little chance of reaching a functional position in the mouth be viewed? Phillips et al²⁰ analyzed clinical and radiographic data from 146 subjects with at least a 2-year follow-up, who had at least 1 third molar not fully erupted at baseline. Of the 369 molars that could not be probed at baseline, approximately 35% could be probed at the follow-up; the highest percentage of change was 46% in the older subjects with follow-up of at least 4 years. After the peak eruption age, few third molars reach the occlusal plane, but some do. Existing data, although limited, suggest that the prevalence of periodontal pathology is greater in late erupting third molars. Patients with impacted third molars who choose to retain these teeth must understand that the third molars will most likely change position so that they can be probed, and this is conducive to colonization of pathogens on the exposed nonshedtable tooth surface.

Perhaps as many as a quarter of adolescents and young adults, who have asymptomatic third molars at an initial evaluation, retain functional third molars that remain “pathology free” with time. The high likelihood of third molar problems developing later in 70% to 75% of these patients requires periodic clinical and radiographic evaluations for a lifetime. A decision for third molar removal or retention could be delayed and reassessed after subsequent clinical evaluation. However, experienced clinicians believe that the difficulty of surgery increases, and recovery after surgery is delayed, if third molar surgery is performed beyond the third decade of life.²¹ No clinical data refute these impressions. A recent report on quality-of-life outcomes after surgery from 954 patients treated by specialty board-certified surgeons adds weight to the views of experienced clinicians. With outcomes controlled for the difficulty of surgery, patients who were older than 21 years of age had a delayed recovery for lifestyle and oral function, and had pain for almost 2 days longer compared with younger patients.²²

DECIDING TO REMOVE OR RETAIN

A decision about third molar removal or retention should be made by patients who have been counseled with the best information available. A decision for removal does commit the

patient to an anesthetic and a surgical procedure with well-known risks and outcomes on recovery that relate to the difficulty of the surgery and age at the time of surgery. A decision to retain requires periodic monitoring involving clinical examinations, radiographs, and more uncertainty as to outcomes.

The clinician involved in the consultation about third molar management should frame the odds of possible options in both positive and negative fashions.²³ It is appropriate to tell adolescents and young adults that, based on recent data, at least 70 of 100 young adults with third molars that are “symptom free” already have pathology or will experience pathology with time. Conversely then, 30 or possibly fewer of 100 young adults will not experience pathology with retained asymptomatic third molars. No current data can be more specific about the odds for any patient. In this circumstance, patients must decide about management of their third molars, with either removal or retention with periodic monitoring. No decision is a decision to retain third molars and accept the risks associated with that decision. A recent report by Kinard and Dodson²⁴ is instructive about what patients might decide in these circumstances and could help clinicians in advising patients about third molar management. One third of the 249 young adults seeking a consultation about options for third molar management had “symptom- free and disease-free” third molars. Of that group, 60% elected to have their third molars removed rather than retain the teeth and commit to a monitoring protocol with time.

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