ADA CE Program ARTICLE 4

ORAL AND MAXILLOFACIAL SURGERY

The indications for third-molar extractions

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Editor's note: *This new feature, which will appear occasionally, will focus on content pertinent to the specialty areas of dentistry.*

Defining the indications for third-molar extraction continues to be a topic of controversy among dentists, other health care professionals, the public and third parties such as insurance companies and government agencies. In a systematic review, Mettes and colleagues[1] found no evidence to support or refute removal of third molars to prevent health-related complications.

The dentist's management of third molars commonly hinges on identifying the presence of symptoms or disease that clearly is attributable to the third molar. Dodson[2] developed a useful guide (Table[3]) that serves as a systematic and unambiguous way to classify third molars. According to Dodson,[2] patients' symptoms are designated as present and attributable to the third molar (Sx+) or as absent (Sx−). In addition, clinical or radiographic evidence of disease is evaluated and designated as present (D+) or absent (D−).

Disease status is of importance to Dodson's classification system and its clinical relevance. Investigators in numerous studies have discussed the epidemiology and management of so-called asymptomatic third molars. The term "asymptomatic" is an insufficient description of the clinical status of the third molar.[4] Just as in many other disease courses, such as diabetes and cardiovascular disease, the absence of symptoms in a third molar does not always reflect true absence of disease. This is illustrated in group C.

At the initial visit, the clinician can ascertain the presence or absence of symptoms by obtaining a thorough medical history from the patient. Many patients report that they are not experiencing any symptoms. Other pa-

ABSTRACT

Background. Defining the indications for third-molar extraction continues to be a topic of controversy.

Methods. The dentist's management of third molars commonly hinges on identifying the presence of symptoms or disease that clearly is attributable to the third molar. Use of a guide that serves as a systematic and unambiguous way to classify third molars has been advocated.

Results. Patients' symptoms are designated as present and attributable to the third molar (Sx+) or as absent (Sx−). In addition, clinical or radiographic evidence of disease is evaluated and designated as present (D+) or absent (D−).

Conclusions. Evidence-based clinical data developed from prospective investigations have shown that an asymptomatic third molar does not necessarily reflect the absence of disease.

Practical Implications. Current data are not sufficient to refute or support prophylactic extraction versus active surveillance for the routine management of third molars that are asymptomatic and free of disease (group D). Although decisions regarding third-molar management usually are straightforward, the evidence supporting extraction versus retention of asymptomatic disease-free (group D) third molars is lacking. Active surveillance, a prescribed program of follow-up and reassessment at regular intervals are recommended for retained third molars rather than waiting for the onset of symptoms.

Key Words. Tooth extraction; third molars; literature review; practice guidelines; oral surgical procedures; oral and maxillofacial surgery; evidence-based dentistry.

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tients complain of limited mouth opening (trismus) or periodic swelling and pain in the third molar region, or they relate experiencing episodic foul taste. The clinician then can perform physical and radiographic examinations to determine the presence or absence of disease (Box[3]), and he or she can determine whether the examination findings correlate with the patient's symptoms. If the third molar is not visible, the clinician should perform periodontal probing to determine if the tooth communicates with the oral cavity. By probing posterior to the second molar, the clinician may come into contact with and identify an impacted third molar. This finding suggests the presence of chronic contamination with oral flora and a risk of the patient's developing inflammatory disease.

THIRD MOLARS IN GROUP A: SYMPTOMS AND DISEASE PRESENT

Group A third molars are common and recognized readily. Patients with third molars in group A have symptoms such as severe pain, edema or trismus. Physical and radiographic examination findings may reveal acute pericoronitis, dental caries or localized or spreading fascial space infection or a combination of the preceding.

Pericoronitis. Pericoronitis is a mild to moderate inflammatory response of soft tissues surrounding a partially erupted tooth, and 25 to 30 percent of impacted third molars are extracted because of acute or recurrent pericoronitis.[5]

Dental caries. Dental caries may be present because of the patient's difficulty in reaching the region to clean it adequately. According to Nordenram and colleagues,[6] caries accounts for 15 percent of third-molar extractions.

Infection. Pericoronitis or caries that has resulted in pulpal necrosis can result in a localized or spreading fascial space infection.

Treatment of third molars in group A focuses on addressing the presence of disease. Treatment options are restoring the tooth, periodontal therapy and hygiene care, or extraction. Clinicians should tailor treatment to each patient, taking into consideration his or her ability to maintain adequate hygiene, access for tooth restoration, eruption status, functionality, risk of injury to adjacent structures and the patient's preference.[3]

THIRD MOLARS IN GROUP B: SYMPTOMS PRESENT BUT DISEASE ABSENT

Third molars in group B are seen less often than are third molars in other groups, and placement into this group is more difficult. Clinical examples include vague posterior quadrant pain from impending eruption in the setting of adequate space for the third molar to erupt into a useful, functional position. Other third molars classified into group B are located in quadrants in which there is referred myofascial or deafferentiated (atypical) pain.

Practitioners need to discuss with patients the benefits of and alternatives to third-molar removal, especially if the practitioner is unable to directly identify the source of the symptoms.

TABLE

Classification of third molars, according to symptom and disease status.*

SYMPTOMS ATTRIBUTABLE TO THIRD MOLARS	CLINICAL OR RADIOGRAPHIC EVIDENCE OF DISEASE	
	Yes (D+)	No (D–)
Yes (Sx+)	Group A†	Group B‡
No (Sx–)	Group C§	Group D¶

* Adapted from Dodson,[3] with permission from Elsevier. Copyright 2012 Elsevier.
† Group A: Symptoms present (Sx+), disease present (D+).
‡ Group B: Symptoms present (Sx+), disease absent (D–).
§ Group C: Symptoms absent (Sx–), disease present (D+).
¶ Group D: Symptoms absent (Sx–), disease absent (D–).

BOX

Characteristics of asymptomatic, disease-free third molars.*

PATIENT HISTORY
No symptoms or vague, nonspecific complaints
CLINICAL EXAMINATION
Impacted third molar cannot be seen, cannot be probed, with PD† less than 4 mm‡
Erupting third molar with adequate space to accommodate functional tooth
Erupted third molar has reached occlusal plane; is functional, hygienic, with PD less than 4 mm; with no caries, restorable caries or restored caries; all five surfaces can be examined clinically; and attached tissue is present along distal surface of tooth
RADIOGRAPHIC EXAMINATION
No evidence of radiographic disease present

* Adapted from Dodson,[3] with permission from Elsevier. Copyright 2012 Elsevier.
† PD: Probing depth.
‡ mm: Millimeter.

THIRD MOLARS IN GROUP C: SYMPTOMS ABSENT BUT DISEASE PRESENT

Patients with third molars in group C do not have symptoms associated with the third molar, yet disease is present.

Periodontitis. Periodontal pathology can be associated with asymptomatic third molars. At baseline, 82 of 329 asymptomatic participants (25 percent) enrolled in one prospective study had at least one probing depth (PD) of at least 5 millimeters in the third-molar region, distal to the second molars, or around the third molars, with attachment loss of at least 1 mm in each patient.[7] PDs deeper than 5 mm were associated with an attach-

ABBREVIATION KEY. **D–:** Disease absent. **D+:** Disease present. **PD:** Probing depth. **Sx–:** Symptoms absent. **Sx+:** Symptoms present.

ment loss of at least 2 mm in 80 of 82 participants (98 percent). White and colleagues[8] reported that asymptomatic participants with a PD of at least 5 mm in the third-molar region and associated periodontal attachment loss had increased levels of biochemical mediators of inflammation compared with those in participants whose PD was shallower than 5 mm.

The clinical findings of increased periodontal PDs and periodontal attachment loss, coupled with the colonization of periodontal pathogens, support the concept that clinical and microbial changes associated with the initiation of periodontitis may manifest first in the third-molar regions of young adults.[9] White and colleagues[9] reported that for participants with a baseline PD of at least 4 mm in the third molar region or baseline "orange and red" complex periodontal bacteria of at least 10^5, the odds of the periodontal disease's progressing in the third-molar region increased significantly. ("Red" complex microorganisms include *Bacteroides forsythus, Porphyromonas gingivalis* and *Treponema denticola*; "orange" complex microorganisms include *Prevotella intermedia and Campylobacter rectus*.) The visible presence of third molars in young adults was associated significantly with periodontal inflammatory disease in teeth other than third molars.[9]

Caries. Researchers in prospective studies of occlusal caries in patients with asymptomatic third molars reported an increasing frequency of caries with increasing age and erupted third molars.[10,11] Shugars and colleagues[11] reported that 28 percent of 303 asymptomatic patients had at least one third molar with occlusal caries at baseline (39 percent in patients ≥ 25 years old). Mandibular third molars were affected more often than were maxillary third molars. Data from the 6,793 participants in the Atherosclerosis Risk in Communities (ARIC) study who underwent clinical examination for periodontal disease and coronal caries revealed that fewer than 2 percent of the middle-aged and older participants with a retained visible third molar were free of coronal caries and periodontal pathology.[12]

Cyst or tumor associated with the tooth. Odontogenic cysts and tumors occur in some patients with impacted third molars, although they are relatively rare.[13] Many of these patients are asymptomatic, and the cysts and tumors are identified only incidentally on panoramic radiographic examination. Cystic changes may be encountered in the histopathological examination of the soft tissue associated with asymptomatic impacted third molars, especially in patients older than 20 years.

Treatment of third molars in group C also focuses on eliminating the disease. Treatment options are restoring the tooth, periodontal therapy and hygiene care, or extraction.

THIRD MOLARS IN GROUP D: SYMPTOMS AND DISEASE ABSENT

Clinical decision making for patients with third molars in group D remains challenging. Patients with four asymptomatic disease-free third molars are not common. Kinard and Dodson[10] conducted a study, the results of which showed that in 29 participants (11.6 percent), all third molars present were asymptomatic and free of disease. Many third molars in group D erupt fully into the mouth or remain encased within bone. Absent evidence that would support routinely retaining or removing the third molar, the clinician should review the risks and benefits of extraction versus retention and weigh heavily the patient's own preferences and perceived risks or benefits.

The risks and direct costs of third molar removal are well documented.[14,15] Complications include localized osteitis, peripheral trigeminal nerve injury, postoperative infection, bleeding, periodontal defects, oroantral communication and fracture of the maxillary tuberosity or mandible. The direct cost of care and time lost from work or school also are considerations.

The implications of retaining group D third molars are less well documented. The results of studies of patient cohorts who have elected to retain their third molars demonstrate that retained third molars frequently and unpredictably change their periodontal status, their influence on second-molar caries, and their position and eruption status.[16-18] Retained third molars that are asymptomatic on initial evaluation commonly are extracted over time.[19-23] Given the unknown but high likelihood of future disease, active surveillance, a prescribed program of follow-up, and reassessment at regular intervals are preferred over follow-up only when symptoms manifest. The group D third molar will remain in group D or progress to group B and then to group A. Waiting to treat may result in unnecessary disease progression.

Several situations can arise other than the development of third-molar caries or periodontal disease that necessitate extraction of third molars in group D.

Nonfunctional (unopposed and soon to supraerupt). In cases in which the erupted or erupting maxillary third molar is unopposed, whether due to agenesis or prior tooth removal, the possibility of supraeruption over time may indicate the need for extraction of the maxillary third molar.

Removable prosthetics. Impacted third molars in a region in which a removable prosthetic will be placed over them generally require 1 to 2 mm of bone between the tooth and the prosthesis to avoid irritation, exposure of the tooth to the oral cavity and subsequent infection.

Orthodontic indications. Removal of a third molar for orthodontic reasons is justified when the third molar prevents the eruption of second molars or otherwise affects the health of adjacent teeth.[24] Evidence i lacking that removal of third molars will prevent anterior crowding in the mandibular arch or prevent postorthodontic relapse, and outcome measures are controversial.[24]

Planned orthognathic surgery. Clinicians should consider early extraction of third molars to prevent interference with the osteotomy sites. Sagittal split ramus

osteotomies generally are performed more predictably in cases in which third molars are not present at the site, and rigid fixation is optimized because of ample sound bone.

CONCLUSIONS

Evidence-based clinical data collected from prospective investigations show that an asymptomatic third molar does not necessarily reflect an absence of disease.

Practitioners typically should consider removing erupted and impacted third molars when they cause considerable pain, are infected, are associated with bone-destroying pathology, are carious or adversely affect the health of adjacent teeth. In addition, practitioners should remove third molars that are expected to be problematic under dentures, are located at sites of planned osteotomies or interfere with planned orthodontic movements.

Current data are not sufficient to refute or support prophylactic removal of third molars in group D versus active surveillance. Although third-molar management usually is straightforward, the evidence supporting extraction versus retention of asymptomatic, disease-free (group D) third molars is lacking. Active surveillance, a prescribed program of follow-up and reassessment at regular intervals are recommended for retained third molars[3] rather than waiting for the onset of symptoms to initiate follow-up. ■

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