Evidence Based Third Molar Surgery

The American Association of Oral and Maxillofacial Surgeons (AAOMS) is an advocate for the practice of evidence-based medicine and dentistry. AAOMS strongly recommends that when considering treatment for patients, the oral and maxillofacial surgeon must apply pertinent available scientific data to each individual case, critically weigh treatment options, and choose a course of action that best fits the needs of the patient, while being mindful of the financial impact to the patient as well as the cost to society. The management of third molar teeth is a complex topic. Appropriate treatment options include removal, partial removal (coronectomy), or retention with subsequent clinical and radiographic surveillance and hygiene maintenance.

There is general agreement in the medical and dental profession that the removal of third molar teeth is always appropriate when there is evidence of pathological changes such as periodontal disease, non-restorable carious lesions, infections, cysts, tumors, and damage to adjacent teeth. There is also general agreement that third molar teeth that are completely erupted and functional, painless, free of caries, in hygienic position with a healthy periodontium, without other associated pathologic conditions, are disease-free teeth that may not require extraction but do require hygiene maintenance and periodic clinical and radiographic surveillance if retained.

The medical necessity for removal of erupted, partially (or visible) impacted, and fully impacted third molar teeth has been recently challenged by some political action groups and third party carriers. The controversy regarding the medical necessity for removal of third molar teeth seems to be centered on the usage of the term “asymptomatic” in describing the condition of the third molar teeth, or when the extraction of said teeth is described as “prophylactic.”

The term “asymptomatic“ has been used to describe the condition of erupted, impacted or partially impacted third molar teeth. The word “asymptomatic” is an adjective that indicates the noun to which it refers (in this case the third molar) is neither causing nor exhibiting symptoms of disease. This word does not indicate that there is no disease—just that there are no symptoms. However, there is a significant difference between “disease free” as described above, and “asymptomatic.”

For almost fifty years, studies have documented the presence of periodontal disease around asymptomatic third molars.[1] Two very large epidemiological studies show an association between third molar teeth and periodontal pathology in both younger and older patient populations.[2] [3] Recently, the findings of a large scale, multidisciplinary, multiple site, prospective, longitudinal study have shown that a significant number—almost 25%—of patients with retained asymptomatic third molar teeth had baseline probing depths of 5mm or greater on the distal of a second molar or around a third molar tooth. If the probing depth in this area was equal to or greater than 5mm, there was also an associated attachment loss of greater than 2 mm in 80/82 patients. The same study reported that a higher proportion of patients with probing depths equal to or greater than 5mm were more than 25 years old.[4] Another study showed that for 38% of patients with probing depths of to 4mm in the second/third molar region upon enrollment in the study, the probing depths increased in a relatively short period of time with a mean follow up of 2.2 years. The study also concluded that contrary to the expectations of the public and clinicians, erupted third molar teeth are as likely to have increases in probing depths as impacted third molars.[5] These studies and others show that patients with erupted and impacted third molar teeth that have no associated symptoms may in reality have active inflammatory periodontal disease.

Research has also related the presence of wisdom teeth to the progression of periodontal disease.[6] Numerous dental research efforts have studied the microbial make-up of biofilm in plaque and the respondent mediators of inflammation that cause periodontal disease, and the relationship of these factors to other systemic diseases. Biofilms form when free floating bacteria attach to surfaces, produce an extracellular matrix, which serves to trap nutrients from its surrounding environment and allow cohesion of clumps of

microbes.[7] The transfer of genetic and signaling information among the microbes within biofilms leads to resistance of the microbial population to antibacterial agents.[8] There is mounting evidence that biofilms are the causative agents of many infections in humans,[9] including periodontitis and chronic lung infections on cystis fibrosis patients, infections of indwelling medical devices, odontogenic infections and bisphosphonate related osteomyelitis of the jaws.[10 11] The infections share common characteristics; the bacteria in biofilms invade the host defenses, withstand antimicrobial therapy, and persist until the colonized surface is surgically removed from the body.[12]

White studied the microbial complexes found in the subgingival plaque in periodontal pockets of 5mm or greater around third molars and found that organisms responsible for the initiation and propagation of periodontal disease were present, including Bacteroides forsythus, Prevotella gingivalis, Treponema dinticola, Prevotella intermedia and Campylobacter rectus.[13] These, and other bacteria have been shown to work in clusters as the causative agents for the initiation and propagation of periodontitis.[14] The gingival crevicular fluid in pockets around third molar teeth, even in pockets shallower than 5mm, has been shown to harbor inflammatory mediators.[15] These inflammatory mediators have been shown to increase systemic health risks such as cardiovascular disease,[16 17 18] non-hemorrhagic stroke19, preterm low birth weight pregnancies[20] and kidney disease.[21]

There is supporting evidence that once periodontal disease or pericoronal disease is established in the third molar areas, the problem is persistent and progressive,[22] but may improve following extraction of the teeth. Plaque and gingival indices, two accepted criteria for determining the status of oral and gingival health, have been shown to be increased in teeth adjacent to partially impacted third molars. [23 24] Giglio et.al. reported improvement in plaque and gingival index scores in impacted teeth with symptoms and without symptoms following extractions.[25] Pericoronal infections related to ectopically erupted, partially erupted and impacted third molar teeth are common complaints causing persons to seek care from oral and maxillofacial surgeons. The presence of a symptomatic or asymptomatic pericoronal infection is, of course, an absolute indication for removal of the third molar teeth.

Periodontal pocketing, elevated plaque and gingival indices, and the presence of pericoronal infection are all indications that disease exists related to third molar teeth. Extraction of third molar teeth after the age of 25 is itself a risk factor for incomplete healing and the need for additional treatment.[26] This new, relevant research supports the surgical intervention or removal of third molar teeth prior to the development of periodontal pathology, when the post-surgical healing is optimal, and the risk of post-operative complications is lowest. AAOMS fully supports the elective, therapeutic removal of impacted third molar teeth that are not likely to erupt into a disease free position, whether the third molar teeth exhibit symptoms or not, and preferably prior to the onset of periodontal or pericoronal disease.

There are other conditions that may not cause pain or other symptoms, such as when an impacted or partially impacted third molar tooth is positioned ectopically and prevents the eruption of an adjacent tooth, or causes damage to the adjacent tooth. Occult cystic disease was found to be present in about one-third of impacted third molars in one study.[27] Histopathological examination of radiographically normal appearing follicles of impacted third molar teeth demonstrated the presence of cystic changes in up to 50% of patients older than 20 years old.[28] Another study reported that 42% of dentigerous cysts associated with impacted third molar teeth were asymptomatic. The researcher offered that the presence of symptoms alone is a poor indicator of the presence of dentigerous cysts associated with impacted third molar teeth.[29] In these cases, the third molar tooth may be asymptomatic, but the overall condition is not "disease free." Elective therapeutic extraction of the third molar tooth may be required in order to maintain a disease free oral environment.

The term "prophylactic," by definition, indicates that a disease free state already exists and that a course of action such as a medication or a surgical procedure is being utilized to prevent a disease from occurring. In some instances, disease free teeth with no symptoms require extraction to prevent pathology from developing as a result of the presence, location or condition of the third molar teeth. For example, the teeth may require removal for orthodontic purposes, or in preparation for orthognathic surgery. There may not be adequate predicted jaw length to accommodate the third molar teeth.[30 31 32] However, jaw growth and the eruption patterns of third molar teeth are not entirely

predictable.[33 34] The third molar tooth has been shown to continue to change in position over time within the mandible,[35] generally to a less favorable position with respect to the difficulty in extraction and risk of intraoperative complications. The state of root development must also be considered, as the incidence of nerve injuries is statistically related to the age of the patient. A higher incidence of nerve injury in older patients has been attributed to more fully developed third molar teeth, and third molar teeth with roots in proximity to the inferior alveolar nerve, and a decrease in nerve regeneration or neuronal plasticity in older patients.[36 37] For these and other patients, removal of third molar teeth is the best treatment option.

The morbidity associated with the surgical management of third molar teeth, as well as the risk of complications has been shown to increase with age.[38 39 40] Although the frequency is not high, the complications of odontogenic cysts and tumors, damage to adjacent teeth, dental crowding, and changes in position of adjacent of teeth may be prevented by extraction of third molar teeth earlier.[41] The literature is replete with case reports of severe multi-fascial space head and neck infections, necrotizing fasciitis, osteomylelitis, and death occurring when third molar teeth that have not erupted into functional, disease free position are retained and become infected. Management of these conditions is especially challenging in the older population. This is poignantly described in an editorial article by Dr. Leon Assael, then editor of the Journal of Oral and Maxillofacial Surgery, where he presents a radiograph of a patient with bilateral impacted mandibular third molar teeth with large, bilateral dentigerous cysts and osteomyelitis. He reports that this is the radiograph of a patient who is "60 years old, had taken bisphosphonates, had undergone chemotherapy, aortic and mitral valve replacements." She presented with acute cellulitis. Days of hospitalization, surgery and rehabilitation were necessary to restore her health". [42]

In 2008, the American Public Health Association (APHA) adopted a policy in opposition to "prophylactic" removal of wisdom teeth.[43] This policy seems to be based on unscientific extrapolation of data. The scientific literature referenced in this document and elsewhere does indeed support the elective removal of wisdom teeth in cases where pathology is likely to occur as a result of retaining the third molar teeth. AAOMS is an advocate of access to care for patients on all fronts. AAOMS is circumspect about any policy statement such as the APHA policy that could possibly limit a patient's access to information regarding the nature of any current or potential pathologic conditions they may have, and choice of treatment options available to them.

In closing, it is apparent that treatment decisions regarding why, when or how to treat third molar teeth are extremely complex. There is no pat answer, cookbook recipe, or flow chart that is universally accepted regarding the decision making process. The presence of third molar teeth, their position within the jaws and/or dental arches, the condition of the teeth and associated teeth and structures, and the presence or potential for pathology associated with third molar teeth must be considered carefully. The risk of complications involved with early treatment of third molar teeth that are likely to cause problems versus the morbidity caused by retained third molar teeth and subsequent treatment in an older patient must be weighed. The OMS practitioner must attempt, as much as is possible, to base clinical decisions on scientific evidence that a pathologic condition exists, or is likely to develop, and that the proposed treatment will ameliorate or prevent the condition. The care provided must be predictably effective in achieving the desired outcome.

AAOMS firmly supports the surgical management of erupted and impacted third molar teeth, even if the teeth are asymptomatic, if there is presence or reasonable potential that pathology may occur caused by or related to the third molar teeth.

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