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**Bibliographic review**

**Therapeutic approach for third molars: Extraction or surveillance?**

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**ABSTRACT**

One of the daily challenges facing the oral or maxillofacial surgeon is the therapeutic management of asymptomatic and disease free third molars. To date, there has been a lack of conclusive information, with problems in the interpretation of recent literature as well as different views among professionals regarding whether to perform an extraction or maintain active surveillance. The aim of this paper is to review recent literature regarding the therapeutic decisions in these cases; discuss aspects of consensus and controversies; and look for scientific evidence to justify the prophylactic extraction of the third molar. Controversy over the optimal therapeutic management of an asymptomatic third molar, free of disease continues today. This review found no scientific evidence to justify the prophylactic extraction of third molars. Much more scientific evidence, as well as the design of randomised clinical studies to compare the short- and long-term active surveillance and extraction of third molars is needed.

**KEYWORD**

Retained third molar; Asymptomatic third molar; Prophylactic extraction of third molar.

## BACKGROUND

The therapeutic approach for symptomatic third molars (3Ms) or with pathology is simple, but there is controversy over whether to perform extraction or surveillance of asymptomatic and pathology-free 3Ms<sup>1</sup>.

Historically, the American Association of Oral and Maxillofacial Surgeons (AAOMS) recommends the extraction of 3Ms before the patient reaches adulthood<sup>2</sup>. However, the American Public Health Association has the opposite attitude to prophylactic extraction that subjects individuals and society to unnecessary costs; thus avoiding potential morbidity and surgical risk<sup>2,3</sup>. It must be borne in mind that supporting just one of these two extreme positions can be a mistake, as common sense should dictate the better of these two extreme strategies in each particular case.

To date, there has been a lack of conclusive information. Thus, it is better to follow a criterion in accordance with clinical and radiological findings and based on scientific evidence to bring together the best available information before making a decision. The professional and patient can take a mutually agreed therapeutic decision: tooth extraction or surveillance (following a monitoring and follow-up protocol at all times)<sup>1</sup>.

The objectives of this article are to review the recent literature related to therapeutic decisions in asymptomatic, pathology-free 3M cases to discuss aspects of consensus and controversies and seek scientific evidence to justify prophylactic extraction of the 3M.

A search was performed in Spanish and English with the full text and without limiting the publication year.

## ASYMPTOMATIC AND PATHOLOGY-FREE 3M

The term asymptomatic is insufficient to describe the state of a 3M, as the absence of symptoms is not the

same as the absence of pathology<sup>4,5</sup>. Furthermore, this term is ambiguous in the literature, making the interpretation of comparisons difficult<sup>4</sup>.

For example, in many cases the patient does not refer to symptoms in the area of 3M in which a radiolucent radiographic inspection image is seen. However, the frequency of occurrence of cysts or benign tumours is very low and, although such cases and images provide compelling data, pre-emptive extraction of a retained 3M to prevent the occurrence of these diseases is not justified<sup>4</sup>.

Therefore, the extraction of an asymptomatic 3M must be supported by evidence demonstrating that “asymptomatic” does not necessarily mean the “absence of disease”<sup>5</sup>.

Also, the terms asymptomatic and pathology- or disease-free for 3Ms<sup>1,4,6</sup> should be differentiated (Table 1).

In 2012, Dodson et al systematically developed a classification of 3Ms by clinical and radiological examination to avoid the ambiguity of the term asymptomatic (Table 2), and concluded that the estimate of the prevalence of truly asymptomatic, pathology-free 3Ms had a range of 11.6-29%<sup>4,6</sup>.

## PROPHYLACTIC EXTRACTION VS ACTIVE SURVEILLANCE

To date, there are insufficient data to prefer either of the two options, i.e. the two strategies are currently valid and accepted<sup>2</sup>. A systematic review by Metters et al in 2005 found no evidence to defend or reject routine prophylactic extraction as a strategy for management of asymptomatic retained 3Ms. Therefore, these authors defend the surveillance and monitoring approach<sup>7</sup>.

Given the available literature, therapeutic management of 3Ms should be performed after rational judgment based on clinical and radiological evidence. Therefore, after a balanced assessment of the risks and benefits of both treatment options,

**Table 1: Criteria for establishing an asymptomatic and pathology-free 3M**

1. If the 3M shows no symptoms or the patient has no concerns. Symptoms are vague, self-limiting or cannot easily be attributed to 3Ms.
2. If the 3M is retained or impacted, cannot be probed or the probe depth is less than 4mm, if partially erupted.
3. If the 3M is erupting, there must be enough space for eruption into a functional position.
4. If the 3M has erupted, it must be functional, maintaining good hygiene, have adequate gingiva around the tooth, be free of decay or be easily restorable.
5. There is no obvious pathology in the radiographic examination.

the study of each particular case will dictate the best strategy<sup>2</sup>.

To assess the right time for extraction, it is essential to predict the tooth eruption and recognize in advance if it may trigger a pathological process in the future. According to the Current Care Guideline, preventive dental extraction in young people is justified in the case of a mandibular third molar for three

groups: partially erupted horizontally, partially erupted upright and incomplete growth of the roots near to the dental nerve canal<sup>8</sup>. Tolstunov recently suggested a 3M extraction protocol based on the strong association between age and the development of signs and symptoms related to 3Ms, the degree of coronal exposure and the risks and benefits of 3M extraction<sup>9</sup> (Table 3).

**Table 2: 3M Classification according to clinical symptoms**

<b>Group A: (PATHOLOGY + / SYMPTOMATOLOGY +)</b>
Based on clinical history, clinical examination and radiography (symptomatic pericoronitis, caries, inflammation or pain due to an infection secondary to a cystic lesion, for example).
<b>Group B: (PATHOLOGY - / SYMPTOMATOLOGY +)</b>
Symptoms of dental pain due to the normal process of eruption or vague symptoms of pain in the region of 3M, without evidence of pathology.
<b>Group C: (PATHOLOGY + / SYMPTOMATOLOGY -)</b>
Clinically and radiologically evident pathology, but without symptoms (inflammation of the soft tissues, caries, plaque accumulation, increased probing depth, cystic lesions, rhizolysis or decay in adjacent teeth).
<b>Group D: (PATHOLOGY - / SYMPTOMATOLOGY -)</b>
The patient has no symptoms and there is no 3M pathology based on clinical and radiological examination.

**Table 3: Tulstunov et al extraction protocol depending on age**

Patient age	Treatment strategy
0-15	3M extraction not recommended.
16-25	Symptomatic and asymptomatic 3M extraction is recommended if the benefits outweigh the risks.
26-35	Extraction of symptomatic or asymptomatic 3Ms if exposed, when the benefits outweigh the risks.
≥ 36	Extraction of symptomatic 3Ms if exposed. Extraction of asymptomatic 3Ms not recommended.

Why is it important to know in advance which retained 3Ms should be removed in the future? The answer is cost. Extraction of a retained 3M in a young patient is simpler and involves fewer complications, so the risks can be reduced by performing the extraction preventively in young patients<sup>8</sup>. It is clear that maintaining dental retention is not a low cost alternative, considering the periodic active monitoring and risks of delaying intervention<sup>11</sup>.

In addition, it may be more important to predict which 3Ms will develop a pathological condition or symptoms, so it can be extracted in time when the risks are minimal. It is essential to predict the onset of risk factors such as pericoronitis, caries and periodontal problems to indicate prophylactic extraction<sup>8</sup>.

### **PREDICTING A 3M ERUPTION**

This is one of the most significant interests in orthodontics and oral surgery. Extraction of premolar or other teeth for orthodontic purposes must be performed before the age of 20 when 3Ms are expected to erupt to correct for the missing space. In 1979, the Consensus Conference of Third Molars reported that there were no reliable methods for predicting the eruption of 3Ms. Later, in 1993, the AAOMS stressed it was not possible to accurately predict changes in the position of 3Ms. For this purpose, it seems that

panoramic radiography is the best tool; in addition to other techniques, such as cephalometric studies, bitewing radiographs and anteroposterior and periapical radiographs<sup>8</sup>.

There is extensive literature that has contributed to increasing knowledge in predicting the eruption of the 3Ms. Since the 1993 Workshop, predictive accuracy has greatly improved, with values up to 97% efficiency. The most significant variable associated with eruption seems to be the retromolar space. In clinical practice, simple and easy application methods are needed. In general, it should be noted that the prediction of the eruption has shown to be relevant only for a short period of time in young adolescents up to 20 years. The 3Ms which have not erupted at age 20 are often removed (74% of the time) compared with partially erupted (64%) and erupted (50%)<sup>8</sup>.

### **LONG-TERM CONSEQUENCES OF RETAINING THE 3M**

These are often unknown and unpredictable. Given the high probability of developing a future pathology, active surveillance with periodic clinical and radiographic examination is recommended to detect any pathology before it becomes symptomatic<sup>2,5,10,11</sup>.

It is clear that retained 3Ms may remain asymptomatic and free of disease; however, they are unlikely

to remain static and unchanged in their position over time, so they may eventually trigger a pathological process<sup>5,10</sup>. According to Ventä et al, retained teeth may change position from the middle of the third decade of life<sup>12</sup>.

There is sufficient evidence in the literature to show that retained 3Ms do not remain static; i.e. changes in angulation and position of the retained 3M should be considered as risk markers. In addition, it must be said that there are no predictive positional data and probably will not be in the near future; this is usually due to the lack of information available and costs required to carry out longitudinal studies of different populations<sup>10</sup>.

Different prospective studies in periodontal disease and the incidence of caries associated with retained 3Ms show that asymptomatic 3Ms do not necessarily reflect the absence of disease and that there is a “surge” of pathology directly proportional to age. While recent studies<sup>18,19,20,21,22</sup> have shown a series of compelling arguments for the early extraction of the retained 3Ms to prevent disease, previous and usually retrospective studies have been based on the identification and development of pathological variables, such as odontogenic cysts, rhizolysis and commitment to the integrity of 2M<sup>5</sup>.

In short, considering the consequences of retaining the 3Ms as a whole, there is sufficient evidence to justify the extraction of asymptomatic 3Ms: inflammatory disease, tooth decay, the relationship between periodontal disease and systemic disease, expenses related to the maintenance of an (apparently pathology-free) 3M and 3M surgery in older and probably ill patients<sup>5,14</sup>.

However, for active surveillance, the high frequency of inflammatory and asymptomatic pathology associated with 3Ms must be reviewed, while taking into account the risks and benefits of maintaining the 3M and the importance of regular monitoring and periodic re-evaluation<sup>5</sup>.

A very interesting study by the AAOMS and pub-

lished in 2012, Proceedings of the Third Molar Multidisciplinary Conference, suggested a cost model to try to find a balance between the decision to extract and the disadvantages associated with maintaining retained 3Ms<sup>15</sup> (Table 4).

It has been suggested that there are 2 options for the maintenance and surveillance of a retained 3M<sup>2</sup>:

- 1.- Active surveillance: a prescribed programme of regular monitoring and periodic evaluation of the 3Ms.
- 2.- “Necessary” monitoring: maintenance and monitoring when the 3M is symptomatic or the pathology is manifest.

Active surveillance is a “non-operative” management strategy of asymptomatic retained 3Ms, characterised by the prescription of a series of regular visits, including a reassessment of clinical history, clinical examination and periodic radiography<sup>(2,5)</sup>. Given the age-related risk of complications when extracting a 3M, this is reasonable. Symptoms usually appear in advanced stages of the disease, which justifies regular monitoring visits to detect and treat the disease before symptoms appear (2,5). It must be borne in mind that delaying an extraction may increase the risk of complications associated with this, which is directly proportional to age<sup>2,5,11,13,14</sup>.

The rationale for the selection of biannual visits is compelling. Pathology develops slowly, and clinically significant evidence of progression of periodontal disease, for example, may appear within 2 years<sup>2,11</sup>.

Short-term cross-sectional studies suggest that active surveillance is the least expensive treatment option<sup>(23-27)</sup>. However, these studies did not have the lifetime risks associated with retention of the 3M: future extraction costs, absence from work, school or regular activities, as well as treatment of complications. Thus, the current and future costs of active surveillance and the risk of incurring future costs of surgical treatment or a clinical emergency situation should be considered<sup>2</sup>.

**Table 4: Cost model - Extraction vs. Active surveillance**

<b>Extraction costs</b>
– Added cost of extraction.
– Cost of managing complications multiplied by the probability of developing future or added complications.
– Cost of absence from school or work.
<b>Active surveillance costs</b>
– Cost of extraction, multiplied by the delayed extraction over time.
– Cost of follow-up visits, multiplied by the average number of monitoring visits until extraction or patient death.
– Cost of absence from school or work, multiplied by the probability of delayed extraction over time.
– Cost of managing complications following dental treatment (adjusted for age) multiplied by the probability of delayed extraction over time.
– Cost of necessary active surveillance, adjusted to present value to compare future costs with extraction costs.

### **3M SURVEILLANCE AND EXTRACTION RISKS AND BENEFITS**

The professional is responsible for providing the patient with impartial advice on therapeutic options for 3Ms and for highlighting the risks and benefits of 3M extraction and active surveillance<sup>2,5,11</sup>.

The risks associated with 3M extraction are well known, whereas the risks and benefits of maintaining dental retention are not<sup>2,11</sup>. The immediate benefit of active surveillance is to avoid the risks and costs associated with extraction of the 3M, but this does not guarantee tooth extraction will be avoided in the future, with the costs, risks and complications associated with age<sup>11</sup>.

Maintaining the retention has costs associated with monitoring 3Ms for the development of pathologies and the risk of incurring future costs and the

complications of tooth extraction in elderly patients<sup>2</sup>. Therefore, when deciding to adopt an expectant attitude with an asymptomatic 3M, the potential long-term impact should be considered<sup>2,5</sup>.

Therefore, the professional must review the wide range of therapeutic possibilities based on the symptoms and status of tooth retention: from maintaining 3M retention with active surveillance, “necessary” monitoring with regular monitoring while taking into consideration its proper periodontal and conservative care, to dental extraction or coronectomy.

Making decisions based on clinical evidence should combine the data from the current literature with the experience and skill of the professional, while explicitly incorporating patient preferences, taking into account the risks, benefits, costs and perceived and real desires<sup>2,5,11</sup>.

## CONCLUSIONS

The controversy continues over the optimal therapeutic management of an asymptomatic and pathology-free 3M, as there is still no answer as to which strategy is best or the position which would lead to the best results in the future. Much more scientific evidence and the development of well-designed studies to compare the short- and long-term maintenance and surveillance compared with the extrac-

tion of the 3M is needed to find an answer to this dilemma.

Until such information or evidence is available to guide clinical decision-making, it is recommended that all patients be subjected to timely examinations, i.e. during adolescence or young adulthood, to identify and categorise the type of dental retention, depending on its symptoms, pathology status and to identify potential future risks that may develop.



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