

ORTHODONTIC EXTRACTION: THE EXTRACTION OF THE THIRD MOLARS IN CLOSE PROXIMITY TO THE MANDIBULAR CANAL BY AN ORTHODONTIC-SURGICAL APPROACH

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Summary

The purpose of this study was to describe an orthodontic-surgical approach to performing riskless extractions of those third molars with contiguity between the roots and the mandibular canal.

The approach consists of different phases. First the surgical risks have to be assessed. A first topographic diagnosis is made using a panoramic radiograph and then, if there is a suspected contact between root and mandibular canal, a CT scan is done. When the proximity is confirmed, "the orthodontic extraction procedure" will start with the creation of an orthodontic anchorage. This phase is followed by a surgical exposure of the third molar crown in order to bond a bracket to the occlusal surface. A stainless steel sectional wire is anchored from the first molar to the third molar to produce the extrusive forces. After a positive clinical assessment of the extrusion level, a new radiological check is requested to evaluate the tooth movement.

When the tooth is out of the mandibular canal, the surgeon can perform a safe and easy third molar extraction.

With this therapeutic approach the extraction of an impacted lower third molar will be:

- easier and quicker,
- with less post-operative discomfort,
- without risk of paresthesia or mandibular fracture,
- with periodontal advantages.

In conclusion the orthodontic-surgical approach to the high-risk extraction of impacted lower third molar has proved to be a quite simple technique for the dentist and minimally traumatizing for the patient.

Key Words: third molar, tooth impaction, orthodontic extrusion, extraction.

Introduction:

The extraction of lower third molar is one of the most frequent procedures in oral surgery and it can bring about various complications; among these, the neurological ones (paresthesia), are the most feared since they are likely to lead to legal disputes between dentist and patient.

Once it has been decided that the wisdom tooth has to be extracted, it is necessary to assess the risk of nerve damage consequent to the surgical procedure either by a direct trauma of the lower alveolar nerve, more rarely of the lingual nerve, or by an indirect trauma due to nerve compression following an edema or a post-extraction hematoma (5,8,15,17).

The onset of such complications is affected by many factors as the patient's age (2); the medical history; the level of tooth impaction (8); tooth inclination (3,8); root morphology (8); the skill of the operator (1,8), but most importantly the contiguity between the roots and the mandibular canal influences the incidence of neurological complications (3,8,15). For this reason, it is important to carry out appropriate radiographic exams to make a precise topographic diagnosis of the third molar before the surgery, thus being able to assess the surgical risks and decide the most convenient approach.

If those radiographs show a suspected proximity between tooth and mandibular canal, a dental CT scan must be performed to fix precisely the topographic relationships among these anatomic structures so as to be able to assess the extractive risk before the operation.

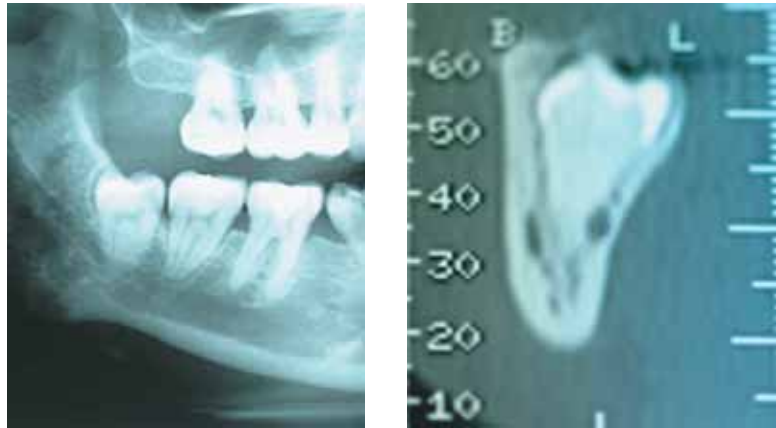


Fig.1: A first topographic diagnosis is made using a panoramic radiograph. If there is a contact between root and mandibular canal a CT scan is done



Fig.2:The orthodontic anchorage



Fig.3:Surgical exposure of the third molar crown

If the proximity between root and canal is confirmed, the "orthodontic extraction" will start by the creation of the orthodontic anchorage.

A stainless steel lingual arch, welded to bands, is cemented on the first molars and a stainless steel sectional wire is tied into orthodontic brackets from the second molar to the first bicuspid, buccally on the extrusion side.

Then an open flap is done to expose the crown of the impacted tooth and to apply an orthodontic bracket on it.

There are two different clinical cases of impaction of wisdom teeth that affect the duration of the extrusion therapy:

- vertically or distally inclined; the extrusive force produces a movement of extrusion, without rotation, along the path of physiologic eruption of the tooth and in 3 to 6 months produces a setting apart from the mandibular canal.

- horizontally or mesially inclined; it often requires longer therapy (6-12 months) because it is difficult to have a mere axial extrusion movement without rotation.

In order to make the tooth movement easier, avoiding impaction of the third molar on the distal surface of the second molar, it is useful to reduce the occlusal surface of the crown during tooth

exposure. However, it is important to make a clinical distinction by means of the CT scan not only on the sagittal level but also on a transversal level. The extrusive force must be direct in such a way so as to set apart the roots from the mandibular canal not only vertically but also frontally.

The orthodontic extrusion of the third molar is done by a cantilever. A rectangular stainless steel sectional wire (placed into the auxiliary tube on the first molar and tied to the bracket on the wisdom tooth) is the active part of the system. Once it has been bended and activated it allows to generate the extrusion movement of the third molar.



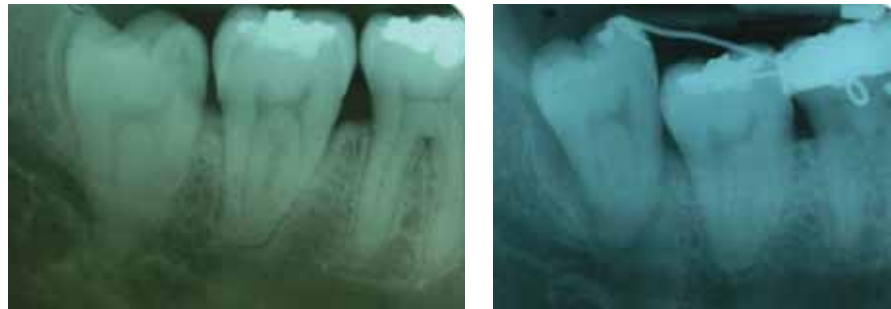
Fig.4: The orthodontic extrusion. A cantilever is placed into the auxiliary tube on the first molar and tied to the bracket on the third molar



Fig5 : Clinical evaluation of the extrusion

The sectional wire has to be reactivated after 4-6 weeks.

On the basis of a positive clinical judgement, a new panoramic radiograph is done to evaluate the tooth movement and to decide the moment to perform the extraction. When the surgeon has checked the absence of true relationship between root and canal by a new panoramic radiograph, the extraction is performed without risk of neurological complications.



Initial

Final

Fig.6. Radiographic evaluation of the extrusion

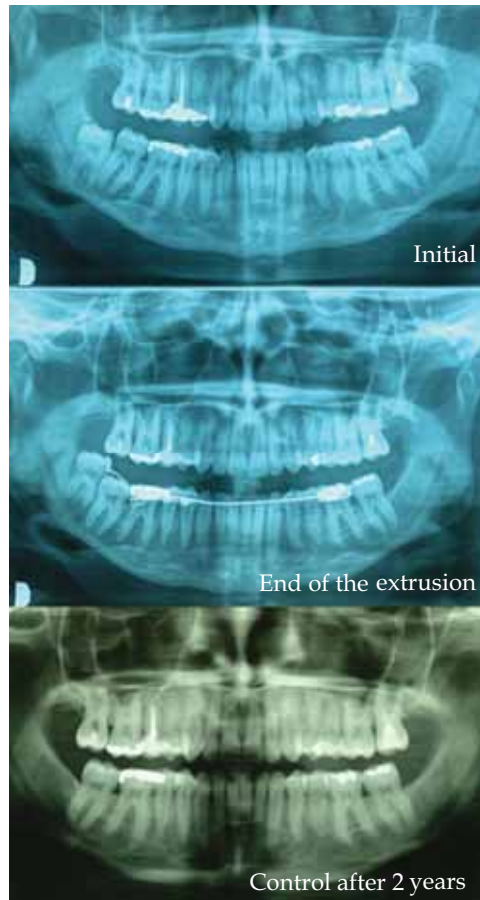
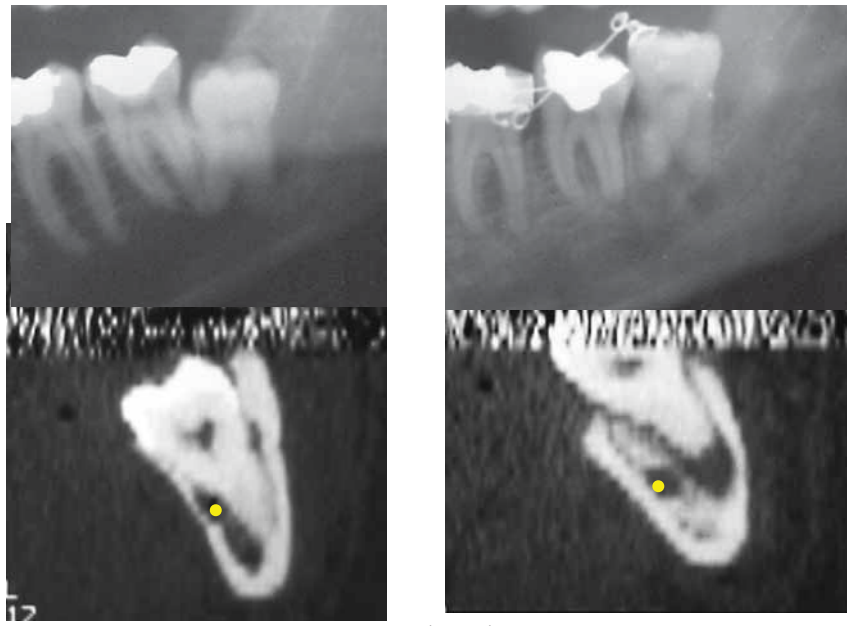


Fig.7. Clinical Case



Initial Final
Fig.8

Discussion

The use of the so called "Orthodontic extraction" eliminates the risk of direct and indirect trauma to the alveolar nerve by the increased distance between the roots and the mandibular canal, the reduction of the time instrumentation during extraction and the more favourable position for the surgery. For these reasons the extraction is quicker, easier and safer (4,7,12).

Bone apposition is another advantage of this technique as a consequence of the extrusive movement. In fact there is a reduction of the possibility of mandibular fracture due to the increase in mandibular resistance (6,11); and a better periodontal status on the distal surface of the second molar after the third molar extraction (7). It is known from the literature that the surgical extraction of an impacted third molar often results in an infrabony periodontal defect on the distal surface of the adjacent second molar (9,10). The "Orthodontic extraction" technique solves this problem because there is a conservative management of the alveolar bone, due to the simplicity of the surgery, and to the (coronally) alveolar bone extrusion distally to second molar.

The "orthodontic extraction" technique, however, is not without drawbacks. The procedure requires two minor surgical procedures: the exposure of the third molar crown and the extraction of the tooth.

The procedure is generally more time-consuming if compared with the mere extraction. Anyway this technique has been progressively developed during the years and it has been improved with regards to predictability of the clinical results and above all reduction of therapy length.

This method cannot be used on a routine basis; it should only be used after an accurate selection of clinical cases of tooth impaction.

Conclusions

The cooperation among various specialists, in both the diagnostic and operative phases, is of paramount importance in order to establish the best possible treatment plan for the patient. The cooperation between the orthodontist and the oral surgeon has led to the "Orthodontic extraction".

The orthodontic-surgical approach to the high-risk extraction of impacted lower third molar has proved to be a technique without risk of paresthesia or mandibular fracture and with periodontal advantages (4,12). It is favourably accepted by the patient because it is considered a biologically, conservative and safe therapeutic choice and a technique that allows extraction of lower third molars otherwise impossible for the high risk of complications.

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