CBCT in assessment of the anatomic relations of a deeply impacted lower third molar to important anatomical structures

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Introduction

Deeply impacted lower third molars may have a close relationship to important anatomical structures, including the mandibular canal, the lower border of the mandible and the lingual cortex. Therefore, surgical extraction could be affected by severe complications, such as excessive bleeding, infection, nerve damage, accidental root displacement or even a mandibular fracture.

Today, a panoramic radiograph is considered to be the standard diagnostic tool for the localisation of impacted third molars and for preoperative planning. However, three-dimensional radiographic modalities (CBCT) are required in cases where there is a close proximity of the impacted third molars and the mandibular canal, in order to provide more accurate information and to avoid injuries and complications.

Case report

A 48-year-old female patient was referred to our clinic for the management of an infection, associated with an impacted right lower third molar. The level of the infection indicated a 5-day course of Amoxicillin 500 mg (Sinacilin, Galenika AD) and Metronidazole 400 mg (Orvagil, Galenika AD) three times a day. A regression of the infection could be observed and the patient was scheduled for the surgical removal of the impacted third molar.
The panoramic radiograph revealed that the right lower third molar was deeply impacted and close to the lower cortical margin of the mandible, showing a potential risk for a mandibular fracture. In addition, the analyses of the panoramic radiograph presumed a close contact between the impacted molar and the mandibular canal, because the roots of the impacted molar showed bright intervals in the lower third (Fig. 1).

In order to better visualise these anatomic relations a CBCT (SCANORA 3Dx, SOREDEX) was acquired. The CBCT images were edited and viewed in OnDemand3D software (Cybermed) and could clearly visualise that there was not that close anatomical proximity of the deeply impacted right lower third molar and the mandibular canal. The mandibular canal runs on the buccal side (blue arrow, Fig. 2).

The mandibular canal is most frequently located and runs lingually, and the surgical approach is most commonly made from the buccal side. Without a CBCT radiograph, there is a great risk of damaging the inferior alveolar nerve, when following the common surgical protocol for wisdom teeth removal.

The CBCT scan also revealed that the lower cortical margin of the mandible had been fully intact (Fig. 3), which decreased the risk of an intraoperative mandibular fracture. On the other hand, the CBCT image showed that the roots of the deeply impacted right lower third molar were penetrating the lingual cortex in the middle and lower third of the mandible body (Figs. 3 & 4). Thus, there was a substantial risk for an accidental root displacement into the sublingual space, excessive bleeding and incalculable complications, e.g. infections of the upper respiratory tract.

**Conclusion**

In cases of deep impaction or close proximity of impacted teeth to important anatomical structures, CBCT imaging is essential to support the surgeons in scheduling a precise treatment plan, avoiding complications and increasing the postoperative outcome.

**Editorial note:** A complete list of references is available from the publisher.