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Presurgical assessment of impacted canines using 2D and 3D imaging

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Introduction

Clinicians need imaging to assess the spatial context of impacted canines and the likeliness for spontaneous eruption, in order to propose an adequate treatment plan. It is not entirely clear whether the use of CBCT gives other and/or better results, compared to 2D imaging, on the determination of the position, therapy planning and the prognostic information. With an updated quantification of these assessments, it might be possible to develop evidence-based treatment advice and/or a prognostic scale for canine impaction.

Objectives

The objective of this research was to assess the difference in canine position and treatment decisions with CBCT and 2D imaging.

Materials and methods

Thirty subjects (aged 25 SD 4 yrs) with impacted canines were recruited at the university hospital of Cluj-Napoca. In total, 39 impacted canines were evaluated. Panoramic radiographs were taken with Instrumentarium OP100 (Tuusula, Finland). CBCT imaging was conducted using a NewTom 3G (QR, Verona, Italy). Six examiners observed both imaging types and assessed: treatment options, treatment confidence, canine position, resorption of neighbouring teeth and linear measurements. During surgery, comparable observations were made by the treating surgeon.

Results

A fourth of the panoramic readings and 8% of the CBCT readings gave a reversed classification of the crown position compared to what was found during surgery. Root resorption was identified in 17% of panoramic and in 10% of CBCT observations. Furthermore, the treatment choice was more likely to be conservative with CBCT: observers decided more often for extractions based on panoramic radiographs. Examiners had significantly higher confidence in their therapy plan based on CBCT images and could better predict complications.

Conclusions and discussion

CBCT is recommended: to define the surgical access route and thus keep surgery minimally invasive; to guide the direction of orthodontic traction; to determine if root resorption is present and if this resorption would require a specific treatment. In general, CBCT is advocated to choose optimal treatment in case of doubt.