PRECISION OF CONE BEAM COMPUTED TOMOGRAPHY FOR MEASURING TEETH

KENTUCKY



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Introduction

Understanding the anatomical structures included in the oral and maxillofacial complex is critical in the diagnostic process. Also, the precision of the images is important.²² when clinicians need to assess the extension of a disease, or to pre-assess the availability of bone before an implant is placed for example. Up to today, several studies have correlated linear measures on dry skulls with different available Cone Beam Computed Tomography (CBCT) units, obtaining high correlation.^{15, 16} The use of a reference tooth length before, during and/or after a treatment of endodontics, orthodontics, peridontics, oral pathology and oral surgery, is decisive.^{5, 26}

Objective:

The purpose of this study was to compare the accuracy of linear measurements made on CBCT images with measurements using an electronic caliper system in a dry skull.

Materials and Methods:

A dentate dry human skull was imaged with CBCT (i-CAT, Imaging Sciences International, Inc; Hatfield, USA) with a single 360° rotation, and 0.4 mm isotropic voxel resolution, i-CAT ® Vision software was used to measure all maxillary and mandibular teeth. Direct measure of the teeth on the dry skull was done using a calibrated digital caliper.

Fig 1 Dentate dry human skull positioned in I-CAT CBCT







Fig.2
a) Paroramic view and
b) Axial view was marked
to select trickness and
teeth long ans with I-CAT
vision Software.





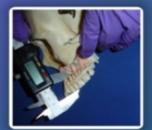


Fig 4 We measured tooth length with digital caliper.

Results

Statistical analysis was done using the Student paired t test. Statistical significant submillimetric differences were found between the measurement using the i-CAT ® vision software and the in vivo measurement in the dry skull. (Table 1).

Table 1. Descriptive analysis of data.

Group	N	Mean	Variance	Típical Dev	Minimum	Máximum
Digital Caliper - Linear	18	20,716	3,147	1,774	18,070	23,660
CBCT - Linear	18	20,853	2,852	1,689	18,250	23,760

Conclusions and Discussion:

The i-CAT ® vision software provides non accurate images for linear measurements on teeth compared with the in vivo measurement. However, these differences are not clinically significant because are in the submillimetric range.^{5,20}

References

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