

6th Indian Dental Congress

November 23-25, 2015 Bengaluru, India

Analysis of linear measurement accuracy obtained by cone beam computed tomography (CBCT-NewTom VG)

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Background and Aim: the aim of this study was to evaluate linear measurement accuracy of CBCT Newtom VG (Quantitative Radiology, Verona, Italy) in vitro. CBCT is dedicated to dental and Maxillofacial imaging particularly for surgical and prosthetics implant planning in dentistry. Linear measurement accuracy is important in selection of implant type, size, orientation and number of implants.

Materials and methods: 22 anatomic landmarks in 4 dry skulls were marked by gutta – percha. 15 linear measurements were obtained using a digital caliper. These were considered as real measurements. Skulls were scanned at two settings: (a) voxel size 0.3mm (b) voxel size 0.15 mm High Resolution (HR). Radiographic distance measurement were made using the NNT viewer software in axial and coronal sections by three observers. The data were compared by mean difference, standard deviation and IntraclassCorrelation Coefficient (ICC).

Results: Mean difference of real and radiographic measurements was -0.10 0.99 mm in axial sections, -0.27 1.07 mm in coronal sections, +0.14 1.44mm in axial (HR) sections, 0.02 1.4mm in coronal (HR) sections. The ICC for CBCT measurements in axial sections was 0.9944, coronal sections 0.9941, axial (HR) sections 0.9935, coronal (HR) sections 0.9937. Statistical analysis showed high interobserver and intraobserver reliability.

Conclusion: CBCT is reliable in linear measurement in different image planes in maxillofacial area. Voxel size has no effect on accuracy of linear measurements, so by reducing radiation dose we can have images with the same dimensional accuracy.

Keywords: Cone Beam CT, Accuracy, Skull, Linear measurement

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Enhancing dental treatment with lasers

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As the applications for dental lasers expand, greater numbers of dentists will use the technology to provide patients with precision treatment that may minimize pain and recovery time

The application of lasers in dentistry opens the door for dentists to perform a wide variety of dental procedures they otherwise may not be capable of performing. Dentists using lasers in dentistry have become adept at incorporating the state-of-the-art precision technology into a number of common and not-so-common procedures. (Cavity Detector, Dental Fillings/Tooth Preparation, Tooth Sensitivity, Crown Lengthening, Gummy Smile, Muscle Attachment (Frenula Soft Tissue Folds (Epulis), Viewing Tooth and Gum Tissues, Benign Tumors, Cold Sores, Nerve Regeneration, Sleep Apnea, Teeth Whitening, Temporomandibular, Joint Treatment)

- Learning objectives:
- Explain & describe the application of lasers in dental hard tissue & soft tissue procedures
- Describe the benefits of laser dentistry
- Explain what can dental lasers offer for the dentist & patients.
- Comparing between dental lasers treatment and conventional treatments depending on many studies in this field.

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