

Section: Validierung

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Abstract-Title:

EVALUATION OF THE GALILEOS® CB 3D X-RAY UNIT FOR DENTAL IMPLANT
TREATMENT PLANNING KLINISCHE BEURTEILUNG DES GALILEOS® CB 3D EINHEIT
FÜR DIE PLANUNG VON ZAHNIMPLANTATEN.

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Abstract-Text:

Purpose

The purpose of this study was to evaluate image quality of a new three dimensional cone beam device and its applicability for pre-surgical dental implant planning. Methods

The concept of this study was an evaluation of 55 pre-surgical CB data sets by 5 clinically experienced observers. Scans were performed using the novel cone beam device GALILEOS® (Sirona, Bensheim, Germany). The observers graded the visualization of 10 anatomical structures with ranks from 1 (excellent) to 5 (bad) in accordance to structure definition and image noise (figure 1). Additionally the influence of 3 artifacts criteria (with 1 as high and 5 as no influence) was evaluated. CB Data sets were visualized as a three-dimensional rendered volume illustration in addition to the three conventional orthogonal (sagittal, coronal and axial) planes (figure 2). Each volume had a size of 15 cm³ and was reconstructed with 5123 pixels. Results

Descriptive statistical analysis showed all cone beam datasets suitable for assessment of the implant site as well as the endangered and important anatomical structures to be saved in implant surgery. The median for image quality in all anatomic criteria was ranked between excellent and good (figure 3). Best scoring results were obtained for the floor of the nasal fossa and the maxillary sinus as well as the incisive foramen. The median for all other anatomic criteria was good (2). Movement artifacts had no detectable influence on the image quality, while metal artifacts had a negative influence in close restoration proximity. Conclusion

Scientific requirements on three-dimensional (3D) pre-surgical planning include illustration and precise location of important anatomical structures to be prevented from intraoperative damage. In this study we showed that the new cone beam device satisfies scientific requests on three-dimensional (3D) imaging of anatomical structures relevant to dental implantology. Metal artifact can hamper image quality, but as local phenomenon had no influence on the diagnostic value for the investigated anatomic structures. Movement of the patient while scanning is in progress generally can be a problem in cone beam technology dependent on patient collaboration and scan acquisition time. However, movement artifacts weren't observed within this study presumably due to the documented generally good till excellent collaboration of the patients during the scan and the relatively short scan time of 15 seconds. In conclusion cone beam imaging with the new cone beam device satisfies all scientific requirements on three-dimensional (3D) pre-surgical dental implant treatment planning. The sum of advantages of 3D imaging with the new cone

beam device might increase operational availability in the future and extend the medical recommendations for 3D implant site assessments.

Bild 1/JPG

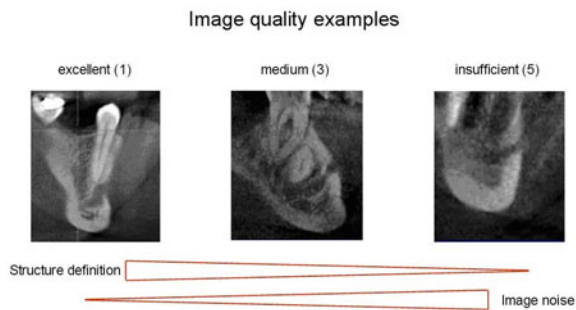


Bild 2/JPG



Bild 3/JPG

