

## Section: Validierung

ID: 106

### Abstract-Title:

INFLUENCE FACTORS ON THE IMAGE QUALITY OF A NOVEL 3D IMAGING UNIT FOR THE DENTO-MAXILLOFACIAL REGION

### Authors:

L. Ritter<sup>1</sup>, J. Neugebauer<sup>2</sup>, T. Dreiseidler<sup>1</sup>, R.A. Mischkowski<sup>2</sup>, J.E. Zöller<sup>2</sup>, E. Keeve<sup>1</sup>

<sup>1</sup> surgical systems lab, caesar

<sup>2</sup> Klinik und Poliklinik für Zahnärztliche Chirurgie und für Mund-, Kiefer- und Plastische Gesichtschirurgie

### Abstract-Text:

#### Purpose

After introduction in 1998, Cone Beam (CB) imaging has become an established imaging method for various indications in the maxillofacial area. Today, indications comprise pre-surgical and diagnostic imaging for implant planning, trauma, orthognathic surgery, root resections, extraction of third molars, tempero-mandibular joint surgery and other cranio-maxillo facial interventions. Therefore CB imaging is indicated for a wide range of patients. However, little is know about the influence of patients on image quality, possibly narrowing the indication for CB scanning. The aim of this study was to evaluate whether or not patient age and body-mass-index (BMI) has an influence on the image quality of CB images. Methods

Four clinically experienced observers retrospectively evaluated 50 CB scans indicated for implantology (56,9%), cysts (13,7%), trauma (13,7%), impacted third molars (5,9%), or other (9,8%). Rates were given from 1 to 5 (excellent, good, average, sufficient, not sufficient) for general image impression and image quality of relevant anatomical structures. The canalis mandibulars, foramen mentale, nasal floor, maxillary sinus floor and temperomandibular joint were evaluated as relevant anatomical structures.

Additionally, image quality of the indicated diagnostic findings was evaluated. Observers were able to visualize the scan in a dedicated panoramic view, featuring an inspection window permitting navigation through the three-dimensional data set, parallel to the given panoramic line at any given point in the panoramic view. Simultaneously, transversal sections perpendicular to the inspection window are shown. Alternatively, slice views in axial, frontal and sagittal orientation were offered along with a three-dimensional volume rendering of the dataset. All views were continuously adjustable in zoom, brightness and contrast. Patients

4,2). □ 12,9); mean BMI was 24,23 (□ 50 scans from patients of our department were retrospectively collected. Patients were 42% male, and 58% female; mean age was 54,3 years ( Unit and Scanning Protocol

A new CB unit (Sirona Dental Systems, Bensheim, Germany) was used, producing a three-dimensional volume of 15 x 15 x 15 cm in size. Scanning time was 15 sec while patients were fixed with a bite block firmly attached to the unit. Scanning parameters were 90 kV and 28mAs constantly for all patients. Statistical Analysis

Correlation was calculated for age and BMI against the various image quality ratings for all evaluated anatomical structures. Spearman´s rank correlation coefficient was used, due to

the ordinal data from observer evaluations. Descriptive statistical analysis was performed for all evaluations. Results In this study no strong correlations between patient age, BMI and image quality ratings were found. The strongest correlation found was between age and overall image quality (Spearman-Rho 0.373). Mean rating for the image quality of indicated diagnostic findings was between excellent and good (1,68;  $\pm 0,939$ ), for general image quality mean rating was good (2,02;  $\pm 0,75$ ). Mean rated image qualities for the anatomical structures were good for canalis mandibularis (1,97;  $\pm 0,823$ ), between excellent and good for the foramen mentale (1.52;  $\pm 0,844$ ) and the temporomandibular joint (1,64;  $\pm 0,738$ ), and excellent for the nasal floor (1,38;  $\pm 0,605$ ), foramen incisivum (1,49;  $\pm 0,919$ ) and maxillary sinus floor (1,33;  $\pm 0,511$ ). Conclusion Findings of this study indicate that with the used set of scanning parameters no significant influence from the patient's age or BMI on the image quality exist. These findings have to be put in perspective to the relative small number of patients investigated. Moreover, age, imaging indications, sex and BMI were not equally distributed in this patient group. We further plan to investigate the influence of patient cooperation during the scan on image quality as well as the amount of dental metal restorations.

*Bild 1/JPG*



Bild 2/JPG



Bild 3/JPG

