available micro-computed tomography system. The scanned teeth were three-dimensionally reconstructed. The functional taper was defined as the change in the smallest canal diameter over its length in %. It was calculated by a computer algorithm, using virtual spheres fitted into the canals from coronal to apical. The functional taper was determined over the total canal length and in coronal, middle and apical thirds separately. Values were grouped according to canal type (mesiobuccal, mesiopalatal, distobuccal, and palatal). Data were compared using Kruskal–Wallis analysis of variance followed by Mann–Whitney *U*-test with Bonferroni correction, $\alpha = 0.01$.

Results The median overall functional taper between canal types ranged from 1.5% (mesiopalatal canals, IQR 3.3%) to 6.2% (palatal canals, IQR 4.0%). In the palatal canals the overall taper was significantly ($P < 0.0001$) greater than in all other canal types. The taper in the middle canal third was greatest irrespective of the canal type.

Conclusions The knowledge on functional taper should enable clinicians to enlarge root canals with minimal damage to the dental hard tissues. However, based on the present data, it would appear that currently marketed rotary instruments do not concur with these tapers.

R6

Abstract withdrawn.

R7

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Micro–CT evaluation of mandibular incisors root canals: anatomic, linear and volume analysis

Aim To describe the anatomy of mandibular incisors using micro-computed tomography analysis, including configuration, linear and volume aspects.

Methodology Three hundred and forty extracted mandibular incisors were scanned at 18 μm voxel resolution (SkyScan 1076). The canal morfology were classified according to Vertucci criteria and the major and minor diameters and three-dimensional analysis of the apical third was performed (CTan-CTvol softwares). Data was presented in terms of median and range for each anatomical classification.

Results Ninety-one percent of the teeth were classified as Vertucci's Type I (256) and Type III (56). The medians of major diameter at 1, 2 and 3 mm level of these most prevalent anatomies were 0.36 (type I)-0.41 mm (type III), 0.39–0.51 mm and 0.47–0.66 mm, respectively. Apical volume appears to be constant amongst the main anatomies (0.59 and 0.63 mm^3). Oval canals were found at the 1 mm apical level in 16.7% of Vertucci's type I anatomy and 37.3% for type III. The presence of oval canals increased at the 3 mm apical level to 32.4% and 75.9% for Vertucci's type I and III classifications, respectively.

Conclusions Oval shaped canals were common among Vertucci's types I and III mandibular incisors, which comprised 91% of the analyzed teeth. Moreover, the anatomy of mandibular incisors may vary widely and should be known and identified for a correct root canal treatment.

R8

Abstract withdrawn.

R9

Abstract withdrawn.

R10

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Diagnostic thinking and therapeutic decision confidence after cone beam computed tomography in endodontics measured by a visual analogue scale (VAS)

Aim To determine if Cone Beam Computed Tomography (CBCT) used in accordance with the European Commission guidelines has an impact on the diagnostic thinking confidence and therapeutic decision confidence in a population referred for endodontic problems.

Methodology The study includes data collected from October 2011 until December 2012. From two different endodontic clinics consecutive patients were referred to a CBCT examination using criteria in accordance with the European Commission guidelines. The CBCT examinations were performed with similar equipment and standardized between clinics. After a thorough clinical examination and before CBCT examination, the endodontist scored the confidence for both diagnosis and therapeutic decision on a 100 mm visual analogue scale (VAS). After the CBCT examination both diagnosis and therapy plan were revised by the same dentist and a new VAS-score of confidence was performed. The VAS-scores before and after the CBCT examination were plotted for all teeth. Before and after assessments were analyzed with paired samples *t*-test.

Results Fifty-seven patients were referred for a CBCT examination, representing 4% of all patients examined by both endodontic clinics during the study period. Four patients were excluded from the analysis as the protocol was not followed. The final data included 53 patients, and 81 teeth. For all teeth the mean score for diagnostic confidence before CBCT examination was 63 mm (SD 30). After CBCT-examination, the mean of the changes in diagnostic confidence for each patient was 23 mm (SD 27) ($P < 0.01$). The mean therapeutic decision confidence score before CBCT was 67 mm (SD 25). The mean of the changes in therapeutic decision confidence after CBCT was 22 mm (SD 28) $P < 0.01$.

Conclusions CBCT examination used in accordance with the European Commission guidelines increased the clinician's confidence in both diagnostic thinking and therapeutic decision in a population with endodontic problems.

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