# Statistical model for testing the reliability of some CBCT dental scanners

**Remus O. Campean[1] and Mihaela Hedesiu[2]**

[1] *Department of Mathematics and Informatics,*
*University of Medicine and Pharmacy "Iuliu Hatieganu",*
*Cluj-Napoca, 400023, Romania*
*E-mail:* rocampean@gmail.com
[2] *Department of Dental Radiology,*
*University of Medicine and Pharmacy "Iuliu Hatieganu",*
*Cluj-Napoca, 400023, Romania*
*E-mail:* mihaelahedesiu@yahoo.com

**Key words:** statistical reliability model, validation, CBCT scanner, periapical injuries.

The purpose of the experiment described in this article is to establish a reliable hierarchy between four CBCT (cone-beam CT) high resolution dental scanners: NewTom, Scanora, Galileos and Accuitomo. The accuracies in detecting periapical injuries is the criteria of classification. Dental images obtained from each scanner are evaluated by 7 independent examiners. Based on these, each equipment gains a score and each examiner realizes a hierarchy of the four equipments. The problem was that we had no external reference, independent from the experiment. So the hierarchy must be established based only on the 7 sets of experimental data. The paper is focused on the statistical model of validating the classification made in this way. The statistical model has two purposes: (1) to prove the reliability of the classification by demonstrating that between the classifications of the 4 equipments established by the 7 examiners there are no statistically significant differences; (2) to prove the accuracy of the positions occupied of each equipment into the hierarchy, meaning that the scores that identify each position in the classification are different enough, statistically significant, to uniquely identify an equipment on a certain position in the classification. All statistical calculations are made using SPSS 16.