

## ABSTRACT

Cone Beam Computed Tomography (CBCT) allows effective 3D imaging in dentistry. CBCT consists of a planar detector and a x-ray source that rotate once around patient`s head. The x-ray beam is cone-shaped and is directed through the whole volume of interest. All the data needed are obtained during a single rotation of the source and detector. This rotation takes from several to several tens of seconds, and during this time the CBCT captures several hundred of 2D images. They represent different points of view on the region of interest and are later reconstructed to form a 3D data set. The biggest advantage of CBCT is that it can produce 3D image using at radiation doses similar to those of conventional diagnostic methods used in dentistry (Pauwels et al., 2010).

In the experimental part of our experiment, we address one of the biggest weaknesses of CBCT - patient movement during scanning which has a major impact on the image quality and is currently the main limiting factor in the further development of this technology. In the first part of our experiment, we recorded movements of patients and CBCT scanner using a high speed camera and subsequently analyzed the data in MatLab program. Significant level of patient motion as well as motion of CBCT scanner was demonstrated. Motion was highest at the beginning of the procedure. The second part of our experiment presents our original solution of eliminating the negative effects of patient`s movements. Radiopaque markers are used to monitor the patient throughout scanning. These markers are later used to detect motion artifacts and eliminate its consequent impact on image quality by a special software. Our solution is inexpensive and technically feasible at current state of art. Possible benefits would be better resolution or lower radiation dose.

Key words: *CBCT, movement, artifacts, resolution, image quality*