Cureus

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Poster

# Interobserver Variability in Structure Delineation of Organs at Risk on Cone Beam CT using Raystation TPS v4.5.2

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**Categories:** Radiation Oncology
**Keywords:** contouring, organs at risk, interobserver delineation, cone beam ct, treatment planning, radiation oncology, dice index

**How to cite this poster**
Wong O, Mcniven A, Chan B, et al. (2017) Interobserver Variability in Structure Delineation of Organs at Risk on Cone Beam CT using Raystation TPS v4.5.2. Cureus 9(9): e.

## Abstract

Purpose

The purpose of this study was to evaluate the feasibility of contouring organs at risk (OAR) relevant for potential adaptation decisions on CBCT and to determine the variability in interobserver delineation. The contours were also compared to the automatically deformed contours to assess the feasibility of utilizing deformed contours clinically.

Materials and Methods

Images from three different patients were evaluated. The planning CTs with original contours and two CBCT images (fraction 10) from two separate treatment delivery systems (Elekta and Varian) were imported into the treatment planning system (Raystation v4.5.2). Five observers delineated 15 OARs on each image set. The observers were blinded to the volumes delineated by others. A 4-point Likert scale survey was administered for subjective confidence in delineation. Interobserver variability was quantified using the DICE similarity index. The original contours from planning CT were deformed onto the CBCT and compared to the observer generated contours. The DICE value of all contours was compared to the gold standard of 0.8 as described in literature.

Results

The DICE index, respectively, for (1) observer contours on the Elekta CBCT, (2) the Varian CBCT, (3) deformed contours on the Elekta CBCT, and (4) on the Varian CBCT were as follows: brainstem 0.7,0.7,0.7,0.8; chiasm 0.2,0.3,0.3,0.3; cord 0.7,0.7,0.7,0.8; larynx 0.4,0.7,0.6,0.7; mandible 0.9,0.9,0.9,0.9; left optic nerve 0.5,0.5,0.5,0.5; right optic nerve 0.5,0.5,0.5,0.6; left

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**Published 09/13/2017**

parotid gland 0.6,0.8,0.7,0.9; right parotid gland 0.7,0.8,0.7,0.8; left plexus 0.3,0.2,0.4,0.2; right plexus 0.3,0.2,0.3,0.2; postcricoid 0.4,0.5,0.4,0.6.

## Conclusions

The mandible and parotid glands achieved a DICE of 0.8 or greater when comparing automatic deformation against observer contours. In contrast, the chiasm, left and right plexus contours result in poor agreement. The DICE index of the deformed contours is comparable to the DICE index of contours delineated by observers. The brainstem, spinal cord, and parotid glands achieve a DICE of 0.8 with automated contours. This suggests that automatic deformed contours can be utilized in the dose accumulation process.

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