

## Poster PE-14

Accuracy of image registration for radiation treatment planning using a brain phantom

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**목적** : The purposes of our study are (1) to develop a brain phantom which can be used for multimodal image registration, (2) to evaluate the accuracy of image registration with the home-made phantom.

**대상 및 방법** : A brain phantom which could be used for image registration technique of CT-MR and CT-SPECT images using chamfer matching was developed. The brain phantom was specially designed to obtain imaging dataset of CT, MR, and SPECT. The phantom had an external frame with 4 N-shaped pipes filled with acryl rods for CT, MR imaging and Pb rods for SPECT imaging. 8 acrylic pipes were inserted into the empty space of the brain phantom to be imaged for geometric evaluation of the matching. Accuracy of image fusion was assessed by the comparison between the center points of the section of N-shaped bars in the external frame and the inserted pipes of the phantom. Technique with partially transparent, mixed images using color on gray was used for visual assessment of the image registration process.

**결과** : The visual inspection with the superimposed images of CT-MR, and CT-SPECT correlation showed good matching results. 3D rms(root-mean-square) translational deviations of CT-MR and CT-SPECT registration were found to be  $2.52 \pm 1.05 \text{mm}$  and  $3.74 \pm 0.35 \text{mm}$ , respectively. Rotational errors were determined to be  $< 2$  degree for three orthogonal axes.

**결론** : These errors were considered within a reasonable margin from the phantom study. The chamfer matching was a useful tool for multimodal image registration and our method to detect translation and rotation errors worked well with the home-made phantom.