AbstractID: 13854 Title: A Creative Way to Ensure the Accuracy of Removable SRS Mask

Purposes:
To analyze geometrical uncertainties of Brainlab SRS head mask system during clinical practice, and evaluate the effectiveness in limiting the uncertainty by introducing a special longitudinal restraint.

Material and Method:
From June, 2009 to February, 2010, total 24 intracranial lesions were treated with Brainlab SRS mask system on Varian NTX at our center. All patients were immobilized with Brainlab head mask system, which was made about 15 minutes prior to simulation. The removable frame consists of a back and front thermoplastic mashes; reinforcing pieces cross the forehead and upper lip attached by a nose bridge and bite pieces. In the test group, a longitudinal restraint was extended cross the top of head. The mask is attached to a U shaped base ring for rigid geometric registration of simulation CT. During the treatment the setup of Brainlab's localizer was compared with CBCT.

Results:
The mean 3D displacement of 16 cases with Brainlab SRS mask was 4.1 ±1.5mm. Their vertical, longitudinal, and lateral shifts were 1.6 ±1.0mm, 3.2 ±1.9mm ($p < 0.01$), and 1.1 ±0.9mm respectively. Averaging all 8 cases in the test group using the longitudinal constraint, the shift was reduced to 0.3 ±0.5 mm ($p < 0.01$). The only 2 cases were shifted, only by 1mm, and identified after CBCT to be caused by operator's oversight.

Conclusion:
During treatment setups for less cooperative patients, the accuracy of commercial Brainlab SRS head mask system can be easily compromised due to altered the pitch angle or longitudinal position of the head inside the mask. Due to this reason, we found greater variations in our practice for SRS setups using Brainlab's removable frame. The introduction of longitudinal restraint has demonstrated its effectiveness in ensuring the accuracy of this system.