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# Gyroscopic Radiosurgery Patient Alignment Comparison: Shim Head and Shoulder Mask Versus Standard Head Mask

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## Abstract

Objectives:

To evaluate the patient alignment accuracy of a shim head and shoulder mask compared to the standard head mask in ZAP-X stereotactic radiosurgery (SRS) for the treatment of malignant and benign lesions.

Methods:

Prospectively, 60 patients were evaluated consisting of 30 shim Efficast head and shoulder mask patients and 30 standard Fibreplast and Nanor head mask patients. Two shims were employed during head and shoulder mask creation. Alignment deviation > 2 mm in any direction and 1.5° in any rotation axis required a readjustment of the patient positioning. Mask comfort was evaluated for 24 shim head and shoulder mask patients and 24 standard head mask patients using a Likert scale from 1-5 (1 = “very poor”, 5 = “very good”).

Results:

The shim mask significantly reduced y-offset ($P = 0.0014$), pitch-offset ($P < 0.001$), roll-offset ($P < 0.001$), yaw-offset ($P < 0.001$), number of readjustments ($P = 0.0294$), and setup time ($P = 0.0017$). There was no significant difference in x-offset ($P = 0.406$) and z-offset ($P = 0.453$). Mask comfort improved significantly ($P = 0.0345$).

Conclusion(s):

The shim head and shoulder mask improves immobilization in ZAP-X treatments, leading to greater targeting accuracy, reduced treatment times, and improved comfort.