Purpose/Objective: Intra-fractional motion can be monitored using the Calypso system with an accuracy of less than 1 mm necessary for the SRS treatments. The volunteer studies showed the possibility of using the Calypso surface transponder positioned behind the ear for the stereotactic treatments. 90% of the studied intracranial patients would qualify for the SRS treatment using Calypso.

Conclusions: The intrafractional motion was not reduced due to the reduction in treatment time.

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Investigation of gating techniques and visual guidance using surface scanning and pressure monitoring

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Purpose/Objective: The purpose of this study was to evaluate and compare enhanced inspiration gating (EIG) and deep inspiration breath hold (DIBH), with and without visual guidance. The study also included pressure measurements to investigate the potential risk of patient lifting during DIBH.

Materials and Methods: Twenty healthy female volunteers were included in the study. The volunteers performed both EIG and DIBH, with and without visual guidance. Based on a practice session a 3 mm gating window was introduced at an individual amplitude for both EIG and DIBH. To monitor the breathing and to have access to visual guidance the Catalyst (C-RAD positioning AB, Uppsala, Sweden) was used. Parameters such as reproducibility, stability and the percentage attendance in the gating window (P_{gw}) were evaluated. The study also included pressure measurements to evaluate any potential risk of patient lifting during DIBH.

Results: Spontaneously, without visual guidance, the volunteers breathed significantly deeper using DIBH compared to EIG, and thus potentially increased the distance between the heart and the target volume. The average chest amplitude for EIG was 10.8 ± 4.7 mm (1 SD) and for DIBH 12.9 ± 5.8 mm. The reproducibility and P_{gw} improved for both techniques when visual guidance was added. The stability did not indicate any particular trend. The pressure measurements showed that there was a possible risk that the volunteers lifted from the couch during DIBH, which was more prominent for high amplitudes (~2.5 cm) and when visual guidance was used. On average the volunteers were able to hold their breath for 57.2 ± 22.5 s.

Conclusions: According to this study there are major advantages using DIBH and visual guidance. DIBH resulted in higher amplitudes which could result in sparing of cardiac...