

O-6-7

Replication of physiologic center of rotation (COR) geometry can improve lordosis reconstruction in anterior cervical realignment surgery – A comparative analysis using a novel distractor type.

Carina Fritzsche¹, Heiko Koller², Andreas Schmiedl³, Daniel Fluri⁴, Alfred Niederberger⁴, Sebastian Decker¹

¹*Medizinische Hochschule Hannover, Klinik für Unfallchirurgie, Hannover, Germany*

²*Asklepios Klinik Bad Abbach, Zentrum für Wirbelsäulen- und Skoliotherapie, Bad Abbach, Germany*

³*Medizinische Hochschule Hannover, Institut für Funktionelle und Angewandte Anatomie, Hannover, Germany*

⁴*41 Medical, Bettlach, Switzerland*

Background: Cervical realignment surgery is associated with lordosis adjustment. Main techniques so far include patient positioning, uncovertebral release, plate bending as well as intervertebral cages.

Research question: A novel cervical distractor that allows to realign the cervical lordosis around the segmental COR was customized. We hypothesized, that it would achieve better lordosis reconstruction than common Caspar-type cervical distractors.

Design: Cadaver-based laboratory study.

Methods: A left anterior approach was dissected in six human cadavers. The novel COR-distractor was compared to a commercial Caspar-type distractor (Standard) considering uni-segmental (C6-7) and bi-segmental (C4-6) effects during distraction and lordosis reconstruction. Tests were performed with intact and resected intervertebral discs. Lateral x-rays were used for documentation and measurements.

Results: Bi-segmental lordosis reconstruction was significantly increased following disc resection using the COR-distractor (7.4° vs. 3.1°, $p=0.032$). Similar results were documented for uni-segmental use following disc resection (5.8° vs. 1.8°, $p<0.001$). Considering distraction effects only, without activation of lordosis realignment features of the COR-distractor, higher values were also achieved using the novel COR-distractor (6.1° vs. 2.7°, $p=0.009$) following bi-segmental disc resection.

Discussion: Our data indicate, that the novel COR-distractor is a powerful tool with a potential to increase reproducibility during lordosis reconstruction and facilitate to achieve target alignment with anterior cervical realignment surgery. Distraction always results in slight lordosis due to the attachment of the distractors to the cervical spine. However, our study stressed that with the novel distractor replicating the physiologic segmental COR effects a more reliable and better lordosis restoration compared to standards of reference.