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A suggestion of Necessary correction angle (NeCA) and surgical algorithm enhancing ideal alignment for cervical spinal deformity

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Background: The Cervical spinal deformity (CSD) classification is infantile.

Research question: To know necessary correction amount as well as surgical approach, osteotomy, and fixation level

Design: Retrospective case series

Objective: Based on our experience from a series of 40 cases, we propose Necessary Correction Angle (NeCA) = C2 slope (C2S) - 15 + Center of gravity-T1 tilt (CGT1 tilt). Through the NeCA prediction, we can decide the selection of the surgical approaches, osteotomies, and instrumented levels. We aim to present a surgical plan using spinal osteotomies according to the different types of CSD to achieve the NeCA.

Methods: We measured NeCA in 40 cases of CSD, which included 21 cases of degenerative disease, 13 cases of spinal metastatic tumors, and 6 cases of spinal infection. Our surgical algorithm was made according to the location of an ankylosis (Figure 1). Based on this algorithm, three types correction surgery was done; i.e. 1) posterior only approach with grade II osteotomy, 2) anterior-posterior approaches using grade IV and grade II osteotomies, and 3) anterior-posterior approaches using grade IV and grade II /VI osteotomies. We evaluated and compared the radiological outcome of patients who achieved NeCA with that of patients who did not achieve.

Results: Among the 40 patients, 26 patients underwent regional posterior only correction, 11 patients underwent regional anterior and posterior correction, and 3 patients underwent long segment fixation with grade IV and grade II /VI osteotomies. Among those, patients, who didn't achieve NeCA, experienced postoperative sagittal malalignment, leading to worsening kyphosis. However, the other patients who achieved NeCA have maintained their alignment for longer time period.

Discussion: Our analysis of 40 cases confirmed the importance of achieving the NeCA and following surgical algorithm to reach the ideal angle.

Fig. 1

Correction Algorithm

