Validation of Correlation between Chin Brow Vertical Angle (CBVA), Slope of Line of Sight (SLS), and McGregor’s Slope (McGS) for Cervical Disability.

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Introduction: The maintenance of horizontal gaze is an essential function of upright posture and global sagittal spinal alignment. One of the parameters allowing measurement of the horizontal gaze is the CBVA, which is not well visualized on most standard lateral spine radiographs. This study proposes to evaluate the correlation of CBVA with two more accessible angles: the SLS and slope McGS, and to determine if these cranial parameters correlate with HRQOL measures.

Methods: Patients were identified from a multicenter database of 531 spine patients who underwent full body EOS X-rays with a variety of presenting complaints (primary cervical, lumbar, or adult scoliosis). Exclusion criteria were age<18y, total hip arthroplasty, total knee arthroplasty, neuropathic scoliosis, fractures, and tumor. Correlations between CBVA, SLS, and McGS and were assessed. Using a quadratic regression with ODI and CBVA, we established a severe disability range of values for the CBVA and then, by simple regression, a severe disability range of values for SLS and McGS.

Results: 435 patients were included (67% females, mean age 57±15yo, mean BMI 27.4±6.4 kg/m2). CBVA strongly correlated with SLS (r=.996, p<.001) and McGS (r=.862, p<.001). A significant negative correlation was observed between ODI and all 3 angles (Table). Using a quadratic regression with the ODI and CBVA lead to the following CBVA range of values corresponding to severe disability (17.7°) (Figure). A simple regression demonstrated the following severe disability ranges for SLS (18.5°), and for McGS (14.3°).

Conclusions: The maintenance of horizontal gaze, classically measured by the CBVA, is an essential element of cranio-cervical alignment. This study found that the SLS and slope of McGregor’s line correlate strongly to CBVA and can be used as surrogate measures. The range of values for these measures corresponding to severe disability was identified. Further studies should be undertaken to evaluate these angles in severe cases of specific spinal pathologies.
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**Figure 1:** Quadratic regression and range of CBVA corresponding to an ODI of 40

![Graph showing quadratic regression and range of CBVA with ODI threshold of 40.](image)

<table>
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*Table 1: Correlation between CBVA, SLS, McGS and ODI*

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