Cervical Spine Deformity (CSD) and PROMIS Domains of Pain and Physical Functioning

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Introduction

Cervical deformities are difficult to evaluate and treat due to their heterogeneous malalignment and symptomatic presentation. To effectively diagnose and treat the condition, Ames and the International Spine Study Group (ISSG) proposed a classification system of deformity severity, which is the most widely studied novel system for classifying CD. The Ames-ISSG classification includes parameters such as moderate and severe cutoffs, the mismatch between T1 slope and cervical lordosis, C2–C7 sagittal vertical axis (cSVA), horizontal gaze, myelopathy severity, and the SRS-Schwab Classification for adult spinal deformity [1].

However, in order for the classification system to be properly recommended and validated, the suggested radiographic alignment cutoffs must have a relationship with patient-reported outcomes (health-related quality of life [HRQLs]). The 36-Item Short-Form Health Survey (SF-36) and the Neck Disability Index (NDI) have contributed to a better understanding of the relationship between cervical sagittal malalignment and HRQLs (NDI). The neck deformity index (NDI) is still the most commonly used metric for evaluating neck pain in patients undergoing cervical deformity (CD) corrective surgery. However, this modality has an inherent disadvantage: the presence of parallel pain and dysfunction in the spine regions adjacent to the cervical spine may alter the NDI. The NDI also lacks a strong link to the CD disease itself, instead assessing cervical spine pathology as a whole, which affects its overall reliability and reproducibility in this condition. These factors point to the need for a novel method of collecting patient-reported outcomes [2,3].

The Patient-Reported Outcomes Measurement Information System (PROMIS), developed by the National Institutes of Health, employs computerised adaptive testing to effectively capture patient outcomes. The system selects question items algorithmically based on previous responses, allowing for a more precise and efficient mode of patient symptom reporting [4]. The PROMIS outcome assessment includes three domains that have been linked to established patient outcome metrics: Pain Intensity (PI), Physical Function (PF), and Pain Interference. The PROMIS domain of PF has been shown to have a negative correlation with the NDI. There is, however, a scarcity of research on the relationship between PROMIS physical health domain metrics and established Ames CD radiographic classification [5].

With the increased prevalence of CD diagnoses and the development of severity classification systems, such as the one proposed by Ames and the ISSG, modalities for assessing deformity are critical to proper treatment. There is currently no CD-specific patient outcome measurement available. Even though NDI legacy questionnaire is the widely used metric for assessing CD quality of life, the PROMIS item banks have less item redundancy and variety by proximal location spine regions, as well as a lower administrative burden. PROMIS tools have been validated in a variety of orthopaedic subspecialties, outperforming traditional legacy HRQLs [6]. The PROMIS metric, in particular, has been found to have a strong correlation with the NDI and has been presented in the literature as a superior modality for quantifying neck pain.

References

1. Cella D, Yount S, Rothrock N, Gershon R, Cook K, et al. (2007) The patient-reported outcomes measurement information system (PROMIS): Progress of an NIH roadmap cooperative group during its first two years. Med Care 45: S3-S11.

2. Rose M, Bjorner JB, Gandek B, Bruce B, Fries JF, et al. (2014) The PROMIS physical function item bank was calibrated to a standardized metric and shown to improve measurement efficiency. J Clin Epidemiol 67: 516-526.

3. Johnson B, Stekas N, Ayres E, Moses MJ, Jevotovsky D, et al. (2019) PROMIS correlates with legacy outcome measures in patients with neck pain and improves upon NDI when assessing disability in cervical deformity. Spine 44(14): 982-988.

4. Owen RJ, Zebala LP, Peters C, McAnany S (2018) PROMIS Physical Function Correlation with NDI and mJOA in the Surgical Cervical Myelopathy Patient Population. Spine 43(8): 550-555.

5. Brodke DJ, Saltzman CL, Brodke DS (2016) PROMIS for orthopaedic outcomes measurement. J Am Acad Orthop Surg 24: 744-749.

6. Hung M, Nickisch F, Beals TC, Greene T, Clegg DO, et al. (2012) New paradigm for patient-reported outcomes assessment in foot and ankle research: Computerized adaptive testing. Foot Ankle Int 33: 621-626.