

## Shoulder Pain and Disability Index: An Overview of Its Measurement Properties

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### Abstract

The Shoulder Pain and Disability Index (SPADI) was developed to measure shoulder pain and disability. The objective of this short communication was to explore the measurement properties of SPADI. There were studies on measurement procedure, reliability and validity, predictors, comparison with other measures such as Shoulder Disability Questionnaire (SDQ), Western Ontario Rotator Cuff (WORC) index and Oxford Shoulder Scale (OSS), and studies on cross-cultural adaptation into German and Italian languages. The SPADI had good clinometric properties warranting its routine use in orthopedic practice, education, research and administration.

**Keywords:** Psychometric Properties; Clinimetrics; Measurement Properties; Physical Examination; Outcome Assessment; Shoulder Orthopedics.

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### Shoulder Pain and Disability Index (SPADI)

The Shoulder Pain and Disability Index (SPADI) were developed to measure shoulder pain and disability. The SPADI contains 13 items that assess two domains; a 5-item subscale that measures pain and an 8-item subscale that measures disability. There are two versions of the SPADI; the original version with visual analogue scale (VAS) and a second version with a numerical rating scale (NRS).

### Measurement procedure- reliability and validity

Breckenridge and McAuley [1] provided a detailed description on the methodology of measurement and

scoring SPADI as follows; "In the original version the patient was instructed to place a mark on the VAS for each item that best represented their experience of their shoulder problem over the last week. Each subscale is summed and transformed to a score out of 100. A mean is taken of the two subscales to give a total score out of 100, higher score indicating greater impairment or disability. In the NRS version the VAS is replaced by a 0-10 scale and the patient is asked to circle the number that best describes the pain or disability. The total score is derived in exactly the same manner as the VAS version. In each subscale patients may mark one item only as not applicable and the item is omitted from the total score. If a patient marks more than two items as non-applicable, no score is calculated." The authors comprehensively summarized the reliability and validity of SPADI as follows: The SPADI had good reproducibility, high internal consistency, good construct validity, highly responsive to change over time, good discriminated validity, and without large

floor or ceiling effects. The minimal clinically important difference was reported to be 8 points and the minimal detectable change was 18 points.

### Predictors of SPADI

Engebretsen et al [2] identified the predictors for pain and disability (measured using SPADI) and work status in 104 patients with sub-acromial shoulder pain.

Low level of education (less than equal to 12 years), previous shoulder pain, and a high baseline SPADI score predicted poor results in outcomes.

### Comparison with other measures

Dogu et al [3] compared the responsiveness of the two region specific questionnaires Shoulder Disability Questionnaire (SDQ) and Shoulder Pain Disability Index (SPADI) and the disease specific Western Ontario Rotator Cuff (WORC) index in 64 patients with sub-acromial impingement syndrome (SIS) who received physical therapy or sub-acromial corticosteroid injection. The three measures performed well and SDQ, SPADI, WORC index were highly responsive for SIS. The SDQ, the SPADI and the WORC index were suitable for measuring changes in patients with SIS. Of these three indices, the SPADI was found to be more suitable for a rapid assessment

Ekeberg et al [4] compared the responsiveness and minimal clinically important change (MCIC) for the disease-specific Western Ontario Rotator Cuff index (WORC) and the two region-specific questionnaires Shoulder Pain and Disability Index (SPADI) and Oxford Shoulder Scale (OSS) in 121 patients with rotator cuff disease receiving corticosteroid injection therapy. Shoulder Pain and Disability Index was found to be more responsive than OSS at 2 and 6 weeks. Western Ontario Rotator Cuff index was more responsive than OSS in at 6 weeks. Shoulder Pain and Disability Index was more responsive than WORC at 2 weeks. Minimal clinically important change was estimated to 5, 275, and 20 points for OSS, WORC, and SPADI, respectively.

#### *German version*

Simmen [5] adapted the Shoulder Pain and Disability Index (SPADI) from English into German, and tested the reliability and validity of the German version by studying one hundred and eighteen patients who had undergone shoulder arthroplasty.

“The cross-cultural adaptation procedure revealed no major problems with the content or language. The intra-class correlation coefficients for the individual items of the SPADI were between 0.68 and 0.89, and that for the SPADI total score was 0.94. The SPADI total score showed a correlation of 0.61-0.69 with the SF-36 physical scales, of 0.88 with the DASH and of 0.92 with the ASES.”

#### *Italian version*

Marchese et al [6] translated, culturally adapted and validated an Italian version of UCLA Shoulder Scale, SPADI and SST in 66 patients treated with neck dissection for head and neck cancer and 40 patients completed the same questionnaires a second time one week after the first to test the reproducibility of the Italian versions. For all three scales, Cronbach's  $\alpha$  was  $> 0.89$ . The Pearson correlation coefficient was  $r > 0.91$ . With respect to validity, there was a significant correlation between the Italian and the English versions of all three scales. This study shows that the Italian versions of UCLA Shoulder Scale, SPADI and SST are valid instruments for the evaluation of shoulder dysfunction after neck dissection in Italian patients.

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