# Assessing Back Pain: Does the Oswestry Disability Questionnaire Accurately Measure Function in Ankylosing Spondylitis?

FINBAR D. O'SHEA, REENA RIARH, ANNEPA ANTON, and ROBERT D. INMAN

*ABSTRACT*. ***Objective.*** To determine whether the Oswestry Disability Questionnaire (ODQ) can be used to assess the degree of pain or disability in patients with ankylosing spondylitis (AS).

***Methods.*** The ODQ was administered to a cohort of patients with AS. The resulting pain scores were correlated to the conventional measures in AS, the Bath AS Disease Activity Index and Functional Index (BASDAI and BASFI), as well as the Total and Nocturnal Back Pain scores, and the patient global assessment score.

***Results.*** A total of 49 patients with AS were assessed (38 men, 11 women), mean age 40 years (range 17–68). The mean ODQ score was 40/100 (range 0–92), the mean BASDAI 3.7/10 (range 0–9.5), the mean BASFI 3.3/10 (range 0–9.7), the mean total back pain score 3.7/10 (range 0–10), and the mean patient global assessment score 3.6/10 (range 0–10). Correlation between the ODQ and the traditional AS outcome measures was very good, with a correlation coefficient of r = 0.73 (BASFI) and r = 0.70 (BASDAI). Correlations between the ODQ and the total back pain score (r = 0.70) and the patient self-reported global assessment (r = 0.61) were good.

***Conclusion.*** The strong correlations between the ODQ and BASFI and BASDAI indicate that it identifies both activity and function domains in AS. This is the first demonstration of a role for this outcome measure in the assessment of patients with AS. (First Release April 15 2010; J Rheumatol 2010;37:1211–13; doi:10.3899/jrheum.091240)

*Key Indexing Terms:*
ANKYLOSING SPONDYLITIS OSWESTRY DISABILITY QUESTIONNAIRE BACK PAIN

Low back pain (LBP) affects a significant proportion of the population. It has been estimated that for LBP there is a point prevalence of 15%–30%, an annual prevalence of 20%–60%, and a lifetime prevalence of 60%–80%[1]. While many questionnaires have been developed to measure pain and disability in people with chronic LBP, the Oswestry Disability Index (ODI) has become the gold standard for assessing the level of disability associated with LBP[2]. It was first published in 1980 by Fairbank, *et al*. There are 4 versions of the ODI available in English and 9 in other languages[3]. It has been used extensively in a wide range of conditions including pelvic fractures, scoliosis, spondylolisthesis, mechanical back pain, sciatica, fibromyalgia, and metastatic disease.

Ankylosing spondylitis (AS) is a chronic rheumatic disease characterized by inflammatory back pain and restricted spinal mobility. It typically affects young people, with symptom onset in the second to fourth decade. It has been estimated that up to 5% of patients with chronic LBP presenting to primary care have AS[4,5]. There is a wide range of figures quoted in the literature as to the exact incidence of AS, from a low of 0.3%[6] of all patients with back pain, up to 14%[7], depending on the presence of specific symptoms felt to be inflammatory in origin.

To date the ODI has not been commonly used for the assessment and monitoring of patients with AS. In general, more specific AS outcome measures such as the Bath AS Disease Activity Index (BASDAI), Bath AS Functional Index (BASFI), AS Quality of Life (ASQOL), and visual analog scores for total and nocturnal back pain have been used. As a result, different measures of the functional effect of inflammatory and mechanical back pain have developed. There has been no systematic study to address whether the Oswestry Disability instrument routinely applied accurately assesses function in AS. Our purpose was to determine whether the ODI correlates with the standard outcome measures used in the assessment of AS.

## MATERIALS AND METHODS

The Oswestry Disability Questionnaire (ODQ) was administered to a consecutive cohort of patients with AS attending the spondylitis clinic of a

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large teaching hospital. The version used in this study was that developed by the Anglo-European Chiropractic College[8]. The main modification in this version is the substitution of the original question on sex life for one on the changing pattern of pain. The ODQ has 10 sections that assess pain intensity, personal care (washing, dressing, etc.), lifting, walking, sitting, standing, sleeping, social life, traveling, and changing degree of pain. Each section has 6 possible responses, with a score of 0 for the best level and 5 for the worst. A total score is calculated by adding the individual section scores, dividing by the total possible score, and multiplying by 100. The ODQ yields a total functional score ranging from 0 to 100 and is interpreted as follows: 0%–20% — minimal disability and no treatment necessary; 20%–40% — mild disability and conservative treatment recommended; 40%–60% — severe disability and detailed investigation required; 60%–80% — crippling disability and severe intervention required; and > 80% — bedridden.

The resulting pain scores were compared and correlated using the Pearson correlation coefficient, with the conventional measures used in the assessment of AS, the BASDAI, the BASFI, the ASQOL, as well as the numerical rating scale for total back pain and nocturnal back pain, and the patient self-reported global assessment score. These measures were collected at the same clinic visit.

## RESULTS

Forty-nine sequential patients with AS were sampled for the study. The mean age of all patients with AS was 40 years (range 17–68), 38 men and 11 women. Thirty-five percent (11 patients) of the cohort was taking nonsteroidal antiinflammatory drugs or no medications (6 patients), while 65% were taking a tumor necrosis factor inhibitor at the time of the assessment. The mean score (± SD) for the ODQ was 40/100 (± 22). The mean scores for the BASDAI, BASFI, total back pain score, nocturnal back pain score, and patient global assessment, and the respective correlations with ODQ scores, are listed in Table 1. Correlations between the ODQ scores and the traditional AS instruments were very good, with a correlation coefficient of r = 0.73 for BASFI and r = 0.70 for BASDAI. Correlations between the Oswestry score and the total back pain score, the nocturnal back pain score, and the patient global assessment score were also considered good (Table 1, Figure 1).

## DISCUSSION

We have demonstrated that the ODQ, an instrument widely used for the assessment of back pain, correlates very well with the standard self-reported measures used to assess patients with AS. The ODQ is commonly used by primary care physicians, physiotherapists, and chiropractors, while the BASDAI and BASFI are instruments used primarily by rheumatologists in the management of AS. These measures are not usually applied in a primary care setting. When applied to AS, the strong correlation of the ODQ with BASDAI and BASFI indicates that it accurately records both activity and function domains in assessing inflammatory back pain.

*Table 1*. Mean scores (± SD) for the various measurements and the correlation with the Oswestry Disability score using the Pearson correlation coefficient.

| Questionnaire | Mean Score ( SD) | Correlation with Oswestry |
|---|---|---|
| Oswestry | 40/100 (22) | — |
| BASDAI | 3.7/10 (2.5) | 0.70 |
| BASFI | 3.3/10 (2.7) | 0.73 |
| Total back pain score | 3.7/10 (2.9) | 0.70 |
| Nocturnal back pain score | 3.4/10 (2.8) | 0.66 |
| Patient global assessment | 3.6/10 (3.0) | 0.61 |

BASDAI: Bath Ankylosing Spondylitis Disease Activity Index; BASFI: Bath AS Functional Index.

The Oswestry is one of the most widely applied self-reported questionnaires for measuring functional outcomes in patients with LBP and other spinal disorders. It was developed as a clinical assessment tool that would provide an estimate of disability. The ODQ is quick and easy to complete (about 5 min) and score (1 min). There are now 4 different versions in use, plus different translations. The version used in our study was that developed by the Anglo-European Chiropractic College[8] — the main modification in this version being the substitution of the original question on sex life for one on the changing pattern of pain. Indeed, the back pain literature has seen many publications on the appropriate use of the different versions of the Oswestry questionnaire[9]. After reviewing the alternative versions, we elected to use this version in our AS cohort.

Although it was developed over 25 years ago, the ODQ remains one of the most extensively used low back disability questionnaires. It is easy for both patients and clinicians to use and its clinimetric properties are well established. Australian physiotherapy data demonstrated that a change of 10 points over a 6-week period allows one to be 95% confident that the observed change is beyond measurement error, and a change of between 5 and 9 points is considered by patients to be clinically important[10].

In patients with AS, physical function measures aim to assess the degree of limitation in a patient's ability to carry out everyday tasks. The BASFI is the measure that is most widely used both in clinical practice and in clinical trials. The BASFI is a 10-item self-administered index that focuses on the patient's function over the previous month[11]. The BASFI index is structured so that the first 8 questions focus on the functional anatomy of the patient with AS and the last 2 relate to global assessments that measure the patient's functional ability to cope with everyday life. When distinguishing between patients with high and low disease activity, the index has been shown to have a sensitivity of 94% and a specificity of 87%[12].

This is the first demonstration of the utility of the ODQ in the assessment of patients with AS and suggests a platform for future studies across the full spectrum of back pain using similar instruments. One practical result of our study is that it provides a common framework to assess disability for mechanical and inflammatory back pain. This is a step

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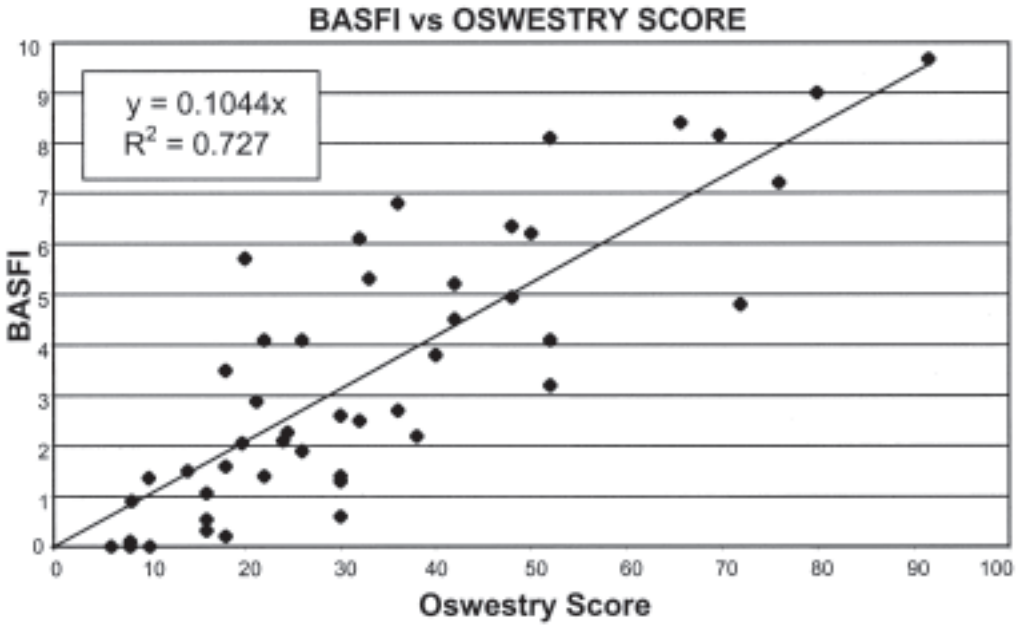


*Figure 1*. Correlations between the Oswestry score and the Bath Ankylosing Spondylitis Functional Index. y = 0.1044x, and $R^2 = 0.727$.

toward a context for comparative clinical research in these different contributors to chronic LBP.

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