EVALUATING THE EFFECTIVENESS OF CARE IN NECK AND BACK PAIN
Pain and Functional Status as Outcome Measures

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Abstract:
Background: Objective outcome measures reflecting the level of effectiveness of care is a clinical imperative for practitioners dealing with neck and back pain. It is widely recognised that there is no relationship between physical pathology, pain and disability. Traditional measures of function such as range of motion and strength, on their own, are no longer sufficient when assessing treatment outcomes.
Objective: Five patient-based objective outcome tools for measuring pain and four for measuring disability are outlined with a view to encouraging their use when managing back and neck pain.
Discussion: All of the outcome measures presented in this review have a high clinical utility when managing patients with neck and back pain. That is, they have been shown to be valid and reliable as well as being easy to administer and score.

Key Words: Outcome measures, back pain, neck pain, disability.

INTRODUCTION

There is mounting pressure on health care practitioners from third party payers, health care consumers, and from within the health care professions, to show that their practice is both effective and efficient. Traditionally clinical success in the treatment of musculo-skeletal disorders has been measured in terms of improvement in physical findings (e.g. ranges of motion). However, the importance of the patient’s perspective in the evaluation of treatment outcome is now widely recognised1. Partly in response to pressures from the various sectors mentioned above, there has recently been an enthusiastic proliferation of outcome assessment tools based on the patients self-report.

Many of these questionnaires are lengthy, some are tedious to score, and some were developed for use with non-ambulatory populations. Thus many of these outcome assessment tools have a low clinical utility2 for chiropractors and osteopaths. With this in mind, this article discusses some outcome assessment tools with a high clinical utility for the most common conditions seen by chiropractors and osteopaths, namely low back pain and neck pain.

REVIEW OF THE LITERATURE

There are five types of outcomes that can be measured3:

a Biological, physiological variables (e.g. ranges of motion, radiographic changes).
b Symptom status (e.g. pain).
c Functional status (e.g. return to work).
d General health perceptions (various aspects of global health).
e Quality of life (general well-being).

Although all of these measures are important for a full understanding of a patient’s improvement, it is generally agreed that the most important patient-based outcomes in back pain are symptoms, physical function, and the impact of pain on activities of daily living4-6. The following outcome measurement tools may be accessed via the internet. The URL’s are stated under ‘Summary Points’ at the end of this article.

MEASURING PAIN

Pain is the primary symptom that prompts people to seek treatment. A patient’s perception of and response to pain depend not only on the extent of tissue damage, but on a number of psychological, social, economic, cultural and situational factors. These factors also influence an individual’s response to treatments that are provided7.

A wide variety of tools have been developed in response to challenges of measuring pain and assessing outcome in musculoskeletal pain syndromes8-10.

VISUAL ANALOGUE PAIN RATING SCALES

Visual analogue (VA) scales (see example in Section 2: Practical Clinical Procedures) have been in use for psychological assessment since the early twentieth century and were popularised by Huskisson in the late 1970s for use in pain measurement11. They are a simple method of recording subjective estimates of pain intensity, and improvement or deterioration. The typical scale is a 10 cm.horiztonal line with short vertical bars at each end. Terminal descriptors are placed at each end, usually ‘none’ or ‘no pain’, at the left-hand end, and ‘worst possible pain’, or ‘pain as bad as it could be’ at the right hand end. The patient places an ‘X’ or a slash on the
horizontal line to indicate the severity of pain and the score is determined by measuring from the ‘none’ or ‘no pain’ marker to the intersect. There are a number of variations on this basic scale20-22. VA scales can be modified to record change by locating ‘no change’ at the centre point and using terminal descriptors such as ‘extreme deterioration’ and ‘extreme improvement’.

VA scales correlate highly with Verbal Rating Scales23,24 and the McGill Pain Questionnaire25, and are more sensitive to change than Verbal Rating Scales. Retest reliability of VA scales is higher with literate patients than with non-literate patients26. VA scales are more difficult to understand than other measures of pain intensity, especially for those at risk of cognitive difficulties, such as some elderly individuals or those taking high doses of opioid analgesics26,27.

CLINICAL USE

VA scales have been used to assess pain, stiffness, physical dysfunction and global well-being. They are simple to use, require only about 30 seconds to complete, and can be combined with other pain assessment tools. For patients with low literacy levels or cognitive difficulties, a Numerical Rating Scale or Faces Scale is preferred over a VA Scale28.

NUMERICAL PAIN RATING SCALES (NR)

NR scales ask the patient to rate their pain from 0 to 10 or from 0 to 100, with the understanding that 0 represents no pain and that 10 or 100 represents pain as bad as it could be. The number that the patient circles or states represents his pain intensity score, which is then recorded. These scales have also been presented as thermometers to try to clarify the metaphor and to underscore the links with health. Retest reliability for NR scales is high and is not affected by the respondent’s literacy level29.

CLINICAL USE

NR scales are very easy to administer and score. They can be used with a great variety of patients as they have one of the highest compliance rates of all measures of pain intensity. The primary weakness is the lack of research comparing their sensitivity to that of other measures, particularly the VA scale.

PAIN DRAWING

The pain drawing (see example in Section 2: Practical Clinical Procedures) is a standardised self-report measurement of location and quality of pain. The pain drawing usually involves a line drawing of the front and back of the body. Sometimes, line drawings of the face, head and neck are used for patients experiencing localised pain such as oro-facial pain or headaches. Patients are asked to indicated the location of their pain on the surface of the drawings. Patients may be asked to distinguish between various sensations of the pain experience and to indicate the location of these sensations by means of different symbols. Alternatively, patients may simply shade in the areas of their body that are ‘in pain’. The reliability of the pain drawing data has been established and test-retest stability is high29. Pain drawing scores correlate well with McGill pain Questionnaire scores and hysteria and hypochondriasis scores on the Minnesota Multiphasic Personality Index30.

CLINICAL USE

The pain drawing is easy to administer and interpret, and is a valuable diagnostic tool as well as a useful outcome measure for assessing pain location. It may be also be a useful screening tool for inappropriate pain behaviour30.

MCGILL PAIN QUESTIONNAIRE (MPQ)

The MPQ provides a quantitative profile of three aspects of pain: sensory-discriminative, motivational-affective, and cognitive-evaluative31. It was originally used in evaluating pain therapies but can also be used as a diagnostic tool32. It is the leading instrument for describing the various dimensions of pain and is considered the gold standard by which other newer instruments are compared.

The MPQ consists of 78 adjectives describing pain arranged in 20 subclasses describing different aspects or types of pain. These descriptors are either read to the patient or the questionnaire may be self administered, with the explicit instructions that the patient chooses only those words that describe their feelings or sensations at that moment. The MPQ is sensitive to treatment-related changes in the pain report33, and the rest-retest reliability is high34.

CLINICAL USE

The questionnaire initially takes about 15 minutes to complete but, with increasing experience from repeated assessments, it is usually completed in less than 10 minutes. It is relatively easy to score.

SHORT-FORM MCGILL PAIN QUESTIONNAIRE (SFM).

There is also a short-form McGill questionnaire (see example in Section 2: Practical Clinical Procedures) that has a total of 15 descriptors, the first 11 representing the sensory dimension of pain and the last 4 representing the affective dimension35. Each descriptor is ranked on an intensify scale with 0 being none and 3 being severe. A visual analogue scale and present pain intensity index of the long form McGill are also included.
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CLINICAL USE

The SFM take only a few minutes to complete, correlates highly with the standard version, and is sensitive to treatment-related changes in the pain report.

MEASURING DISABILITY

The presence and intensity of pain alone is an insufficient measure of health outcome35. As pain measurement scales have been shown to correspond poorly with measures of physical function36, their use in the assessment of patient outcome is necessarily limited. This highlights the need for tools that measure the effect that pain has no function.

The assessment of alterations in function due to any musculoskeletal disorder is fundamental to clinical treatment, monitoring progress and providing social support. This is generally carried out in three sequential stages, impairment, disability, and handicap37.

The World Health Organisation defines impairment as a reduction in physical or mental capacities. Impairments are generally disturbances at the organic level and may not have adverse consequences for the individual, for example impaired vision or hearing can usually be corrected with glasses or aids. A disability may result where the effects of an impairment are not corrected. Disability refers to the restriction in a person’s ability to perform a function normally (for example walking or driving). Thus, impairment is a tissue damage-based concept in contrast to disability which is a task-based concept. Handicap refers to the social disadvantage that may arise from disability (for example, loss of earnings). A minor injury may handicap an athlete, whereas an average person would not be noticeably restricted in their activities37.

Traditionally, treatment and assessing outcomes in physical medicine has focussed on alleviating and measuring impairment. However, a patient’s problem is usually expressed in terms of disability or handicap (“I can’t sit for more than 20 minutes”). Consequently, assessing the outcome of treatment may best be assessed using disability or handicap indicators rather than impairment indicators. In other words, a patient (or payer) may not care if they have a 15% increase in range of motion or an improved straight leg raised test if they can’t sit for more 20 minutes.

The following instruments were designed to quantify the subjective perception of function and pain in the two most common musculoskeletal complaints seen by chiropractors and osteopaths – low back pain and neck pain. It is appropriate to use any of these indices in serial testing at appropriate intervals (e.g. acute – weekly, chronic – biweekly). This allows ongoing evaluation of progress.

OSWESTRY LOW BACK PAIN AND DISABILITY QUESTIONNAIRE (ODI)

The Oswestry Scale39 is a self-report questionnaire intended for clinical use, and indicates the extent to which a person’s back or leg pain restricts their function. The first section of this 10 item scale rates pain intensity and the remaining nine cover the disabling effect of pain on activities of daily living. Very high test-retest correlations and a good internal consistency have been reported in multiple studies for the ODI

It is recommended that the Oswestry questionnaire (version 2.0) be used as a standard measurement for assessing back pain. An alternative version of the questionnaire was developed (for use in studies in chiropractic) which omitted the section on sex life, altered the remaining sections, and added a section on changes in level of pain. Fairbank, one of the developers, of the Oswestry questionnaire recommended against the use of this version, suggesting that it ‘confuses impairment with disability’ and ‘was never properly validated’ among other reasons39.

ROLAND-MORRIS LOW BACK PAIN AND DISABILITY QUESTIONNAIRE (RDQ)

The RDQ40, a modification of the Sickness Impact Profile41, is a self-report questionnaire designed for measuring how low back pain restricts the activities of daily living. This scale consists of a set of 24 questions pertaining to work, time at home, walking, sitting, and other activities of daily living relevant to patients with low back pain. Clinical improvements over time can be graded based on an analysis of serial questionnaire scores.

Scores on this questionnaire correlate highly with those of the ODI and Verbal Rating Scales. Test-retest reliability also compares favourably with that of the ODI. Scores are not related to age, gender or social class, making this an appropriate instrument for general practice. In practice, there is not a great difference between the ODI and the RDQ. Bombardier42 has suggested that the ODI may be the superior instrument for populations with higher disability levels, while the RDQ is favoured in populations at the lower end of the disability spectrum.

A modified Roland-Morris scale was devised which consists of 18 of the original 24 questions, and its measurement properties appear to be equal to those of the 24 item scale45.

NECK DISABILITY INDEX (NDI)

This index is a revision of the Oswestry Scale and was developed by chiropractors Vernon and Mior in 199146 to measure reduced activities of daily living in patients with disabling neck pain, particularly those with whiplash-type
injuries. As with the ODI, the NDNI is a 10-item scale.

A moderately high correlation has been found between scores on the NDNI and the McGill Pain Questionnaire. Test-retest reliability is high and this instrument appears sensitive to changes in levels of severity of complaint. Although still a relatively new instrument, the NDNI has been used in many studies involving assessment and treatment of patients with mechanical neck pain. Sensitivity to change correlates well with VA scale scores and it is appropriate for use in an ambulatory clinical population.

**FUNCTIONAL RATING INDEX (FRI)**

The FRI is a hybrid instrument based on the ODI and NDNI developed for use with both neck and back problems. Initial evaluation of the FRI demonstrated a high test-retest reliability and good correlation with the Disability Rating Index and the Short Form-12 Physical Component Score. Scores were not affected by gender, level of education, nor age. This clinician-friendly instrument has the distinct advantage of taking less than one and a half minutes to fill out and score.

**CONCLUSION**

A core set of patient-based outcome measures with high clinical utility for practitioners dealing with back and neck pain has been presented. The Visual Analogue scale, Pain Drawing and the McGill Pain Questionnaire are arguably the most frequently used self rating instruments for the measurement of pain in the clinical and research settings. When used in combination, these three tools provide a practitioner with a broad understanding of the patient’s pain experience. Four measures of back/neck – specific function were also recommended: The Oswestry Disability Index, Roland-Morris Disability Questionnaire, Neck Disability Index, and the Functional Rating Index. Objective measures of pain and disability, when combined with physical examination findings provide the clinician with all the information needed for evaluating the effectiveness of care in the vast majority of cases of low back and neck pain.

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SUMMARY OF IMPORTANT POINTS

a. There is an increasing demand by third party payers and health care consumers for the utilisation of objective, patient-based outcome measures.
b. The most important outcome measures in cases of back and neck pain are symptoms, physical function and the impact of pain on activities of daily living.
c. The multidimensional nature of pain demands more than simple one-dimensional pain intensity measurements.
d. A combination of visual analogue scale (or numerical rating scale), pain drawing and McGill (of short-form McGill) pain questionnaire can provide the clinician with a broad understanding of a patient’s pain experience.
e. The Oswestry Disability Index, Roland-Morris Disability Questionnaire, Neck Disability Index, and the Functional Rating Index are all objective measures of back/neck specific function with high clinical utility for chiropractors and osteopaths.
f. Objective measures of pain and disability, when combined with physical examination findings provide the clinician with all the information needed for evaluating the effectiveness of care in the vast majority of cases of low back and neck pain.

USEFUL WEBSITES

Oswestry disability Index:  
http://www.drsnetwork.com/pdf/files/oswestry.pdf

Neck Disability Index:  
Roland-Morris Disability Questionnaire, Visual Analogue Scales:  
http://www.chiro.org./LINKS/outcome.shtml

Functional Rating Index:  
http://www.chiroevidence.com

McGill Pain Questionnaire, Short-Form McGill Pain Questionnaire:  
http://www.cher.brown.edu/pcoc/Physical.htm#McGill Pain Questionnaire