Clinical Assessment of Low-Back-Pain Treatment Outcomes in Athletes

Luzita I. Vela, Douglas E. Haladay, and Craig Denegar

Patient Scenario: A 21-year-old male rodeo athlete complains of acute low back pain (LBP) after a bareback event. The athlete wishes to compete in a rodeo event in 4 d. Clinical Outcomes Assessment: Given the questionable validity and reliability of traditional clinical examination techniques for LBP, a treatment subgroup classification system combined with clinical outcomes assessment provides greater insight into suitable clinical interventions and patient response to treatment. Four LBP treatment subgroups based on the patient’s clinical presentation and symptoms have been established: manipulation, stabilization, specific exercise, and traction. Manipulation subgroup research has produced a valid clinical prediction rule (CPR). The Visual Analog Scale, Numeric Rating Scale (NRS), Oswestry Low Back Pain Disability Index (ODI), Roland Morris Disability Questionnaire, Short Form 36 (SF-36), and Global Rating of Change Scale are valid, reliable, and responsive outcomes instruments with established values for minimum clinically important difference (MCID). These instruments document important changes in disablement and health-related quality of life in patients with low back injury, as well as demonstrate treatment outcomes. Clinical Decision Making: On examination the athlete presents with moderate pain and disability as measured by the NRS, ODI, and SF-36 and meets all 5 criteria for the manipulation subgroup, indicating a high likelihood of success with manipulative therapy when following the guidelines presented in the CPR. Expected outcomes values, based on MCID values, were met after 1 treatment. Preferred outcomes, based on physical activity requirements for sport, were met on day 4. Clinical Bottom Line: LBP generators are difficult to establish using traditional clinical examination techniques. The combined use of clinical criteria, using an LBP subgroup system, and baseline outcomes measures should guide treatment. Benchmarks should be guided by established MCID values for each instrument.

Low back pain (LBP) is a common condition with a lifetime incidence as high as 80%,¹ and the prevalence of chronic low back pain is increasing.² The incidence of LBP in physically active or athletic populations is not well defined; however, it is estimated that 10% to 15% of athletic injuries occur to the low back.³ Although LBP is common, the precise source of pain in an individual patient is often not fully known. Multiple structures including the intervertebral discs, facet joints,
sacroiliac joints, spinal nerves, and trunk muscles may contribute to LBP. Physical examination tests identifying the biomechanical or structural cause of LBP are often unreliable and misleading. Moreover, factors unrelated to physical structures, including depression and fear-avoidance beliefs, may contribute to the LBP experience or affect the outcome of treatment.

Effective management of patients with LBP requires 2 steps: identifying appropriate treatment interventions via appropriate classification systems and assessing treatment outcomes using psychometrically sound outcomes instruments. The use of positive clinical outcomes data has helped identify patient subgroups most likely to respond to specific low back interventions. Studies that have used criteria to subgroup patients into appropriate treatment interventions have resulted in better patient outcomes and the development of a clinical prediction rule (CPR). CPRs assist clinicians with the management of LBP and other spine-related pain through classification of patients based on history, signs and symptoms, and findings on physical examination rather than through confirming the specific source of pain. CPRs for the treatment of patients complaining of LBP are relatively new to rehabilitation medicine. Many recently derived CPRs still warrant further prospective investigation to establish their validity and assess the impact of widespread implementation in the management of LBP patients, but they are an effective way to integrate evidence into clinical practice.

Research conducted on patients with LBP typically assess improvement by measuring pain, disability, and health-related quality-of-life (HRQOL) outcomes. However, the outcomes assessment patterns of physicians during the assessment of acute, nonspecific LBP patients demonstrated that such patterns may differ in clinical practice. Kent et al found that physicians focused the clinical examination on impairment and pain measurements and measured disability and HRQOL far less often (21% and 7%, respectively). A study of US physical therapists found more promising outcomes assessment patterns. In that study, 47.8% of physical therapists were found to use standardized outcome measures related to disability. In addition, the most frequently used measure for disability was associated with LBP. The clinician’s goal should be to assess outcomes along the entire disablement spectrum to understand the full impact of the injury on the patient’s activity limitations, participation restrictions, and HRQOL.

Our purpose is to review patient-report outcomes instruments that are appropriate for use with patients reporting LBP, to present low-back-treatment subgroups, and to discuss CPRs that relate to caring for physically active patients with LBP.

**Patient Scenario**

A 21-year-old male rodeo athlete presents to the athletic training room complaining of pain in the lower back. He does not recall a specific mechanism of injury and denies falling from his horse. He states that he noticed pain after a bareback-riding event 2 days ago but that the pain worsened after a 7-hour car ride home. He reports several previous LBP episodes that were less severe, did not require medical attention, and resolved without treatment after approximately 1 week. He denies pain radiating below the buttocks and other neurological symptoms but states that he has aching in the right lower back and sacroiliac region. He also complains of tightness in the right buttock. The patient states that the pain increases when
he initiates movement after staying in 1 position (standing, seated, lying) for a prolonged period of time. He also notices pain and “tightness” with trunk flexion when he does activities such as dressing and picking up objects. He states that he feels well otherwise and wants to compete in a college rodeo in 4 days.

Visual observation reveals that the patient is free of any lower extremity malalignments and has no signs of a lower cross syndrome. On clinical examination the patient has active trunk range of motion that is slightly limited and painful in flexion and rotation to the left side. Palpable spasms are noted in the right erector spinae muscles and quadratus lumborum. The patient has normal hip range of motion in flexion, extension, abduction, and external rotation but has a discrepancy in hip internal range of motion, measured in the prone position, between the involved and uninvolved side (right = 30°, left = 40°). The patient has negative tests for discogenic pain, radiculopathy, spondylolysis, and spondylolisthesis. He has reduced posteroanterior motion of the L4 and L5 vertebrae, as well as positive tests for right-sided sacroiliac dysfunction. The differential diagnosis includes right-sided sacroiliac dysfunction and associated L4–L5 lumbar-facet dysfunction.

Clinical Outcomes Assessment

There are numerous self-report instruments that have been proposed for patients with LBP, but only a few have been extensively studied for reliability, and none specifically for validity in athletic populations. Information regarding minimal clinically important difference (MCID), defined as the minimal change in an outcome score that is meaningful for patients, is available for all these measures except the Fear Avoidance Beliefs Questionnaire (FABQ).19 As data are assembled from additional investigations the precision of these values will become increasingly well defined, further enhancing their clinical usefulness.

We will discuss the available outcomes tools and give recommendations based on feasibility, applicability, and psychometric properties. We will also present instruments that are commonly used in LBP patients and measure pain, disability, and HRQOL. In addition, we will present the option of using a simple Global Rating of Change instrument and an instrument that measures fear-avoidance behaviors in LBP patients. The latter instrument is particularly useful when applying a CPR to determine treatment for LBP patients. We will also present general information regarding each instrument to enable clinicians to choose the instrument that will be best suited for the patient and injury. An overview of each outcomes tool presented can be found in Table 1. Actual patient scores and expected change scores will be discussed as part of the clinical decision-making process later in this article and can be found in Table 2.

Pain

Pain intensity refers to the patient’s perception of pain level. Pain may be quantified by using a visual analog scale (VAS) or numeric rating scale (NRS).20,21 Both are simple tools that are useful in determining a patient’s status.

The VAS is a self-reported measure that asks the patient to mark the intensity of his or her pain along a 10-cm line. One end of the line represents no pain, and the other indicates maximal pain. This line may be horizontal or vertical and may
Table 1  Overview of Low-Back-Pain Outcome Instruments

<table>
<thead>
<tr>
<th>Measure</th>
<th>Description</th>
<th>Construct validity</th>
<th>Reliability</th>
<th>MCID</th>
</tr>
</thead>
</table>
| VAS     | Time for completion: 1 min  
Description: Traditionally 10-cm horizontal line with 1 end labeled *no pain* and the opposite labeled *maximal pain*  
Scored: Score reported numerically in mm or cm  
Time frame: Varies, including today, average, best, worst | Verbal rating scale and numerical rating scale | .97–.99     | 20–35 mm      |
| NRS     | Time for completion: 1 min  
Description: Verbal rating of pain on a scale from 0 to 10 with 0 representing *no pain* and 10 indicating *worst imaginable pain*  
Time frame: Varies, including today, average, best, worst | Visual analog scale and verbal rating scale | .61<sup>30</sup> | 2 points     |
| ODI     | Time for completion: 5 min  
Description: 10 sections assessing limitations of various ADLs  
Response possibilities: 6-item ordinal scale  
Scored: Each section is scored 0–5, with 5 being the highest level of disability  
Time frame: Not specified, assumed today | Moderate correlation with pain measures and SF-36<sup>27</sup> | .83–.99<sup>27</sup> | 6–10 points |
| RDQ     | Time for completion: 5 min  
Description: 24 items chosen from the Sickness Impact Profile to cover a variety of ADLs  
Response possibilities: Nominal yes/no  
Scored: yes = 1, no = 0  
Time frame: Specifies today | Correlates with SF-36, SIP, Quebec Back Scale, ODI, and pain ratings<sup>27</sup> | .43–.96     | 2–8 points based on initial score |
Table 1 (continued)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Description</th>
<th>Construct validity</th>
<th>Reliability</th>
<th>MCID</th>
</tr>
</thead>
</table>
| SF-36   | Time for completion: 10 min  
Description: 36 items form 8 subscales and 2 composite scores (PCS and MCS)  
Response possibilities: 5-item ordinal scale  
Scored: 0–100, with a higher score indicating greater function  
Time frame: 1-wk or 4-wk recall | Correlates with RDQ and ODI $^{27}$  
.88 (MCS) to .92 (PCS) $^{31}$  
1–9 points based on initial score | | |
| FABQ    | Time for completion: 5–10 min  
Description: 2 subscales that measure work and activity avoidance  
Response possibilities: 0–6 scale, with a higher rating indicating a greater level of fear  
Scored: Activity subscale score ranging from 0 to 24 and including questions regarding fears associated with performing work and physical activities | Positive correlation with ODI, Tampa Scale for Kinesiphobia $^{45}$  
.64–.80 $^{45}$  
Unknown | | |
| GRC     | Time for completion: 1 min  
Description: 15-point scale that measures the degree of positive or negative change  
Response possibilities: No change, positive change (7 choices), negative change (7 choices)  
Time frame: variable | Moderate and high correlation with RMQ and ODI, respectively $^{16,44}$  
.90 $^{45}$  
$\geq+5$ or $\geq+3$ | | |

MCID, minimal clinically important difference; VAS, visual analog scale; NRS, numeric rating scale; ODI, Oswestry Low Back Pain Disability Index; ADLs = activities of daily living; SF-36, Short Form-36 version 2; RDQ, Roland Morris Disability Questionnaire; SIP, Sickness Impact Profile; PCS, physical health component summary score; MCS, mental health component summary score; FABQ, Fear Avoidance Beliefs Questionnaire; GRC, Global Rating of Change Scale.
include hatch marks or numbers to further help patients mark their pain intensity. The intensity may be recorded in either millimeters or centimeters from 0 (no pain). The reliability and, to a lesser extent, validity of the VAS have been well established.20,22,23 In fact, the VAS-24 (a measure of pain within the past 24 h) has been shown to be more responsive than the McGill Pain Questionnaire in patients with LBP.24 The MCID of the VAS for LBP has been reported to range from 20 to 35 mm. Some authors have suggested that the lower and upper bounds should be used for chronic and acute pain, respectively.20

For the NRS, patients are asked to rate their pain on a scale from 0 to 10, with 0 representing no pain and 10 indicating maximal pain. As with the VAS, the validity of the NRS has been well established. It has been suggested that the MCID for the NRS may range from 1.0 to 4.5,20 but consensus has indicated a cutoff value of 2.21

When dealing with cases of LBP, pain should be measured during each treatment session using a standardized scale such as the VAS or NRS, which are psychometrically sound and have reported MCID values. We suggest using the NRS because of its ease of use.

### Disability Scales

The most frequently used multidimensional, patient-reported instruments in research studies examining LBP include the Oswestry Low Back Pain Disability Index (ODI), Quebec Back Pain Disability Scale, and Roland Morris Disability Questionnaire (RDQ).25–27 Expert panels have recommended using either the ODI or the RDQ for pain-related disability in patients with LBP.28

Multiple studies have shown that the ODI is more reliable and responsive than other low back instruments. The ODI is a performance- and capacity-based outcomes

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Pretreatment</th>
<th>Posttreatment (day 3)</th>
<th>Posttreatment (day 4)</th>
<th>Expected posttreatment</th>
<th>Preferred posttreatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRS</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>ODI</td>
<td>34%</td>
<td>16%</td>
<td>6%</td>
<td>24%</td>
<td>8%</td>
</tr>
<tr>
<td>SF-36</td>
<td>PCS = 30.2,</td>
<td>n/a</td>
<td>PCS = 44.0,</td>
<td>PCS = 34</td>
<td>PCS = 40</td>
</tr>
<tr>
<td></td>
<td>MCS = 54.5</td>
<td></td>
<td>MCS = 55.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FABQ</td>
<td>activity = 12,</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>work = 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRC</td>
<td>n/a</td>
<td>+5</td>
<td>+6</td>
<td>+5</td>
<td>+6</td>
</tr>
</tbody>
</table>

NRS, numeric rating scale; ODI, Oswestry Low Back Pain Disability Index; SF-36, Short Form-36 version 2; PCS, physical health component summary score; MCS, mental health component summary score; FABQ, Fear Avoidance Beliefs Questionnaire; GRC, Global Rating of Change Scale.

* SF-36 reported 1 wk after treatment.

* Based on established minimal clinically important difference values.
instrument consisting of 10 questions assessing pain intensity and limitations in various activities.29 Scores range from 0 to 50 (with a higher score indicating greater level of disablement) and are transformed into a percentage score: (total score/50) × 100. The MCID for the modified ODI was established as 6%, indicating that a patient with a 6-point change on the ODI had experienced a clinically important change in response to a therapy.16,30 Recent consensus, however, has indicated that the proposed cutoff value should be 10% for the ODI.21

The RDQ is a 24-item scale that evaluates the effect of pain on disability on a scale that ranges from 0 to 24, with higher scores indicating greater levels of disability. Each item has dichotomous yes/no-type answer, and the total score is the sum of all answers. The RDQ is suggested for use in patients with mild to moderate low back injuries.31 The RDQ is reliable (reliability coefficient ranging from .43 to .96), valid, and responsive to change.26,32 The MCID values for the RDQ depend on the initial score. Stratford et al33 calculated MCID values for the RDQ in 5 subgroups based on the initial scores of the patients. Initial scores were grouped as 0 to 8 (MCID = 2), 5 to 12 (MCID = 4), 9 to 16 (MCID = 5), 13 to 20 (MCID = 8), and 17 to 24 (MCID = 8).

Both the ODI and the RDQ measure activity limitations and participation restrictions associated with LBP. Therefore, they are both clinically meaningful outcomes instruments that help the clinician understand the full impact of injury on patient status and progress. One inherent limitation of both the ODI and the RDQ, which is also true of many outcomes instruments, is that they measure only a minimal level of function and may not address the high physical demands required of athletes or the transient disabilities that are of concern to athletes. Future research related to LBP should address the notion that some outcomes instruments appear to be too easy for athletic patients.

Research applying a CPR for manipulation of the lumbar spine used the ODI to measure treatment success. It has been suggested that the ODI is more sensitive to change in patients with severe disability, whereas the RDQ is more sensitive to change in those reporting minor disability.27,31,33 This may be related to the presence of leg pain resulting in more severe perception of disability.34 Because both instruments are psychometrically sound and take less than 10 minutes to complete, we suggest that clinicians choose the instrument that best measures the concerns of the patient populations they work with most often. An examination of the questions on the ODI and RDQ reveals that both instruments ask questions regarding limitations the patient complained of, including dressing, positional pain, and lifting objects. The ODI asks 1 question regarding limitations in “energetic” social interests, whereas no such question is found on the RDQ. Given that rodeo can be considered an energetic social interest and the importance of rodeo to the patient, we chose to use the ODI.

HRQOL

The Short Form 36 version 2 (SF-36) is a generic outcomes instrument that is used to assess HRQOL and has been used in multiple studies assessing low back outcomes.35–37 The instrument consists of 36 questions, with a 5-level response scale available in both standard (4-wk) and acute (1-wk) recall formats. The scale provides physical health (PCS) and mental health (MCS) component summary
scores from 8 subscales. Although multiple studies have validated the use of a shorter version of the SF-36, the Short Form 12 version 2 (SF-12), in patients with low back conditions, there may be some limitations in using the SF-12 with our patient. The studies that have investigated the use of the SF-12 have been used in patients with more severe, long-term conditions such as disc herniation and spinal stenosis. One study of LBP patients found that the SF-36 and SF-12 were equally sensitive to change, but the SF-12 did not adequately predict SF-36 PCS scores. Furthermore, it has been suggested that the SF-12 should be used to assess groups and not individual patients.

Research investigating the use of the SF-36 in athletes established that elite athletes scored higher on HRQOL measurements than a sedentary population at baseline and after injury, indicating that HRQOL measurement is warranted. Traditionally, generic instruments are considered less sensitive in detecting patient change. For example, Turner et al found that the SF-36 was less responsive to changes in LBP patients than the RDQ. The MCID value of the SF-36 PCS has been established but differs for patients who have isolated LBP compared with those with LBP accompanied by leg pain. Lauridsen et al calculated MCID values for the SF-36 PCS in 3 subgroups based on patients’ initial scores. Initial scores for patients who had isolated LBP were grouped as 0 to 25 (MCID = 1), 26 to 50 (MCID = 3), and 51 to 75 (MCID = 9). Given that our patient has a pretreatment SF-36 PCS score of 30.2, we will use an MCID of 3 points to determine clinically significant change in HRQOL.

We suggest using the SF-36 with the 1-week recall option before treatment is initiated and 1 week after treatment. We also suggest using the SF-36 in addition to a disability scale. Although there is some overlap in the instruments, particularly in regard to physical-function assessment, they each measure unique aspects of disability and HRQOL. We will report both the PCS and MCS scores, but we will only examine the MCID of the PCS scores because no MCID values have been reported for the MCS in LBP patients.

**Global Rating of Change**

The Global Rating of Change Scale (GRC), a retrospective, patient-report, 15-point rating scale, has been commonly used in research as an external criterion to assess whether a patient has experienced a change in injury status as a result of an intervention (see Figure 1). The GRC has been validated for use in LBP patients when GRC scores are averaged across the patient and health care provider. Because the instrument requires patient judgment of change on 2 time periods (ie, start of treatment and end of treatment), the tool is not administered before treatment. The time between the injury and posttreatment GRC assessment should not be lengthy, though, because of potential problems with patient recall.

In research, the GRC has been used to dichotomize treatment success or failure by picking an arbitrary cutoff point on the scale to signify clinically significant improvement. Stratford et al defined clinically significant improvement in LBP patients as a GRC score ≥4, whereas Fritz and Irrgang defined clinically significant improvement as greater than +3 on the GRC when averaging the patient’s and clinician’s ratings. The scale can also be used to measure patient progression and deterioration without using a cutoff point. The GRC is a meaningful, simple
With respect to your injury, how would you describe yourself now compared with immediately after your injury?

Better
Almost the same
Worse

If better, circle the most appropriate answer from the scale below.
1. Almost the same, hardly any better at all
2. A little better
3. Somewhat better
4. Moderately better
5. A good deal better
6. A great deal better
7. A very great deal better

If worse, circle the most appropriate answer from the scale below.
1. Almost the same, hardly any worse at all
2. A little worse
3. Somewhat worse
4. Moderately worse
5. A good deal worse
6. A great deal worse
7. A very great deal worse

Figure 1 — Global Rating of Change Scale.

outcomes tool to use with the physically active because it allows patients to judge success based on their expectations for sport. We use the GRC in our patient scenario as an external guide to validate treatment success.

Fear-Avoidance Beliefs

More recently, the FABQ has been integrated into research and CPRs as a predictor for therapy success. The FABQ measures fear levels and activity avoidance in patients with LBP. The scale is constructed of 2 subscales that measure work and activity avoidance and is used to establish a patient’s adaptive or maladaptive responses to LBP. Multiple studies have shown a positive correlation between FABQ and disability levels, with the work subscale score predicting the most variance in disability when compared with the ODI. All items are scored on a scale of 0 to 6, with a higher rating indicating a greater level of fear. The activity subscale is scored from 0 to 24 and includes questions regarding fears associated with performing physical activity. This scale provides excellent information for clinicians trying to understand the psychosocial impact of LBP in physical activity. The work subscale is scored from 0 to 42. Preliminary research has established cutoff scores for the subscales that are predictive of long-term outcomes (activity subscale >14 and work subscale >29), but more research needs to be completed to establish an MCID value.

Although fear avoidance may not be associated with athletes participating in high-risk activities, assumptions about individual patients should not be made. Kinesiophobia, for example, has been shown to be a predictor of 6-month treatment outcomes in military personnel with LBP. In addition, the FABQ is a factor in the LBP CPR. Therefore, we suggest using the FABQ as an instrument for treatment stratification rather than as a measure of treatment success.
Clinical Decision Making

The recognition of multiple sources, or causes, of nonspecific LBP suggests that a single, generic label has been inappropriately applied. Nonspecific LBP is a common symptom of related disorders rather than a single problem. Moreover, the source of LBP is often never confirmed in patients who fully recover, and the reliability, sensitivity, and specificity of many specials tests are suspect. Treatment subgroups were introduced by Delitto et al as a practical approach for classifying LBP and identifying appropriate treatment strategies. Subsequent work has helped update the classification system with criteria that have been substantiated by research performed since the original work by Delitto in 1995 (see Table 3).

Table 3  Low-Back-Pain Subgroups and Classification Criteria

<table>
<thead>
<tr>
<th>Classification subgroup</th>
<th>Classification criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manipulation</td>
<td>No Sx distal to the knee</td>
</tr>
<tr>
<td></td>
<td>Recent onset of Sx (&lt;16 d)</td>
</tr>
<tr>
<td></td>
<td>Low FABQ work subscale score (&lt;19)</td>
</tr>
<tr>
<td></td>
<td>Hypomobility of the lumbar spine</td>
</tr>
<tr>
<td></td>
<td>Hip internal-rotation ROM (&gt;35° for at least 1 hip)</td>
</tr>
<tr>
<td>Stabilization</td>
<td>Age &lt;40 y</td>
</tr>
<tr>
<td></td>
<td>Greater general flexibility (average SLR ROM &gt;91°)</td>
</tr>
<tr>
<td></td>
<td>“Instability catch” or aberrant movements during lumbar flexion and extension</td>
</tr>
<tr>
<td></td>
<td>(+) Prone instability test</td>
</tr>
<tr>
<td></td>
<td>Additional test findings in postpartum patientsa</td>
</tr>
<tr>
<td>Specific exercise</td>
<td>Sx distal to buttock</td>
</tr>
<tr>
<td>extension</td>
<td>Sx centralize with lumbar extension</td>
</tr>
<tr>
<td></td>
<td>Sx peripheralize with lumbar flexion</td>
</tr>
<tr>
<td></td>
<td>Directional preference for extension</td>
</tr>
<tr>
<td>flexion</td>
<td>Age &gt;50 y</td>
</tr>
<tr>
<td></td>
<td>Directional preference for lumbar flexion</td>
</tr>
<tr>
<td></td>
<td>Imaging evidence of spinal stenosis</td>
</tr>
<tr>
<td>lateral shift</td>
<td>Visible lateral deviation of shoulders relative to pelvis</td>
</tr>
<tr>
<td></td>
<td>Directional preference for lateral movements of the pelvis</td>
</tr>
<tr>
<td>Traction</td>
<td>S and Sx of nerve-root compression</td>
</tr>
<tr>
<td></td>
<td>No movements centralize Sx</td>
</tr>
</tbody>
</table>


a See source article for additional criteria for postpartum patients.
Management with classification-specific intervention has been found to result in better outcomes than nonspecific treatments. Childs et al identified 5 factors (duration of symptoms, hip internal rotation range of motion, lumbar mobility, radiation of symptoms, and FABQ work subscale score <19) to consider when determining whether manipulation of the lumbar spine is likely to produce more than 50% improvement after 1 or 2 treatments. The mean percentage change in ODI scores was 5 times greater in patients for whom treatment with manipulation was successful than for those for whom it was not. Patients who have 4 or 5 of 5 factors were most likely to respond to the manipulative therapy, and those with 2 or fewer factors were very unlikely to respond to a manipulation treatment.

**Patient Scenario**

Our approach to patient treatment was to use the NRS, SF-36, ODI, and FABQ before treatment. We measured the NRS and ODI again when the patient returned on days 3 and 4 for additional treatment. For this population, it is appropriate to administer the ODI within 2 to 4 days of manipulation to determine treatment success. In addition, we added the GRC scale at days 3 and 4 as an external criterion of treatment success. We had the patient complete the SF-36 at the 1-week recall time period as suggested by the instrument’s creators.

Before treatment, the patient’s pain on the NRS was a 6/10 at its worst, and his ODI score was 34%. When examining the individual items on the ODI, the patient had reported as most problematic pain intensity, pain with lifting, and positional pain with sitting, sleeping, and traveling. His scores for the SF-36 PCS and MCS were 30.2 and 54.5, respectively. His scores on the FABQ activity and work subscales were 12 and 8, respectively. Table 2 presents pretreatment, expected posttreatment, preferred posttreatment, and actual scores for all recommended outcomes instruments. Our expected changes were based on reported MCID values. Our preferred values were set higher, taking into account the extreme nature of the patient’s sport and the physical requirements required for him to be able to return to sport successfully.

The patient’s scores on the NRS, ODI, SF-36, and FABQ before treatment indicated that he was experiencing moderate pain and disability but relatively low levels of fear avoidance related to either activity or work. Treatment was determined using the classification-system criteria to categorize the patient to a treatment strategy that would most effectively manage his symptoms. In our patient scenario, 2 of the factors favoring the manipulation subgroup were identified from the patient history. The symptoms had been present for less than 16 days, and the symptoms did not radiate below the knee. On physical examination, hip internal rotation, when performed in the prone position, was found to be greater than 35° on the uninvolved side. Evidence of lumbar-segment hypomobility was found at the L4–L5 level when performing posteroanterior mobilizations. The low FABQ work subscale score, the fifth factor, was deemed to fall within the acceptable range. Our patient met all 5 criteria in the manipulation subgroup, so we could predict a high likelihood of success if the manipulative technique described in the original study was performed.

After 1 treatment session that included pain-gating modalities and the manipulation technique, the patient returned on day 3 reporting the following results: ODI = 16%, NRS = 3/10, GRC = +5. Although he met the expected posttreatment
benchmarks, we continued modality use and exercise in the subsequent treatment sessions with the goal of reaching our preferred posttreatment outcomes on day 4. On the day of the rodeo competition (day 4), the patient reported scores that were in the preferred posttreatment ranges (NRS = 2, ODI = 6%, GRC = +6). One week postinjury his SF-36 PCS scores had also changed dramatically from 30.2 up to 44.5, exceeding posttreatment expectations.

This application of the CPR is not without limitations. First, the CPR has been prospectively evaluated in only 1 published report, and although the derivation13 and validation15 studies assessed and treated patients with LBP, these results may not generalize to athletes participating in highly demanding activities. This CPR was developed based on change in modified-ODI scores provided by patients. Many of the ODI questions may have little relevance for an athlete suffering from acute LBP who is focused on returning to competition.

Summary

Clinical outcomes measures are useful tools in quantifying pain intensity, functional limitations, and disability in patients with LBP. There are a number of psychometrically sound outcomes instruments to assess outcomes in LBP patients. Classification systems as described by Delitto et al8 and further developed by Fritz et al9 are useful in identifying appropriate interventions for this population, and research has shown their clinical utility. Further evaluation regarding the use of LBP outcomes measures and CPRs in athletic populations is warranted.

Acknowledgments

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References


