Centralization Phenomenon
Its Usefulness in Evaluating and Treating Referred Pain

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In patients with low-back and radiating leg pain, a clinical phenomenon has been described known as "centralization," which occurs during a mechanical evaluation protocol described by McKenzie. Relocation of the most distal pain in a proximal or central direction characterizes the pain behavior when patients are assessed in this fashion. Centralization typically occurs rapidly and can be maintained. In a review of 87 such patients, centralization occurred in 76 (87%). Its occurrence during initial mechanical evaluation is a very accurate predictor of successful treatment outcome and reliably determines the appropriate direction of treatment exercise. Nonoccurrence of centralization accurately predicts poor treatment outcome and was a helpful early predictor of the need for surgical treatment. [Key words: sciatica, pain centralization, predictive valve]

THE "CENTRALIZATION" OF PAIN is a little-known clinical phenomenon initially observed by McKenzie in 1956.[3] He noted this phenomenon to be quite helpful in evaluating and treating patients with low-back and radiating leg pain.

Recovery from a low-back and leg pain episode with the simple passage of time typically involves a slow, variable regression of peripheral pain toward the center of the back, where it originated. "Centralization," as McKenzie used the term, refers to a rapid change in the perceived location of pain from a distal or peripheral location to a more proximal or central one. It is this rapid, frequently dramatic rate of pain centralization occurring in the span of a single clinic visit that has caught our attention and to which we refer in this study.

Like McKenzie, we have found this phenomenon to be most helpful in evaluating low-back pain patients. Its virtual absence from the scientific literature warrants this retrospective study and report.

METHODS

Population. In a private general orthopaedic office practice, 87 of 225 consecutive low-back pain patients also had pain radiating to the buttock, thigh, or calf. The evaluation, type of treatment, and treatment outcome of these 87 patients were reviewed for this study (Table 1).

The average age of the study group was 37 years, ranging from 17 to 65 years, with 37 male and 50 female patients. Fifty-three of the 87 had symptoms for 4 weeks or less; 15 patients, between 4 and 12 weeks, and 19 patients had symptoms for longer than 12 weeks (Table 1). Pain was present below the knee in 44 of the 87 patients. Thirty-seven patients were out of work because of their back condition.

Patient Evaluation and Treatment. On initial evaluation, 53 of the 87 patients studied were noted to have positive straight leg raising that reproduced or intensified their leg pain. An associated scoliosis, often very mild in appearance, was recorded in 43 patients. Eight patients had a deficient patellar or Achilles reflex, one had a motor deficit, and sensory loss was recorded in 12.

In addition to routine orthopaedic examination, each patient underwent an extensive mechanical evaluation by a physical therapist trained in the evaluation technique described by McKenzie. Patients performed a series of predetermined repeated end-range spinal movements, while the behavior of the patient's most distal pain in response to each of the movements was closely monitored.

Initially, the repeated end-range movements were performed while standing: forward bending (lumbar flexion), backbending (extension) and side gliding (Figure 1). This was followed by similar repeated end-range movements while recumbent: knees-to-chest while supine (Figure 2), passive extension while prone (Figure 3), and if necessary, prone lateral shifting of hips off the midline, similar to Figure 1.

Each movement was taken to its available end-range and performed repeatedly as long as distal pain continued to abolish. If distal symptoms worsened, however, that specific movement was discontinued. Pain location resulting from these movements was closely recorded.

Treatment. The technique and outcome of McKenzie treatment for low-back syndrome has been documented in other studies.[1,2,4-8] While it is not our purpose to address the techniques or effectiveness of the McKenzie approach, treatment outcomes in this study are nevertheless useful in determining the usefulness and role of the centralization phenomenon.

Treatment Outcome. Treatment outcome was considered excellent if complete relief of symptoms was obtained with return to full function. If symptom relief was only partial, then secondary criteria were considered: the patient's satisfaction with his outcome, improvement in physical and neurologic exam, and return to work. A good result then required partial relief of pain and improvement in all three of these secondary criteria. A fair result was also defined as partial pain relief, but with failure to improve in one or more of the three secondary criteria. A poor outcome was defined as no relief of symptoms.

Chart Reviewer. Chart review, data collection, and analysis were performed by an independent physician who had taken no part in the clinical evaluation or treatment and who was unfamiliar with the McKenzie assessment and treatment approach.

RESULTS

Rapid centralization of peripheral pain was experienced by 76 of the 87 (87%) patients in this series. In each case, it always occurred in response to repeated end-range movements in a single direction while movements in the opposite direction always exacerbated the distal symptoms. In the majority of cases, centralization of pain was noted during the initial visit, whereas the remainder experienced it over the next 2 days.

Final treatment outcomes were excellent or good in 83% of the total study population (Table 2). Of the 59 patients with excellent results, all (100%) experienced centralization of their pain during initial evaluation. Centralization occurred in ten of 13 (77%) of those with good results, four of seven (57%) with fair results, and three of eight (37.5%) with poor results.

There were 53 patients who had been symptomatic for 4 weeks or less

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