Evidence-Based Literature Review Project

CPAIN #5

Individually graded exercises for patients with chronic low-back pain may result in return to work.

Lindström, I., Öhlund, C., Eek, C., Wallin, L., Peterson, L.-E., Fordyce, W. E., & Nachemson, A. L. (1992). The effect of graded activity on patients with subacute low back pain: A randomized prospective clinical study with an operant-conditioning behavioral approach. *Physical Therapy*, 72, 279–290.

Level IA2b

Randomized controlled trial, 20 or more participants per condition, moderate internal validity, moderate external validity.

Why research this topic?

Researchers have conducted few randomized **prospective studies** (see *Glossary*) of the effectiveness of various treatments on patients who have experienced low-back pain of more than 8 weeks' duration. Such patients "are at considerable risk of developing chronic [low-back pain]" (p. 279).

What did the researchers do?

Lindström and his colleagues (1992), variously of Sahlgren Hospital (Göteborg), the University of Göteborg, and the Volvo Company (Göteborg), all in Sweden, and the University of Washington (Seattle), compared the effects of traditional medical care alone with the effects of traditional medical care plus graded activity in restoring occupational function and facilitating a return to work. They recruited 103 (71 men, 32 women) workers from the Volvo Company. The workers' average age was 40.9 years, and they were selected from a larger group who had been on medical leave for at least 6 weeks because of low-back pain. Five workers were excluded from the final analyses because they did not complete the 1-year follow-up examination.

Participants were randomly assigned to an activity group or a control group. For the duration of the study, both groups received traditional medical care from their regular physicians. The activity group participated in a graded-activity program, consisting of an assessment of each patient's functional capacity, which included three aspects: mobility, strength and fitness. Mobility was measured by thoracic and lumbar spinal range of motion (ROM) in forward–backward bending, lateral bending, active leg raising, spinal rotation, walking ability, climbing a 25-cm stool and jumping from the stool, and squatting and standing on tiptoe with elevated arms. Strength was measured by assessing ability to push and pull a vehicle with 100 kg of weights, pulling down 90-kg weights with arm in 90 degree of elevation, and measuring lifting tolerance capacity. Abdominal and back muscle endurance time also was calculated as part of strength testing. Fitness of the participants was tested with (1) a work test on an electronic stationary bike with a fitness computer; (2) a 1-hour visit to each patient's workplace to investigate the demands of his or her work; (3) 1 hour of education about the back; and (4) an individually graded program of exercises, based on the results of each patient's functional capacity tests and the demands of each patient's job. The exercise program used an operant-conditioning approach, which involved patients exercising until they achieved quotas set by a therapist.

The therapist increased the quotas over time but always kept them below the patients' limit of tolerance. The patients' reward for achieving the quotas was rest.

The outcome areas of interest were *return to work* and the amount of medical leave taken during the second year following treatment. Records of sick leave were available through Sweden's social insurance program. The researchers obtained records for the year before intervention, the year of intervention, and the two years after intervention.

What did the researchers find?

Patients in the graded-activity group returned to work **significantly** (see *Glossary*) earlier than patients in the control group did. Fifty-nine percent of the graded-activity group members returned to work within 6 weeks of their assignment to the group and 80 percent within 12 weeks. Comparable proportions for the control group were 40 and 58 percent. On average, patients in the graded-activity group returned to work after 10.0 weeks, patients in the control group after 15.1 weeks.

At the 2-year follow-up, patients in the graded-activity group averaged 16.6 weeks of total sick leave, 12.1 weeks of sick leave related to low-back pain. Comparable figures for the control group were 24.3 weeks and 19.6 weeks. The differences between the groups on each measure were significant.

What do the findings mean?

For therapists and other providers, the findings suggest that individually graded exercises for patients with chronic low-back pain, performed at a level lower than the patients' limit of tolerance, result in an efficient and successful return to work.

The exercises did not call for unusual or expensive equipment. Further, they led to cost savings for the social insurance program, expressed in less compensation for sick leave, fewer therapy appointments, and an earlier return to work.

What are the study's limitations?

A potential bias in the study was possible contamination from uncontrolled interaction between the participants in the two groups and from the medical attention given by the treating physicians, who were not "blinded" to (made unaware of) the patients' assignments. Also, comparison of the effectiveness between the graded exercise program based on operant conditioning with the established protocol for return to work (e.g., work hardening is required to provide solid evidence about its effectiveness).

GLOSSARY

prospective study—A study that identifies participants, then looks at what happens to them afterward—as opposed to a *retrospective study*, which identifies participants, then looks at what happened to them before.

significance (or significant)—A statistical term that refers to the probability that the results obtained in the study are not due to chance but to some other factor (e.g., the treatment of interest). A significant result is likely to be generalizable to populations outside the study.

Significance should not be confused with *clinical effect*. A study can be statistically significant without having a very large clinical effect on the sample. For example, a study that examines the effect of a treatment on a client's ability to walk may report that the participants in the treatment group were able to walk significantly longer distances than the control. However, after reading the study one may find that the treatment group was able to walk, on average, 6 feet, whereas the control group was able to walk, on average, 5 feet. Although the outcome may be statistically significant, a clinician may not feel that a 1-foot increase will make his or her client functional.

Ferminology document was replaced by Occupational Therapy Practice Framework: Domain and Process (AOTA, 2002), and modifications to ICIDH-2 were finalized in the International Classification of Functioning, Disability and Health (WHO, 2001).
Terminology used in this document is based on two systems of classification current at the time the evidence-based literature eviews were completed: <i>Uniform Terminology for Occupational Therapy Practice—Third Edition</i> (AOTA, 1994) and <i>International Classification of Functioning, Disability and Health (ICIDH-2)</i> (World Health Organization [WHO], 1999). More recently, the <i>Uniform</i>

