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Update on

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**Exercise Intervention Enhanced for
Subgroup of Patients with
Low Back Pain**

Low back pain (LBP) is one of the most common reasons that patients visit a physician. Effectiveness of exercise for LBP has been equivocal, but the true value of intervention studies may be minimized if patients are not appropriately categorized into subgroups, based on their clinical findings. In this multicenter randomized clinical trial, Browder et al from the U.S. Army–Baylor University and Wilford Hall Medical Center, Texas, examined the effectiveness of an extension-oriented treatment approach (EOTA) in a subgroup of patients presenting with specific symptoms of LBP.

Forty-eight patients with LBP whose symptoms extended below the buttocks and centralized

with extension movements were included. Patients were randomly assigned to an EOTA group ($n = 26$) or to a strengthening group ($n = 22$). Patients in the EOTA group received exercise and mobilization to promote lumbar spine extension with the goal of centralizing symptoms. Extension exercises progressed from a static prone position to dynamic standing extension exercises. Patients in the strengthening group were instructed in a program that has demonstrated merit in other subgroups of patients with LBP and included strengthening of deep abdominal muscles and primary spinal stabilizers.

Patients in both groups attended physical therapy sessions 2×/

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week for 2 weeks, then 1×/week for the next 2 weeks for a total of 6 sessions. Written instructions were provided for patients to perform exercises at home on the days they were not seen in physical therapy. They also kept an adherence log. Follow-up data were obtained at 1 week and 4 weeks after randomization and 6 months after discharge. Outcome measures assessed disability using the modified Oswestry Low Back Pain Disability Questionnaire (ODQ), and assessed pain using a Numeric Pain Rating Scale.

Significant improvement was observed in the ODQ for the EOTA group at each follow-up period (Figure 1). The EOTA group also showed greater improvement in pain scores, but only at the 1-week follow-up. The authors noted that patients in the EOTA group who had previous back surgery did not fare as well as those patients who had not had prior surgery.

The positive findings of this study related to changes in the disabil-

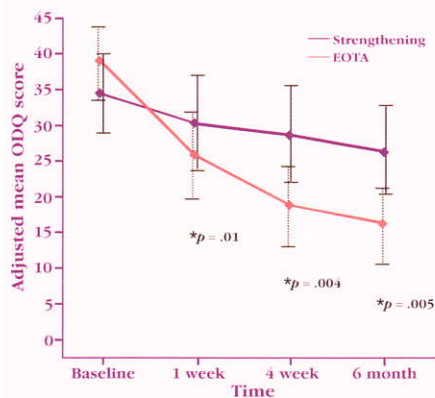


Figure 1. ODQ scores at each assessment point for the EOTA and strengthening groups. Lower scores reflect improvement. *Indicates significant difference between groups in change from baseline score.

ity scores support the hypothesis that outcomes will be improved when interventions are matched to more specific subgroups of patients. EOTA was found to be an effective treatment when given to patients whose symptoms centralized with extension movements at the initial clinical examination. Additional research investigating an EOTA approach using larger samples with longer follow-up time is indicated.

Browder DA, Childs JD, Cleland JA, Fritz JM. Effectiveness of an extension-oriented treatment approach in a subgroup of subjects with low back pain: a randomized clinical trial. Phys Ther 2007;87:1608-1618.

Ankle/Foot Appliances And Balance Control: A Systematic Review

Both older people and people with peripheral nervous system disorders, such as diabetic neuropathies, show a decline in control of balance, resulting in an increased risk for falling. Thirty percent of older people fall at least once a year, and 15% fall more than once a year. Ankle and/or foot appliances (AFA), such as therapeutic shoes, inlays and ankle foot orthoses, are frequently recommended for these individuals, yet their effect on balance remains unclear. Hijmans et al from the University of Groningen, the Netherlands, conducted a systematic review of the literature.

Of 146 papers that were initially identified, 7 papers met the predetermined qualitative criteria

for detailed review. These studies only accounted for the effects of insoles and shoes on balance. Because of the lack of strong research designs in the studies, the authors cautioned that the conclusions drawn from this review are only preliminary.

A summary of their findings include the following:

- 1** New orthopedic footwear may alter center of pressure displacement and velocity (postural sway) directly after application.
- 2** A training program to adapt to new footwear may minimize these changes.
- 3** Application of mechanical “noise” to the plantar surface of the feet, such as vibrating insoles, may improve the detection of pressure distribution under the soles. This mechanism may enable earlier reaction to changes in upright posture and better control of balance.

In the studies concerning standardized shoes, both thick (16–27 mm) and soft (Shore A15) insoles had a negative effect on static and dynamic balance performance, potentially due to the reduced foot position awareness. These types of appliances may be prescribed for patients with peripheral neuropathy associated with diabetes because of their positive effect on plantar pressure reduction or redistribution. It is important that the negative effects on balance be taken into account, as well as a consideration of the need for additional balance training in this population.

The outcome of this systematic review clearly points to the need for well-designed clinical trials of the effect of AFAs on the control of balance in older people and patients with peripheral nervous system disorders.

Hijmans JM, Geertzen JHB, Dijkstra PU, Postema K. A systematic review of the effects of shoes and other ankle or foot appliances on balance in older people and people with peripheral nervous system disorders. *Gait Posture* 2007;25:316-323.

Effects of Manual Scapular Repositioning on Shoulder Strength and Symptoms

A high percentage of athletes involved in overhead sports exhibit shoulder pain. Abnormal scapular motion has been linked to symptoms associated with shoulder pain and impingement. One approach used to identify those with scapular motion abnormalities involves the use of symptom altering or provocation tests. The premise of these tests is to assess the changes in symptom magnitude under different positions of the scapula. This information can then help to identify subgroups of patients who may benefit from interventions focused on scapular motion abnormalities.

Tate et al from Arcadia University, Pennsylvania, examined whether the Scapula Reposition Test (SRT) would reduce pain and increase shoulder elevation strength in

Table 1. Normalized torque values for isometric scapular plane elevation at 90°*

Group	Natural position	SRT
Impingement (n = 98)	0.65 ± 0.17	0.68 ± 0.19 [†]
Nonimpingement (n = 44)	0.72 ± 0.19	0.75 ± 0.19 [†]

**Data are mean ± SD; expressed in Nm per kg of body mass; †represents a statistically significant increase in torque from the natural position using a paired t test (p < .05).*

athletes with and without positive signs of shoulder impingement. A total of 142 college athletes who participated in overhead sports (mean age, 20.8 years; 111 men and 31 women) were tested. Ninety-eight of these athletes (69%) had at least 1 positive shoulder impingement test (Neer, Hawkins or Jobe). These patients (impingement group) were asked to rate their pain verbally (from 0–10) for any of the tests that were positive for symptoms.

All patients were tested in 2 different scapula positions:

- a natural (or rest) scapula position and
- the scapula manually repositioned by an examiner into greater retraction and posterior tilt.

Isometric shoulder strength was tested using a mounted dynamometer, and the mean strength value from 3 maximum isometric shoulder elevation trials was compared between the 2 scapular positions. Patients with symptoms associated with positive im-

pingement tests were also reevaluated using the verbal numeric rating scale after the SRT was applied.

Scapular repositioning was associated with a significant increase in strength in both the impingement ($p = .001$) and nonimpingement groups ($p = .012$; Table 1). When reported in the context of a clinically relevant change, these strength changes took place in 26% of athletes with, and 29% of athletes without, positive signs of shoulder impingement (Table 2). A very low pain threshold was reported by the patients with symptoms of impingement, and approximately half of these patients reported pain reduction with the SRT. However, the increase in strength was not linked to a decrease in pain.

The findings of this study show that strength gains with scapular repositioning were not exclusive to those with symptoms of impingement, and approximately 25–30% of all patients showed clinically relevant changes in torque with SRT. The SRT is a simple clinical test that may help

Table 2. Number (%) of patients with significant change in strength following SRT

Group	Weaker*	No change	Stronger*
Impingement group (n = 98)	7 (7%)	66 (67%)	25 (26%)
Nonimpingement group (n = 44)	2 (5%)	29 (66%)	13 (29%)

**A significant change in strength was based on the minimal detectable change calculated using 90% confidence limits.*



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to identify a subgroup of patients with shoulder impingement whose symptoms may improve with interventions addressing scapular muscular function. Additional research is warranted in patient populations.

Tate AR, McClure P, Kareba S, Irwin D. Effect of the Scapula Reposition Test on shoulder impingement symptoms and elevation strength in overhead athletes. J Orthop Sports Phys Ther 2008;38:4-11.

A Classification Algorithm for Nonoperative Management Following ACL Injury

The majority of active persons who wish to return to high-level activities following an anterior cruciate ligament (ACL) injury will receive surgical stabilization. Recent evidence suggests that there is a differential patient response to ACL injury, and some people are able to regularly participate in high-level activities after injury without complaints of instability. The term “copers” has been used to designate those individuals who are able to resume all preinjury activities without experiencing further episodes of the knee giving way. In contrast, “noncopers” experience knee instability upon resumption of preinjury activities. Although the percentage of copers is small, they may represent a subgroup of patients who may be able to return to premorbid function without surgery. There are also those patients who

want to resume activities for the short-term before undergoing ACL reconstruction. But what factors can effectively discriminate between those who may and may not succeed with nonoperative care?

Hurd et al from the University of Delaware prospectively screened an entire population of patients with an acute ACL injury seen by a single orthopedic surgeon over a 10-year period and described the short-term (6 month) outcomes of those patients who elected nonoperative intervention. A total of 832 highly active patients with ACL tears were seen over a 10-year period. Patients were excluded from the screening algorithm if they had concomitant injuries, unresolved impairments (effusion/weakness, etc.) or were unable to attend and/or refused to participate.

A subgroup of 345 patients (mean age, 27 years) met the inclusion criteria and participated in the screening examination (mean, 6 weeks) after ACL injury. The screening examination consisted of unilateral hop testing, evaluation of self-assessed knee function using the Knee Outcome Survey–Activities of Daily Living Scale, and recording the number of giving-way episodes since injury. Patients also rated their current functional status compared to their preinjury status using a global rating scale. Based on the screening examination, 146 patients were classified as potential copers. Potential copers were counseled that, as rehabilitation candidates, they had the option to

pursue nonoperative management through a structured rehabilitation program.

Sixty percent (88/146) of potential copers opted to return to their high-level sports activities without surgery. Of these individuals, 72% (63/88) successfully returned to high-level activities and did not sustain additional chondral or meniscal injuries. Thirty-six of the potential copers ultimately elected to have ACL reconstruction, and 25 did not have surgery.

The clinical decision-making algorithm used in this study identified a select number of patients who were successful with short-term nonoperative management, without experiencing further knee instability or extending the original injury. This tool may be effective for prospectively identifying individuals who want to pursue nonoperative care or who must delay surgical intervention following ACL injury.

Hurd WJ, Axe MJ, Snyder-Mackler L. A 10-year prospective trial of a patient management algorithm and screening examination for highly active individuals with anterior cruciate ligament injury: part 1, outcomes. Am J Sports Med 2008;36:40-47.

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High- vs low-resistance training for knee osteoarthritis

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