

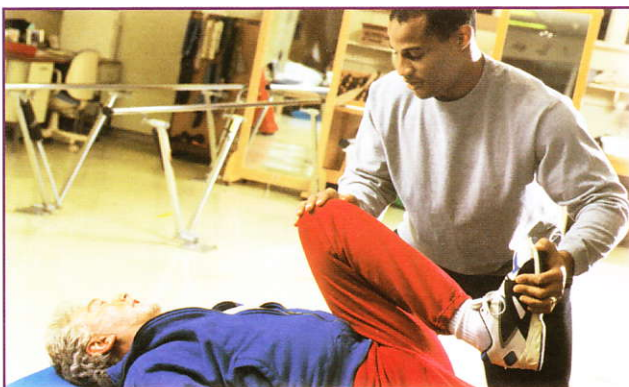
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Update on
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Classification of Nontraumatic Neck Pain: An Indicator of PT Treatment Dose

Neck pain, with an estimated lifetime prevalence of up to 70%, is one of the most costly health problems in the United States and has been reported as being the most common complaint among working-age women visiting their physicians. In many patients, the anatomical source of the symptoms is difficult to establish, thus leading to the diagnostic classification of cervical spinal pain of unknown origin (CPUO). Patients with CPUO vary considerably with respect to pain as well as the physical and psychological effects of the disorder.

Clair et al from Osborne Park Hospital, Australia, conducted a prospective cohort study to determine whether physical ther-

apy (PT) responses to treatment and treatment doses would be different for patients classified according to their primary impairment. Ninety-two patients (31 males, 61 females), with a mean age of 58.8 years and median symptom duration of 24 months were recruited. Patients reported nonacute pain in a distribution that included the neck as well as the occiput and/or upper thoracic region. Patients with pain resulting from vehicle trauma were excluded.

Patients were classified as having either a loading disorder or a movement disorder based on the predominant pain-aggravating activity. Details of the classification criteria are found in Table 1.

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Update on **PHYSICAL THERAPY**

PT treatments consisted of combinations of electrotherapy, spinal mobilization, soft-tissue massage, muscle stretches, and mobility and strengthening exercises according to clinical practice guidelines. Patients were also given advice relating to pain management, neck care and home-based exercises. Patients were discharged from treatment at a time mutually agreed upon by the therapist and patient based on whether the disorder had improved to the point that treatment was no longer required or no further improvement was likely.

Outcome measures were completed prior to treatment and upon completion of the final treatment session, and included a pain intensity visual analogue scale (VAS), the Neck Pain and Disability scale, and a pain limited activity scale. Of the 77 patients who completed the study, 82% ($n = 63$) were classified as having a “movement disorder” while the remaining patients ($n = 14$) were classified into a “loading disorder” group. Groups were similar at baseline with respect to pain intensity and global disability. At the completion of the treatments, both groups responded favorably and were similar in the magnitude of improvement in neck pain and disability. However, the number of treatment sessions received by the loading

group to achieve a significant response (7.3 ± 4.6) was significantly fewer than the number received by the movement group (11.5 ± 5.9 ; 95% confidence interval [CI], -7.6 to -0.8 ; $p < .01$).

This study demonstrated how a relatively uncomplicated method of classification of patients with nonacute, nontraumatic neck pain may be a useful indicator of the treatment dose required to achieve a significant reduction in neck pain and disability. Patients who were classified as having no movement impairment or restriction required 35% fewer treatment sessions and less total duration of treatments than patients with movement impairment.

Clair DA, Edmondston SJ, Allison GT. Physical therapy treatment dose for nontraumatic neck pain: a comparison between 2 patient groups. J Orthop Sports Phys Ther 2006;36:867-875.

Exercises Effective For Shoulder Pain in Wheelchair Users

Wheelchair users are at very high risk for the development of shoulder pain. Up to 50% of persons with paraplegia will develop shoulder pain/impingement at some point in their lives, often

compromising their ability to perform routine daily activities. A recent focus of exercise programs for able-bodied persons with shoulder impingement has been directed to the scapula. In this study, Nawoczenski et al from Ithaca College, New York, assessed the effects of an 8-week, scapula-focused exercise program on pain and functional disability in persons with spinal cord injury.

Forty-one manual wheelchair users both with ($n = 21$) and without ($n = 20$) shoulder impingement symptoms participated in an 8-week clinical trial. Subjects with positive clinical impingement findings were placed in the intervention group and instructed in a home program consisting of strengthening and stretching exercises. Stretching exercises targeted the upper trapezius, pectoralis and long head of the biceps muscles, as well as to the posterior capsule of the shoulder. Strengthening exercises focused on the middle and lower trapezius, the serratus anterior and glenohumeral external rotator muscles. Biofeedback was used to verify correct muscle activation, and a resistance band was given for the strengthening exercises. Subjects without shoulder pain did not receive any intervention.

Pain, function and satisfaction were assessed at initial visit and 8-week follow-up for both groups using the Wheelchair User's Shoulder Pain Index (WUSPI) and the Shoulder Rating Questionnaire (SRQ). Ninety-five percent of subjects returned at the

Table 1. Classification criteria for inclusion into the 2 patient groups

Loading group	Movement group
Pain provoked by sustained postures	Pain provoked by movement or repeated-movement activities
No active-movement impairment	Active-movement impairment
No symptom reproduction with active-movement testing	Symptom reproduction associated with the movement impairment

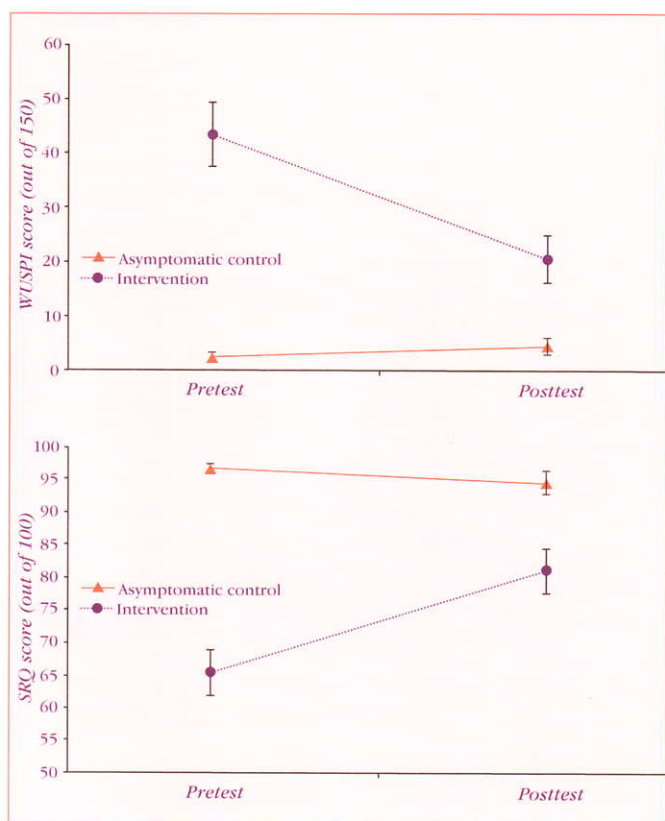


Figure 1. Top: WUSPI total scores: lower scores indicate decreased pain and increased function. **Bottom:** SRQ overall scores: higher scores indicate greater shoulder function and fewer shoulder symptoms.

8-week follow-up. Subjects in the intervention group showed significant improvement in their WUSPI and SRQ scores from pretest to posttest, whereas asymptomatic control group subjects remained stable (Figure 1). Significant improvement in satisfaction scores were also found for the intervention group. It is of interest to note that, although the intervention group had improvement, their scores were still below those of the asymptomatic control group, indicating that maximum recovery was still not achieved.

The findings of this study support the use of an intervention program that focuses on the scapula as a critical component

in rehabilitation protocols. The outcomes also point to the need for continued refinement of shoulder exercise protocols in order to prevent the long-term complications and loss of mobility associated with shoulder pain in wheelchair users.

Nawoczenski DA, Ritter-Soronon JM, Wilson CM, et al. Clinical trial of exercise for shoulder pain in chronic spinal injury. Phys Ther 2006; 86:1604-1618.

Integrated Weight-bearing Protocol for PFPS

Abnormal tracking of the patella has been cited as one of the most common etiologies of patellofemoral pain syndrome (PFPS). An imbalance of muscle activation of the vastus medialis oblique (VMO) relative to the vastus lateralis (VL) has been linked to tracking abnormalities; however, there is still no consensus regarding the neuromuscular timing of these muscles and their impact on PFPS. The role of the hip muscles in neuromuscular activation is also not

well understood. In this study, Boling et al from the University of Kentucky investigated the effects of a weight-bearing rehabilitation protocol on the onset timing of the quadriceps and gluteus medius muscles, as well as pain and function in subjects with PFPS.

Twenty-eight subjects (14 controls, 14 experimental) ages between 18 and 42 years were recruited. Inclusion criteria for the experimental PFPS group included anterior or retropatellar pain of at least 2 months duration that was aggravated by stair climbing, squats, kneeling, running and prolonged sitting. Surface electromyography (EMG) was collected from the VMO, VL and gluteus medius muscles as subjects performed a repeated stair-stepping task. This same task was repeated at the end of the study.

The PFPS group was given a progressive weight-bearing protocol that combined balance, stretching and strengthening exercises. Subjects were also given an exercise video, instruction book and compliance log. They performed the exercises 3 times per week for 6 weeks. All subjects completed a weekly visual analog scale (VAS) and Functional Index Questionnaire.

The onset of the VMO and the differences between the onset of the VMO relative to the VL were evaluated during the stair-stepping task. Gluteus medius EMG onset and duration were also assessed. When compared with the control group, the onset of the quadriceps activation was significantly different for the PFPS

group at baseline. Following the intervention, these differences were no longer apparent between groups (Figure 2). These timing changes were also accompanied by decreased pain and increased function in the PFPS group. VAS scores improved from 4.85 to 1.92 after 4 weeks of rehabilitation. It is also interesting to note that gluteus medius activation was not altered.

An integrated program incorporating balance, strengthening and stretching of both quadriceps and hip musculature proved highly favorable, in a relatively short-time period for subjects with PFPS. The changes in muscle timing of the VMO relative to the VL, as well as the findings of decreased pain and improved function, support the use of weight-bearing exercises in patients with PFPS.

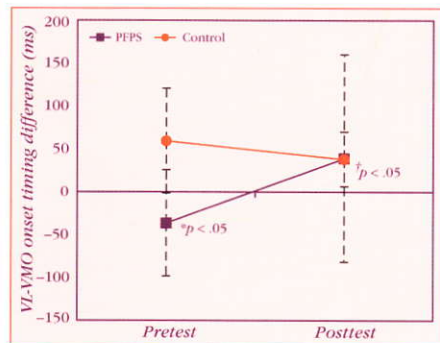


Figure 2. Significant quadriceps timing differences between VMO and VL were found at baseline between the groups. No differences between control and PFPS groups were found following intervention. *Significant difference between control group and PFPS group pretest; †significant difference between PFPS group pretest and posttest.

Boling MC, Bolgla LA, Mattacola CG, et al. Outcomes of a weight-bearing rehabilitation program for patients diagnosed with patellofemoral pain syndrome. *Arch Phys Med Rehabil* 2006;87:1428-1435.

Cryotherapy and Compression Beneficial to Tendon Microcirculation

Cryotherapy and compression are 2 basic treatments indicated for acute soft-tissue injuries. Using the principles of ice, compression and elevation, these treatments have been shown to decrease pain and improve function. Although cryotherapy and compression may be beneficial in patients with acute inflammation, the combination of these treatments may also be effective for patients with tendonopathy. Knobloch et al from Medical School Hannover, Germany, examined the effects of combined cryotherapy and compression on changes in microcirculation of the Achilles tendon.

Twenty-six subjects without acute Achilles tendon injury participated. Each subject received 3 10-minute compression applications of the Cryo/Cuff (Aircast Inc., Summit, N.J.), followed by a 10-minute recovery period. The Cryo/Cuff, which enables a constant water/ice temperature and constant compression, was applied to the midportion of the Achilles tendon region. A combined laser Doppler and flowmetry system was used to evaluate tendon microcirculation at 2- and 8-mm tissue depth. Tendon oxygen saturation, postcapillary venous filling pressures and capillary blood flow were assessed during both the compression and recovery periods of the Cryo/Cuff application.

The results of this study showed that the Cryo/Cuff decreased local Achilles tendon capillary blood flow by 90%. The authors speculated that these changes may prove beneficial for limiting bleeding at the capillary level when patients are injured. The results also showed that postcapillary venous filling pressures were favorably reduced. Increased postcapillary venous pressure indicates venous congestion with decreased clearance of local metabolites. Venous clearance is, therefore, beneficial to promoting local tissue healing. Finally, deep-tissue oxygen saturation was not impaired by cryo-compression, also considered a favorable response.

Cryotherapy with compression results in beneficial effects on the microcirculatory level of the midportion of the Achilles tendon. Decreased capillary blood flow, improved venous capillary outflow and preserved oxygen saturation at deeper-tissue depths were the favorable responses of this treatment regimen.

Knobloch K, Grasemann R, Jagodzinski M, et al. Changes of Achilles midportion tendon microcirculation after repetitive simultaneous cryotherapy and compression using a Cryo/Cuff. *Am J Sports Med* 2006;34:1953-1959.

IN THE NEXT ISSUE

Medial tibial stress syndrome in runners

Stretching for posterior shoulder tightness