A Professional Courtesy of:

Margaret Dibbini, M.S., P.T.
Director

OPTIMUM PHYSICAL THERAPY

2150 Central Park Avenue, Suite 207
Yonkers, New York 10710
914-395-3290

Practice provides Physical Therapy and Acupuncture Services

Update on PHYSICAL THERAPY™

SPRING *2009*

Manual Physical Therapy Effective For Mechanical Neck Pain

Neck pain is a common musculoskeletal disorder seen by physical therapists. Although many interventions are accepted as standards of care, there is increasing evidence to support the use of manual physical therapy and exercise (MTE) as an effective intervention for patients with neck disorders. In this prospective, multicenter, randomized trial, Walker et al from the U.S. Army–Baylor University, Texas, assessed the effectiveness of MTE vs a minimal intervention (MIN) approach for patients with mechanical neck pain.

A total of 98 patients met the inclusion criteria of neck pain, with or without unilateral upper-extremity symptoms, and minimum baseline scores for outcome measures assessing disability and pain intensity. Sixty-two percent of these patients had upper-extremity symptoms consisting of pain or paresthesias. Patients were randomized into either a MTE group or a MIN group. For the MTE group, treatments were targeted to patient-specific impairments identified during the physical examination. Interventions for each group are summarized in Table 1. Patients were seen twice weekly over 3 weeks, for up to 6 sessions.

Outcome measures for disability, pain intensity and perceived recovery were collected at baseline, 3 weeks, 6 weeks and 1 year after treatment completion. Disability was assessed using the 50-point Neck Disability Index (NDI). Cervical and upper-extremity pain were assessed using a 100-mm visual analogue

IN THIS ISSUE

Manual Physical Therapy Effective for Mechanical Neck Pain

Hip Abductor Weakness in Runners with PFPS

Resistance Training Beneficial For Older People with Hip Fractures

Stretching Parameters and MTS

Do you or your staff have any questions or comments about **Update on Physical Therapy**? *Please call or write our office. We would be happy to hear from you.*

scale (VAS). Patient-perceived improvement was measured using a 15-point global rating of change (GRC) scale. Four patients were excluded due to other diagnoses, leaving for analysis the results from 94 patients.

The MTE group demonstrated significantly greater reductions in short- and long-term NDI scores and short-term VAS scores when compared with the MIN group. The MTE group also showed significant improvement in NDI scores and upper-extremity VAS pain scores at all follow-up periods. Perceived patient improvement for the GRC score was significantly greater for the MTE group. The MIN group showed significant improvement at 3 weeks for upper-extremity VAS pain scores, but this improvement was not maintained at subsequent follow-up periods.

The findings of this study provide evidence to support the use of MTE for mechanical neck pain. The authors reported that the positive outcomes of this study may be related to interventions tailored to the individual patient's impairment. Exercises to the cervico-thoracic spine and ribs were also considered integral to the success of the intervention.

Walker MJ, Boyles RE, Young BA, et al. The effectiveness of manual physical therapy and exercise for mechanical neck pain: a randomized clinical trial. Spine *2008;33:2371-2378.*

Hip Abductor Weakness in Runners with PFPS

Patellofemoral pain syndrome (PFPS) accounts for approximately 20% of all running-related injuries. The influence of factors such as quadriceps muscle strength and quadriceps angle (Q angle) on patellofemoral pain has been the focus of many studies. More recently, emphasis has been directed to the joints both proximal and distal to the knee as potential contributors to PFPS. Weakness of the hip abductors and external rotators, as well as a low-arch foot structure, have purportedly been linked to altered hip and knee motions that may contribute to PFPS. Over the course of prolonged running, fatigue may magnify these abnormal movement patterns.

Dierks et al from Indiana University studied the relationship between hip strength and hip kinematics during a prolonged run in a group of runners with PFPS and a group of uninjured runners. The investigators also assessed the relationship between arch height and frontal plane (knee adduction) motion during running. Twenty recreational runners with PFPS were gender-matched (5 men, 15 women) to a group of 20 uninjured runners. Prior to and immediately following a prolonged run, isometric muscle strength was assessed for the hip abductors and external rotators. The arch height index was also measured in the standing position. Reflective markers were placed on the pelvis and lower limb, and kinematic data were collected as patients ran at a self-selected pace on the treadmill. The same footwear was used for all patients. The prolonged run ended when 1 of the following events was achieved:

1 85% of the patient's maximum heart rate;

2 a score of 17 (very hard) on the perceived exertion scale; or

3 a score of 7 (out of 10) on a visual analogue pain scale for patients in the PFPS group.

Runners with PFPS stopped their run 10 minutes before the uninjured group. When comparing the groups for hip strength over time, both groups showed a significant decrease ($p < .001$) in

Table 1. ***Intervention examples***

MTE group	MIN group
Manual physical therapy • Interventions targeted to specific impairments • 1–3 manual interventions (thrust/nonthrust joint mobilization, muscle energy, stretching techniques) **Standard home exercise program** • Cervical retraction, deep neck flexor strengthening, cervical range of motion (ROM) exercises	**Basic treatment plan** • Postural exercises, encouragement to maintain neck motion and daily activities, cervical ROM exercises • Instructions for prescription medication use **Subtherapeutic pulsed ultrasound**

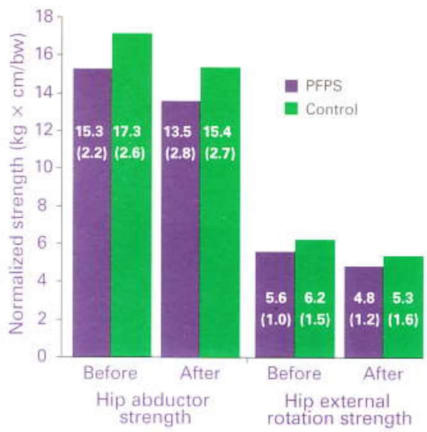

Figure 1. Mean hip strength values (SD) measured before and after a prolonged run and normalized to body weight (kg × cm/body mass) for participants with PFPS and uninjured control.

hip abductor and external rotation strength at the end of the run. However, as a group, the PFPS runners tested weaker for hip abductor strength ($p = .045$) when compared with the uninjured group (Figure 1). This weakness in hip abduction was associated with greater hip adduction angles that became more evident at the end of the run ($r = -0.74$).

The influence of foot structure, measured using the arch height index, did not show any difference between the groups. The results of foot type influence on PFPS need to be interpreted with caution, because the authors noted that the majority of patients in this study (39/40) had normal arch structures. Further exploration of the influence of low-arch foot structure on knee kinematics in patients with PFPS is warranted. These findings underscore the importance of addressing hip strength in runners with PFPS.

Dierks TA, Manal KT, Hamill J, Davis IS. Proximal and distal influences on hip and knee kinematics in runners with patellofemoral pain during a prolonged run. J Orthop Sports Phys Ther *2008;38: 448-456.*

Resistance Training Beneficial for Older People with Hip Fractures

Hip fractures are common in older people and, unfortunately, are associated with high morbidity and mortality. Fewer than half of the patients who survive ≥6 months will achieve prefracture physical function. Loss of muscle strength, muscle power, and asymmetrical deficits may impair balance and mobility. In this study, Portegijs et al from the University of Jyväskylä, Finland, studied the feasibility and effects of progressive strength-power training on muscle strength parameters, leg symmetry, mobility and balance in community-dwelling adults who sustained hip fractures.

Forty-six participants between the ages of 60 and 85 years (mean age, 73.9 years), with a femoral neck or trochanteric fracture within 6 months to 7 years prior to baseline assessment, were randomized into a training group or control group. The following variables were assessed pre- and postintervention:

- isometric knee extension torque (KET);
- leg extension power (LEP);
- leg asymmetry;
- a timed 10-meter walk;
- dynamic balance; and
- self-reported mobility function.

The training group, comprised of 8 men and 16 women, participated in a 12-week, individually adapted training program in a senior gym. The training sessions were supervised by a physical therapist and held 2×/week. Each training session included strength and power exercises, and the weaker leg was trained more intensively with the goal of reducing the strength and power deficits between the legs. In 83% of the patients, the fractured leg was the weaker leg. The control group consisted of 6 men and 16 women who did not receive any intervention.

At baseline, there were no differences between groups for the variables tested. After intervention, KET increased significantly in both weaker and stronger legs, but the asymmetry did not change. Following training, there was significant reduction in the asymmetry deficit for LEP compared with the control group ($p = .010$). The LEP increased in the weaker leg but did not change in the stronger leg. Walking speed and balance performance were not affected by training. Ten of the participants in the training group reported improvement in outdoor mobility. Training compliance was >90%, and only 4 adverse effects were reported.

The findings of this study show an intensive resistance-training program to be feasible for improving muscle strength and power in people with a hip fracture. Although the weaker leg showed significant improvement, asymmetrical muscle strength deficits persisted. The authors suggested that more intensive and specific training may need to be directed to the weaker leg to reduce this deficit.

Portegijs E, Kallinen M, Rantanen T, et al. Effects of resistance training on lower-extremity impairments in older people with hip fracture. Arch Phys Med Rehabil *2008;89:1667-1674.*

Stretching Parameters and MTS

Controversy still exists as to the benefits of stretching prior to exercise or athletic competition. Stretching prior to activities is believed to reduce the risk of musculotendinous strain injuries by decreasing the musculotendinous stiffness (MTS). However, the dose-response relationship between stretching and MTS response is not well understood. Shorter durations of stretching may not be adequate to decrease MTS response. Additionally, the time course for the stretching-induced decreases in MTS also needs to be determined.

The purpose of this study by Ryan et al from the University of Oklahoma was to determine the effect of practical stretching durations (2–8 minutes) on a time course (≤30 minutes post-stretching) of MTS. Twelve participants (mean age, 23 years) were evaluated for 4 different stretching conditions: a) control condition; b) passive stretch (PS) for 2 minutes; c) PS for 4 minutes; and d) PS for 8 minutes. The trials were randomly ordered. The control trial involved 15 minutes without stretching; the passive stretching trials involved progressive repetitions of 30-second PSs of the plantar flexor muscles until the desired time was reached. An isokinetic device was used to provide PS, as well as to acquire ankle position and torque values. The position and torque output were used to derive passive angle-torque curves and subsequent MTS.

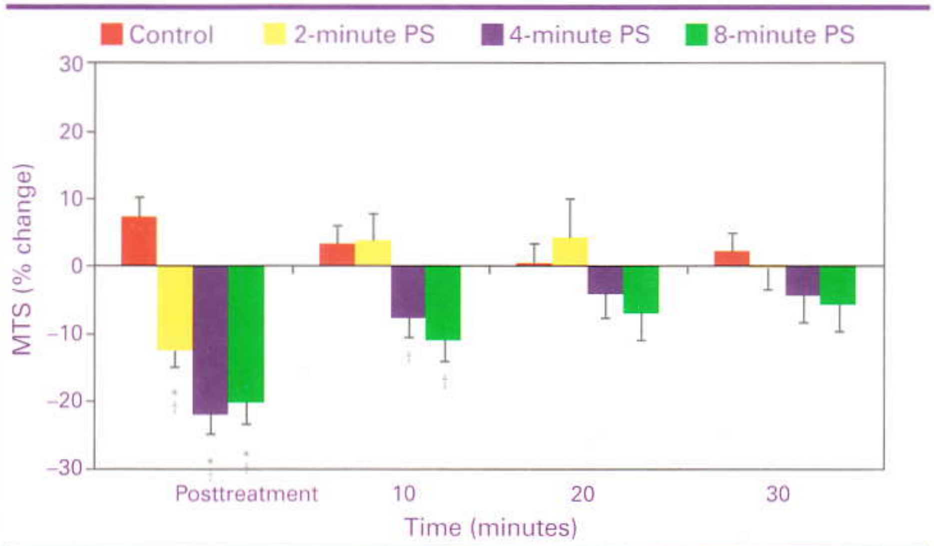

Figure 2. Percent change in MTS from pretreatment values for control, 2-, 4- and 8-minute PS conditions. *Significant decrease ($p < .05$) in MTS from pre- to posttreatment; †significant difference from control.

The results of this study showed that plantar flexor MTS decreased immediately following the 2-, 4- and 8-minute PSs. For the 2-minute stretch, MTS returned to baseline within 10 minutes after stretching. For the 4- and 8-minute stretch, the MTS was decreased for >20 minutes (Figure 2).

If a decrease in MTS can be helpful in the prevention of musculotendinous strain injuries, then the findings of this study suggest that practical durations of passive stretching (2–8 minutes) should be carried out 10–20 minutes prior to the activity. Longer durations of stretching resulted in longer periods of reduced stiffness.

Ryan ED, Beck TW, Herda TJ, et al. The time course of musculotendinous stiffness responses following different durations of passive stretching. J Orthop Sports Phys Ther *2008;38:632-639.*

IN THE NEXT ISSUE

Balance training and ankle instability

Key scapular exercises for shoulder rehabilitation