SportsMed Update Volume 8 (6) 2: 2008

Contents:

- 1. In patients suffering from osteoarthritis of the knee, both an 18-week water-based and a land-based exercise program improved knee pain and knee function however, the water-based program resulted in greater relief of pain before and after walking at the 18 week follow-up
- 2. Self reported higher levels of pre-injury physical activity were associated with earlier recovery from whiplash injury of the neck
- 3. In a laboratory study in human subjects, iontophoresis facilitated the transmission of dexamethasone into connective tissues in humans this may provide an alternative method of delivering corticosteroid to tendon tissue
- 4. In a study among adolescent girls (grade 6), there was no relationship between depressive symptoms and physical activity
- 5. In an animal study exercise training, at an increased frequency per week, improves endothelial function (acetylcholine induced vasorelaxation)

Produced and distributed by MPAH Medical cc, Copyright 2008

In patients suffering from osteoarthritis of the knee, both an 18-week waterbased and a land-based exercise program improved knee pain and knee function - however, the water-based program resulted in greater relief of pain before and after walking at the 18 week follow-up

Title: Hydrotherapy versus conventional land-based exercise for the management of patients with osteoarthritis of the knee: A randomized clinical trial

Authors: Silva LE, Valim V, Pessanha APC, Oliveira LM, Myamoto S, Jones A, Natour J

Reference: Physical Therapy 2008; 88: 12-21

Type of study: Randomized controlled clinical trail

Keywords: knee, injury, osteoarthritis, treatment, hydrotherapy, rehabilitation

EB Rating: 7.5/10

CI Rating: 7/10

Background: It has been shown that regular exercise can improve the symptoms of osteoarthritis of the knee – however land- vs. water-based exercise programs have not been compared **Research question/s:** Is water-based (hydrotherapy) exercise more effective than land-based exercise in reducing

pain and improving function in patients with osteoarthritis (OA) of the knee?

Methodology:

- Subjects: 64 patients with OA of the knee (clinical and radiological diagnosis)
- Experimental procedure: All the subjects were assessed and then randomly assigned to either an 18 weeks water-based (WB=) or a land-based (LB=) exercise intervention. All the subjects were assessed at baseline and repeat measurements were done at 9 and 18 weeks after initiating the intervention. Pain [visual analog (VAS) for pain in the previous week and pain during gait], function [Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC scale, pain, function, stiffness; 0-96)], walking time and the Lequesne Index (LI=pain, function; 0-24)
- Measures of outcome: Primary (pain in previous week on VAS), pain after 50ft walk test, WOMAC score, LI score, walking time

Main finding/s:

• There were significant improvements in pain (last week), WOMAC, LI, and pain (before and after the 50ft walk) in both groups over the treatment period (time effect)



Conclusion/s:

In patients suffering from osteoarthritis of the knee, both an 18-week water-based and a land-based exercise
program improved knee pain and knee function - however, the water-based program resulted in greater relief
of pain before and after walking at the 18 week follow-up

Methodological considerations:

Well conducted study, no control group of no exercise, possible observer bias

Produced and distributed by MPAH Medical cc, Copyright 2008

Self reported higher levels of pre-injury physical activity were associated with earlier recovery from whiplash injury of the neck

Title: The effect of pre-injury physical fitness on the initial severity and recovery from whiplash injury, at six-month follow-up

Authors: Geldman M, Moore A, Cheek L

Reference: Clinical Rehabilitation 2008; 22: 364-376

Type of study: Cross sectional study (retrospective and prospective data)

Keywords: neck, injury, whiplash, physical fitness, recovery

EB Rating: 6/10

CI Rating: 7/10

Background: Whiplash is a common injury. Physical fitness which has been shown to reduce severity and improve recovery in other musculoskeletal injuries may influence the outcome of this injury. **Research question/s:** Does pre-injury physical fitness improve the recovery of motor vehicle-induced neck injury

(whiplash injury)?

Methodology:

- Subjects: 102 patients with neck pain following whiplash injury
- Experimental procedure: All the subjects completed an initial questionnaire (details of the injury, the Problem Percentage Questionnaire and a 0-8 scale Physical Activity Questionnaire) and most (> 80%) completed a 3and 6-month follow-up questionnaire (Problem Percentage, Neck Disability Index). Based on the Physical Activity Questionnaire results, subjects were divided into three physical fitness groups (low=17, medium=50 and high=35). Recovery was compared between the three groups (baseline, 3 and 6 months)
- Measures of outcome: Functional recovery (%), Neck Disability Index score, Problem percentage, return to work rate

Main finding/s:



• There was a significantly better recovery in the medium and high fitness groups compared with the low fitness group (functional recovery %, Neck Disability Index score, and return to work rate)

Conclusion/s:

• Self reported higher levels of pre-injury physical activity were associated with earlier recovery from whiplash injury of the neck

Methodological considerations:

Descriptive study with cross-sectional data, self reported data

Produced and distributed by MPAH Medical cc, Copyright 2008

In a laboratory study in human subjects, iontophoresis facilitated the transmission of dexamethasone into connective tissues in humans – this may provide an alternative method of delivering corticosteroid to tendon tissue

Title: Absorption of dexamethasone sodium phosphate in human connective tissue using lontophoresis Authors: Gurney AB, Wascher DC

Reference: Am J Sports Med 2008; 36(4): 753-759

Type of study: Controlled laboratory study

Keywords: iontophoresis, dexamethasone, administration, human, connective tissue, tendon, inflammation

EB Rating: 7/10

CI Rating: 7/10

Background: lontophoresis is a technique used to facilitate the delivery of medications through the skin to underlying tissues using a direct electrical current

Research question/s: Does iontophoresis facilitate the absorption of dexamethasone into connective tissue compared with diffusion?

Methodology:

- Subjects: 29 adults undergoing anterior cruciate ligament (ACL) reconstructive surgery semitendinosus/gracilis autograft
- Experimental procedure: All the subjects were informed of the study, gave consent and were then randomly assigned to either a true iontophoresis (TI=16, 40-mA/min dose of iontophoresis using 0.4% dexamethasone solution) or sham iontophoresis (CON=13) group before undergoing ACL reconstruction using the semitendinosis hamstring tendon. Treatment time and skin thickness was similar between groups. Tendon tissue was extracted within 4 hours of treatment and analyzed for dexamethasone concentration in the tissue and compared with control samples
- Measures of outcome: Dexamethasone concentrations in the tendon tissue (ng/g)

Main finding/s:



• There were responders (n=8) and non-responders (n=8) to the administration of the dexamethasone by iontophoresis – reasons for this were not clear

Conclusion/s:

 In a laboratory study in human subjects, iontophoresis facilitated the transmission of dexamethasone into connective tissues in humans – this may provide an alternative method of delivering corticosteroid to tendon tissue

Methodological considerations:

Well conducted study, a single dose was studied, wider clinical application needs further investigation

Produced and distributed by MPAH Medical cc, Copyright 2008

In a study among adolescent girls (grade 6), there was no relationship between depressive symptoms and physical activity

Title: Depressive symptoms and physical activity in adolescent girls Authors: Johnson CC, Murray DM, Elder JP, Jobe JB, Dunn AL, Kubik M, Voorhees C, Schachter Reference: Med Sci Sports Exerc 2008; 40(5): 818-826 Type of study: Cross sectional study Keywords: adolescents, female, depression, physical activity, sedentary behavior

EB Rating: 7/10

CI Rating: 7/10

Background: Participation by adults in regular physical activity has been associated with positive effects of psychological parameters including depression – however, data are lacking in children **Research question/s:** Is there a relationship between depressive symptoms and physical activity in adolescent girls?

Methodology:

- Subjects: 1821 adolescent female (mean age 12 yrs, Grade 6, from 36 schools at 6 different locations)
- Experimental procedure: Baseline measurements were done in this random sample of subjects who formed
 part of a study (Trial of Activity for Adolescent Girls TAAG study). The following measures were done:
 accelerometry, 3-day Physical Activity Recall (3DPAR) for physical activity, Center for Epidemiological StudiesDepression scale (CES-D) for depressive symptoms
- Measures of outcome: CES-D score, sedentary activity (min/day), moderate-to vigorous physical activity (MVPA) (min/day), vigorous physical activity (VPA) (min/day) (18 hr day)

Main finding/s:

• In the sample the CES-D score (mean+SD) was 14.7+9.25



There was no relationship between depressive symptoms and physical activity – there was a significant but
modest inverse relationship between sedentary activity and depressive symptoms (mixed-model regression)

Conclusion/s:

 In a study among adolescent girls (grade 6), there was no relationship between depressive symptoms and physical activity

Methodological considerations:

Well conducted study, cross sectional nature limits interpretation of cause-effect

Produced and distributed by MPAH Medical cc, Copyright 2008

In an animal study exercise training, at an increased frequency per week, improves endothelial function (acetylcholine induced vasorelaxation)

Title: Effect of training frequency on endothelium dependent vasorelaxation in rats Authors: Heylen E, Guerrero F, Mansourati J, Theron M, Thioub S, Saiag B Reference: Eur J Cardiovasc Prev Rehabil 2008; 15: 52-58 Type of study: Randomized controlled study (laboratory – animal model) Keywords: aorta, endothelium-dependent vasodilation, exercise, frequency of training, rat

EB Rating: 8/10

CI Rating: 7/10

Background: Moderate physical activity enhances endothelium-dependent vasorelaxation. Whether the frequency of exercise affects endothelial function is unclear

Research question/s: Does frequency of exercise training affect endothelium-dependent vasorelaxation in an animal study?

Methodology:

- Subjects: 35 Male Wistar rats
- Experimental procedure: Endothelial function was compared in a group of control rats (CON) to rats that were
 randomly assigned to a sedentary group (SED=7), or treadmill exercise training (60 min/day) at frequencies of
 1 day/week (EX1=8), 3 days/week (EX3=7) or 5 days/ week (EX5=7) for 8 weeks. Following the interventions
 rats were sacrificed and rings of thoracic aorta were pre-contracted with phenylephrine followed by vasodilation
 using sodium nitroprusside and acetylcholine [ACh also in the presence of inhibitors of endothelial nitric oxide
 synthase (L-arginine methyl ester: L-NAME), cyclo-oxygenase (indomethacin), and EDHF
 (tetraethylammonium)]
- Measures of outcome: Endothelial vasodilatory response (ACh pD₂ values: -logEC₅₀, EC₅₀ being the concentration of ACh that elicited 50% of the maximal response)

Main finding/s:

• Endothelium-independent relaxation elicited by sodium nitroprusside was similar in all groups



L-NAME) reduced the relaxation elicited by 10⁻⁷ mol/I Ach or higher in CON and all EX groups, and by 10⁻⁶ mol/I ACh or higher in SED group, while Indomethacin inhibited the vasodilating response to 10⁻⁷ mol/I ACh or higher in the CON, SED and EX1 groups, and to 10⁻⁸ mol/I or more in EX3 and EX5 groups. TEA reduced the response to 10⁻⁶ mol/I ACh or higher in the CON and SED groups and to 10⁻⁷ mol/I or more in the EX groups

Conclusion/s:

 In an animal study exercise training, at an increased frequency per week, improves endothelial function (acetylcholine induced vasorelaxation)

Methodological considerations:

Well conducted study

Produced and distributed by MPAH Medical cc, Copyright 2008