SportsMed Update

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Contents:

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There is a correlation between vastus medialis obliquus cross-sectional area and patellar tilt angle in patients with patellofemoral pain syndrome – in particular in those with extreme patellar tilt and lateral shift malalignment

Title: Role of the vastus medialis obliquus in repositioning the patella
Authors: Lin Y-F, Lin J-J, Jan M-H, Wei T-C, Shih H-Y, Cheng C-K
Reference: Am J Sports Med 2008; 36(4): 741-746
Type of study: Cross-sectional study
Keywords: knee injury, patella, patellofemoral pain syndrome, anterior knee pain, patellar malalignment, vastus medialis obliquus (VMO)

EB Rating: 7.5/10 **CI Rating: 7/10**

Background: There is considerable interest in the possible role that the vastus medialis obliquus muscle plays in patellar malalignment, which is assumed to be associated with the patellofemoral pain syndrome
Research question/s: Is there a relationship between the morphologic characteristics of the vastus medialis obliquus and patellar malalignment in patients with patellofemoral pain syndrome?

Methodology:
- Subjects: 112 patients (136 knees) with patellofemoral pain syndrome (female=89) (36.1±10.4 yrs)
- Experimental procedure: Each subject underwent 6 sets of computed tomography axial images [Knee flexion at 0^{o}, 15^{o}, or 30^{o} with the quadriceps muscle either relaxed (R) or contracted isometrically (C). Measurements of serial cross-sectional areas of the vastus medialis obliquus (5 slices) and patellar malalignment (lateral shift and patellar tilt) were made in each of the 6 positions. Patellofemoral malalignment type in the patients was grouped (according to the tilt and shift) as follows: patellar tilt (T=12; tilt angle > 27.6 deg), patellar subluxation (S=17; shift>55.3%), patellar tilt and shift(T+S=6), no patellar tilt and shift (N=103)
- Measures of outcome: Correlation and stepwise regression models between the vastus medialis obliquus variables and patellar malalignment (tilt, shift) were calculated

Main finding/s:

Table: Correlation between VMO cross sectional area variables and patellar tilt and shift in sub-groups of patients with PFPS

		0 deg knee flexion	15 deg knee flexion	30 deg knee flexion
All knees (n=138)	Patellar tilt angle	No correlation	No correlation	**Significant correlation**
	Lateral patellar shift	No correlation	No correlation	No correlation
T+S sub-group (n=6)	Patellar tilt angle	**Significant correlation**	**Significant correlation**	No correlation
	Lateral patellar shift	No correlation	No correlation	No correlation
T sub-group (n=12)	Patellar tilt angle	No correlation	No correlation	**Significant correlation**
	Lateral patellar shift	No correlation	No correlation	No correlation
S sub-group (n=17)	Patellar tilt angle	No correlation	No correlation	No correlation
	Lateral patellar shift	No correlation	No correlation	No correlation
N sub-group (n=103)	Patellar tilt angle	No correlation	No correlation	**Significant correlation**
	Lateral patellar shift	No correlation	No correlation	No correlation

Conclusion/s:
- There is a correlation between vastus medialis obliquus cross-sectional area and patellar tilt angle in patients with patellofemoral pain syndrome – in particular in those with extreme patellar tilt and lateral shift malalignment

Methodological considerations:
Well conducted study, cross-sectional study can not confirm a cause-effect relationship, subjective muscle contraction, non-weight bearing model

In a prospective cohort study, 18.2 % of marathon runners report sustaining an injury during a marathon – the annual prevalence of injuries was 54.8% and knee, foot and calf injuries were the most common areas of injury

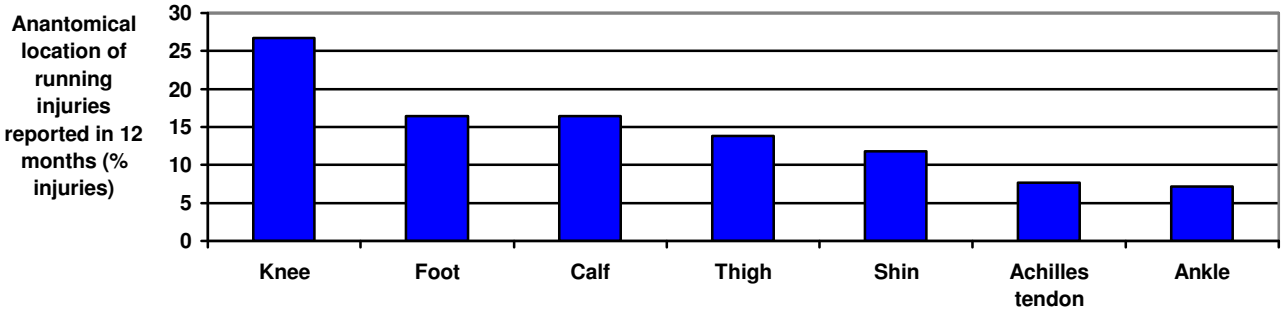
Title: Prevalence and incidence of lower extremity injuries in male marathon runners
Authors: Van Middelkoop M, Kolkman J, Van Ochten J, Bierma-Zeinstra SMA, Koes B
Reference: Scand J Med Sci Sports 2008; 18: 140-144
Type of study: Prospective cohort study with retrospective component
Keywords: running, injury, epidemiology, marathon

EB Rating: 7/10 **CI Rating: 6.5/10**

Background: There are few studies that have examined the epidemiology of running injuries in marathon runners prospectively
Research question/s: What is the prevalence and incidence of lower extremity injuries occurring before and during a marathon, and what is the impact of the injuries?

Methodology:
- Subjects: 1500 male recreational runners participating in a marathon
- Experimental procedure: 725 (48.3% response rate) runners replied to a baseline questionnaire where demographic data and information on previous injuries were obtained. A second post-race questionnaire was completed by 694 runners (95.7% of those completing the baseline) with information on injuries sustained shortly before or during the marathon.
- Measures of outcome: Annual prevalence of running injuries (%), incidence (%) of injury 1 month before and during the marathon, anatomical location of injuries, pain intensity of injuries (scale 0-9)

Main finding/s:
- Prevalence and incidence of running injuries: Annual prevalence (54.8%), I month incidence before a marathon (15.6%), incidence during a marathon (18.2%)
- Pain intensity: Immediately following the marathon pain intensity at rest was 2 points and 4.5 points during physical exercise



Conclusion/s:
- In a prospective cohort study, 18.2 % of marathon runners report sustaining an injury during a marathon – the annual prevalence of injuries was 54.8% and knee, foot and calf injuries were the most common areas of injury

Methodological considerations:
Self reported data, self diagnosis of injury

SMU Volume 8 (6) 4 p3: 2008 **Category: Injury / Knee / Osteoarthritis**

An 8-week daily quadriceps exercise program reduced pain and improved function similar to that of NSAID medication in patients with osteoarthritis of the knee

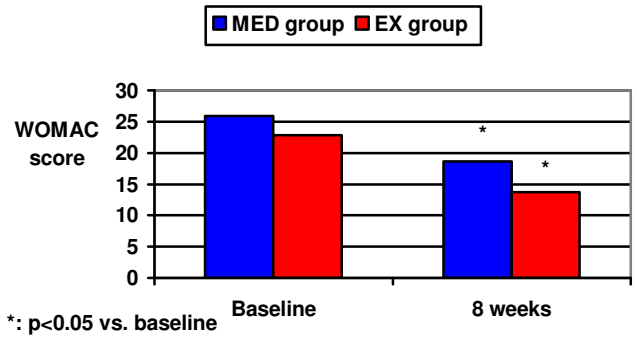
Title: Effect of home exercise of quadriceps on knee osteoarthritis compared with nonsteroidal anti-inflammatory drugs
Authors: Doi T,Akai M, Fujino K, Iwaya T, Kurosawa H, Hayashi K, Marui E
Reference: Am J Phys Med Rehabil 2008; 87(4): 258-269
Type of study: Randomized controlled clinical trial
Keywords: knee injury, osteoarthritis, NSAID's, exercise, resistance exercise, pain, function

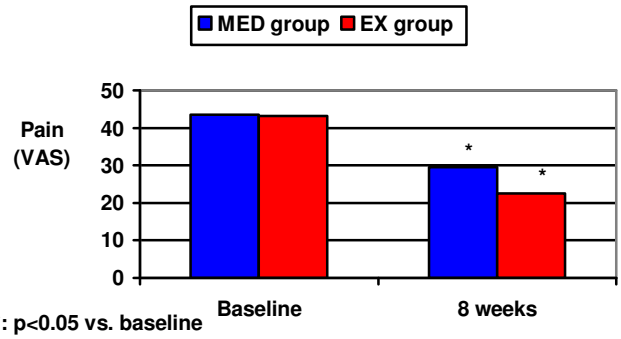
EB Rating: 7/10 **CI Rating: 7/10**

Background: Exercise training has been shown to have benefits for patients suffering from osteoarthritis of the knee
Research question/s: Does an 8-week home-based exercise program reduce pain and improve function in patients with osteoarthritis of the knee compared to non-steroidal anti-inflammatory drugs (NSAIDs)?

Methodology:
- Subjects: 142 patients (with osteoarthritis of the knee (clinical and radiological diagnosis – Am Rheum Assoc)
- Experimental procedure: All the subjects we reassessed and then randomly assigned to either a NSAID group (MED=58, one of three drugs were used daily – loxoprofen, diclofenac, or zaltoprofen) or a home-based exercise program (EX group=63, daily quadriceps exercise - 4 sets of 20) for 8 weeks. Outcomes were evaluated at baseline and after 8 weeks using a set of psychometric measurements including: Western Ontario and McMaster Universities Arthritis Index (WOMAC), 36-Item Short-Form Health Survey (SF-36), Japanese Knee Osteoarthritis Measure (JKOM), and pain with the visual analog scale (VAS)
- Measures of outcome: WOMAC score, SF-36 score, JKOM score, Pain (VAS)

Main finding/s:





- There was a significant improvement in all outcome measures in both groups over the 8 weeks, with no significant differences between groups (the mean rank JKOM score was slightly better in the EX compared with the MED group

Conclusion/s:
- An 8-week daily quadriceps exercise program reduced pain and improved function similar to that of NSAID medication in patients with osteoarthritis of the knee

Methodological considerations:
Short term follow-up, non-blinded study

In an animal study, endurance exercise training prior to starting treatment with the chemotherapeutic drug doxorubicin (DOX) resulted in protection against acute DOX induced cardiotoxicity for up to 10 days - this protection could potentially be explained by a preservation of myosin heavy chain (MHC) isoform distribution

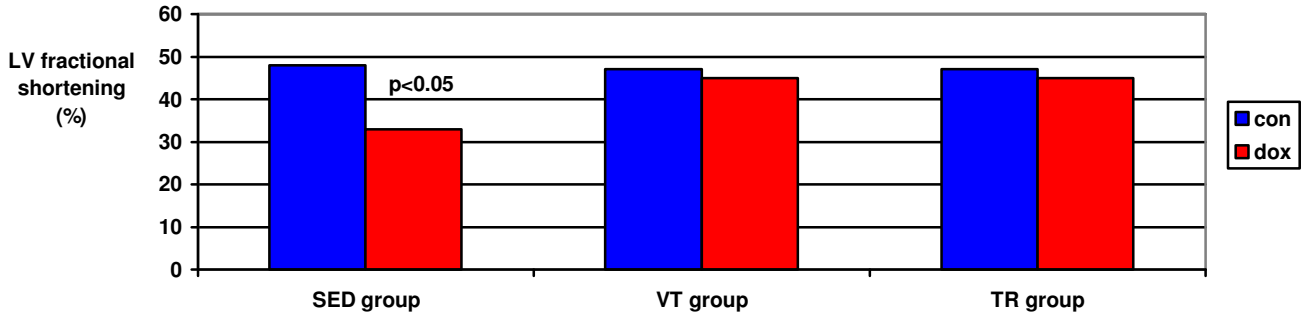
Title: Exercise preconditioning protects against doxorubicin-induced cardiac dysfunction
Authors: Hydock DS, Lien C-Y, Schneider CM, Hayward R
Reference: Med Sci Sports Exerc 2008; 40(5): 808-817
Type of study: Randomized, controlled, clinical trial (animal model)
Keywords: cardioomyopathy, exercise, anthracycline, echocardiography, animal model

EB Rating: 8/10 **CI Rating: 8/10**

Background: The chemotherapeutic drug doxorubicin (DOX) can cause a dose-dependent cardiotoxicity, but recent evidence indicated that exercise training may protect against this negative effect
Research question/s: Does exercise preconditioning reduce acute doxorubicin (DOX) induced cardiotoxicity, and was any observed cardioprotection associated with myosin heavy chain (MHC) isoform alterations?

Methodology:
- Subjects: 147 Male Sprague-Dawley rats (250-350 g)
- Experimental procedure: After acclimatization (5 days) rats were randomly assigned to three groups: Training on a motorized treadmill (TR), voluntary running on wheels (VT), or a sedentary group (SED) for 10 wk. rats were than injected with either saline (con) or 10 mg.kg-1 DOX (dox). Left ventricular function was assessed in vivo (transthoracic echocardiography) and ex vivo (isolated working heart) at 5 and 10 days after injection. Myosin heavy chain (MHC) isoform expression was also analyzed
- Measures of outcome: LV function, MHC expression

Main finding/s:
- Following treatment with DOX there was significant LV dysfunction in the SED group but not in the VT and TR groups
- The observed LV dysfunction in the SED group was associated with an upregulation of the b-MHC isoform



- Exercise preconditioning protected against DOC-induced cardiac dysfunction at 5 and 10 d after injection by attenuating b-MHC upregulation

Conclusion/s:
- In an animal study, endurance exercise training prior to starting treatment with the chemotherapeutic drug doxorubicin (DOX) resulted in protection against acute DOX induced cardiotoxicity for up to 10 days - this protection could potentially be explained by a preservation of myosin heavy chain (MHC) isoform distribution

Methodological considerations:
Well-conducted study, short-term follow-up, application to the human model requires investigation

SMU Volume 8 (6) 4 p5: 2008 **Category: Medical / Fluid balance/ Exercise**

In a prospective cohort study in ultra-marathon races (12-24 hours), the majority of weight loss (dehydration) in runners occurred in the first 8 hours of a race - increased weight loss was positively correlated to athletic performance in the 24 hour race

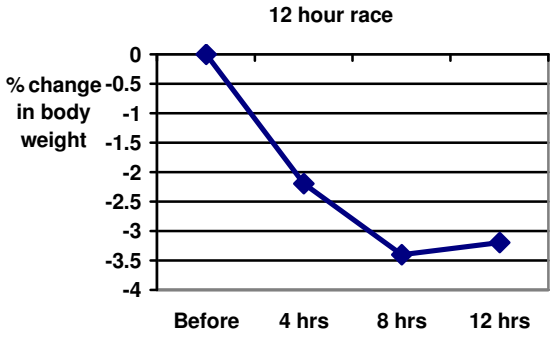
Title: Athletic performance and serial weight changes during 12- and 24-hour ultra-marathons
Authors: Kao W-F, Shyu C-L, Yang X-W, Hsu T-F, Chen J-J, Kao W-C, Polun-Chang, Huang Y-J, Kuo F-C, Huang C-I, Lee C-H
Reference: Clin J Sport Med 2008; 18: 155-158
Type of study: Prospective cohort study
Keywords: fluid, hydration, athletic performance, ultra-marathon, dehydration, body weight, endurance

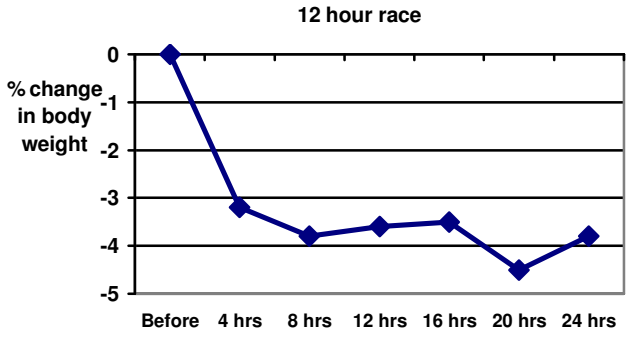
EB Rating: 7/10 **CI Rating: 7.5/10**

Background: The amount of fluid intake and loss in order to optimize athletic performance during endurance events is hotly debated
Research question/s: Does body weight changes (measured serially) in athletes during 12- and 24-hour ultra-marathons correlate to changes in athletic performance (distance covered)?

Methodology:
- Subjects: 41 athletes participating in two international ultra-marathons (18 subjects participated in a 12hr race, 23 subjects participated in a 24 hr race)
- Experimental procedure: All the subjects were assessed and body weight changes were measured before, and at 4-hour intervals during, as well as after in the 12- and a 24-hour ultra-marathon races
- Measures of outcome: % body weight changes over time, correlation between performance (km) and % body weight changes

Main finding/s:





- There was a significant decrease in body weight after both races (12-hour race, mean –2.89±1.56%, 0-6.5%; 24-hour race, mean –5.05±2.28%, –0.77–11.40%), with the greatest weight change (decrease) occurring during the first 4 hrs
- Weight change and athletic performance: There was no relation between weight change and performance in the 12-hour race, but weight loss was positively associated with performance in the 24-hour race

Conclusion/s:
- In a prospective cohort study in ultra-marathon races (12-24 hours), the majority of weight loss (dehydration) in runners occurred in the first 8 hours of a race - increased weight loss was positively correlated to athletic performance in the 24 hour race

Methodological considerations:
Well conducted study, no measures of fluid intake, sodium balance, or core temperature were performed