SportsMed Update

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Contents:

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An 18-week neuromuscular training program can increase electromyographic (EMG) activity for the medial hamstring muscles just before landing during a sidecutting manoeuvre, thereby decreasing the risk of dynamic valgus and a subsequent ACL injury

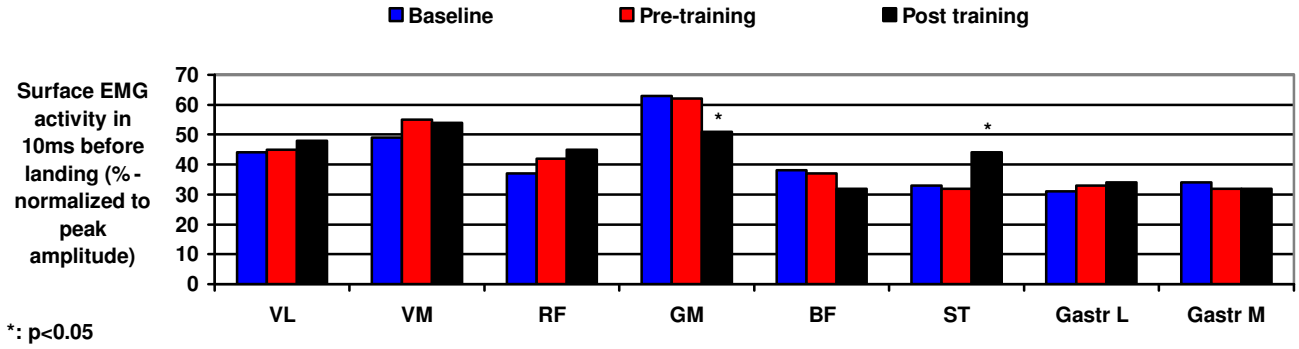
Title: The effects of neuromuscular training on knee joint motor control during sidecutting in female elite soccer and handball players
Authors: Zebis MK, Bencke J, Andersen LL, Dossing S, Alkjoer T, Magnusson P, Kjoer M, Aagaard P
Reference: Clin J Sport Med 2008; 18: 329-337
Type of study: Pre- post intervention clinical trial
Keywords: knee, injury, ACL, neuromuscular training, muscle activation, biomechanics

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

Background: The risk of anterior cruciate ligament injuries has been linked to abnormal biomechanics during movements such as landing and sidecutting. Neuromuscular training may alter abnormal neuromuscular patterns.
Research question/s: Does neuromuscular training during a season alter neuromuscular adaptation mechanisms during a standardized sidecutting maneuver which is known to be associated with non-contact ACL injury?

Methodology:
- Subjects: 20 elite female athletes (12 soccer players, 8 team handball players, 26±3 yrs)
- Experimental procedure: All the subjects underwent neuromuscular (surface EMG activity of vastus lateralis-VL, vastus medialis–VM, rectus femoris-RF, gluteus medius-GM, biceps femoris-BF, semitendinosis-ST, lateral gastrocnemius-Gastr L, and medial gastrocnemius-Gastr M) and biomechanical testing during a sidecutting maneuver before and after 1) a season with no implementation of the prophylactic training and 2) a season during which a specific neuromuscular training program previously shown to reduce non-contact ACL injury was followed (18 weeks, 2/wk, 20 min).
- Measures of outcome: Pre-post training 1) kinematics (joint angles at the hip and knee), 2) kinetics (ground reaction forces), and 3) lower limb muscles surface EMG activity (Onset before foot strike and %-normalized to peak amplitude) in the prelanding (10 and 50 ms before) and the postlanding (10 and 50 ms after) phases

Main finding/s:
- Kinematics and kinetics: Apart from increased jump height, there were no changes after training



Conclusion/s:
- An 18-week neuromuscular training program can increase electromyographic (EMG) activity for the medial hamstring muscles just before landing during a sidecutting maneuver, thereby decreasing the risk of dynamic valgus and a subsequent ACL injury

Methodological considerations:
No control group, small sample size

The risk of sustaining a fracture of the humerus is higher in snowboarders than in skiers- the risk factors for and anatomical sites of fractures of the humerus also differs between these two sports

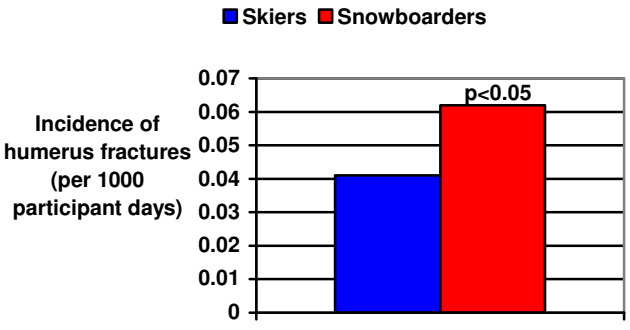
Title: Epidemiology and risk factors of humerus fractures among skiers and snowboarders
Authors: Bissell BT, Johnson RJ, Shafritz AB, Chase DC, Ettlinger CF
Reference: Am J Sports Med 2008; 36(10): 1880-1888
Type of study: Retrospective cross-sectional survey
Keywords: humerus, fracture, skiing, snowboarding

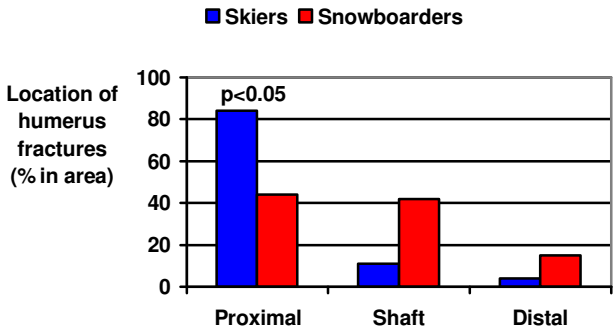
EB Rating: 6/10 **CI Rating: 6.5/10**

Background: The incidence and risk factors for fractures of the humerus in snowboarding and skiing is not well studied
Research question/s: What is the risk of sustaining humerus fractures in snowboarding compared with skiers?

Methodology:
- Subjects: Skiers and snowboarders who sustained fractures of the humerus over 34 seasons (n=318) and who reported these to a clinic at the base of a major ski area (34 seasons for skiers, 18 seasons for snowboarders)
- Experimental procedure: Total skier and snowboarder visits were estimated based on the number of ski lift tickets sold, ski area employees and season ticket holders in order to estimate injuries per skier/snowboarder days. Data from records of all the injured skiers/snowboarders were analyzed and compared with that of a control population of uninjured skiers and snowboarders. Radiographs were assessed and then classified according to the AO and Neer systems.
- Measures of outcome: Incidence of humerus fractures (per 1000 participant days), location of fractures, risk factors for fractures

Main finding/s:





- Factors associated with humerus fractures in snowboarders: Leading foot (mostly left) associated with fracture on the ipsilateral (left) side, less skill, younger age
- Factors associated with humerus fractures in skiers: more skilled, older, and falling less frequently than controls

Conclusion/s:
- The risk of sustaining a fracture of the humerus is higher in snowboarders than in skiers- the risk factors for and anatomical sites of fractures of the humerus also differs between these two sports

Methodological considerations:
Retrospective descriptive study

SMU Volume 8 (12) 2 p3: 2008 **Category: Medical / Pulmonary / COPD**

Five days of treatment with Formoterol significantly improved spirometry, dyspnea and exercise tolerance (6min and 12min walk tests) in patients with COPD - walking tests are useful tools for evaluating the impact of interventions in COPD patients

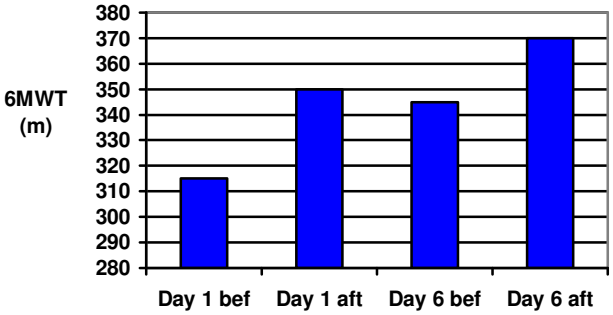
Title: Use of 6-min and 12-min walking test for assessing the efficacy of formoterol in COPD
Authors: Cazzola M, Biscione GL, Pasqua F, Crigna G, Appodia M, Cardaci V, Ferri L
Reference: Resp Med 2008; 102: 1425-1430
Type of study: Randomized crossover trial
Keywords: pulmonary, COPD, exercise tolerance, 6min walk tests, Formoterol

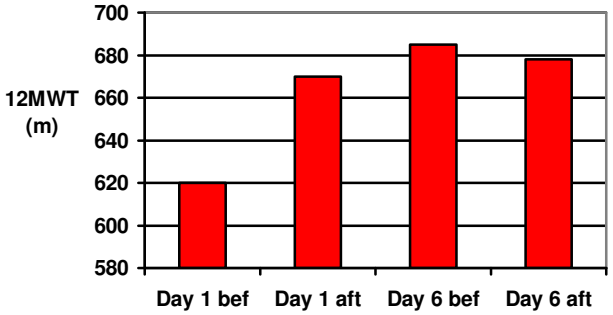
EB Rating: 7.5/10 **CI Rating: 7/10**

Background: Exercise tolerance (using a timed walking test) is a reliable outcome measure in patients with chronic obstructive pulmonary disease (COPD), and could thus be used to assess efficacy of interventions
Research question/s: Does 5-day treatment with formoterol (12 ug twice daily) improve lung function, exercise capacity and dyspnea in stable COPD patients, and how does a 6min walk test compare with a 12min walk test?

Methodology:
- Subjects: 22 patients with stable COPD
- Experimental procedure: In a randomized crossover fashion, all the subjects underwent a 6min and a 12min walk test (6MWT or 12MWT) before and after 5-day treatment with formoterol (12 ug twice daily) (3-day washout between interventions). Walking distance (m), inspiratory capacity (IC), Borg score for dyspnea and spirometry were assessed before and after the walk tests (before and after) on day 1 and day 6 (post–intervention)
- Measures of outcome: Walking distance (m, 6MWT and 12MWT), inspiratory capacity (IC), Borg score for dyspnea and FEV1

Main finding/s:
- FEV1 and Inspiratory capacity: There was a significant progressive increase in pre-drug FEV1 and IC after Formoterol use





- Borg scale for dyspnea: Formoterol improved the Borg score for dyspnea (vs. pre-treatment) during the 6MWT but only after the first dose during the 12MWT

Conclusion/s:
- Five days of treatment with Formoterol significantly improved spirometry, dyspnea and exercise tolerance (6min and 12min walk tests) in patients with COPD - walking tests are useful tools for evaluating the impact of interventions in COPD patients

Methodological considerations:
Short duration intervention

In a meta-analysis, coronary heart disease patients who are married, or have a partner, are 1.5 to 2 times more likely to attend cardiac rehabilitation

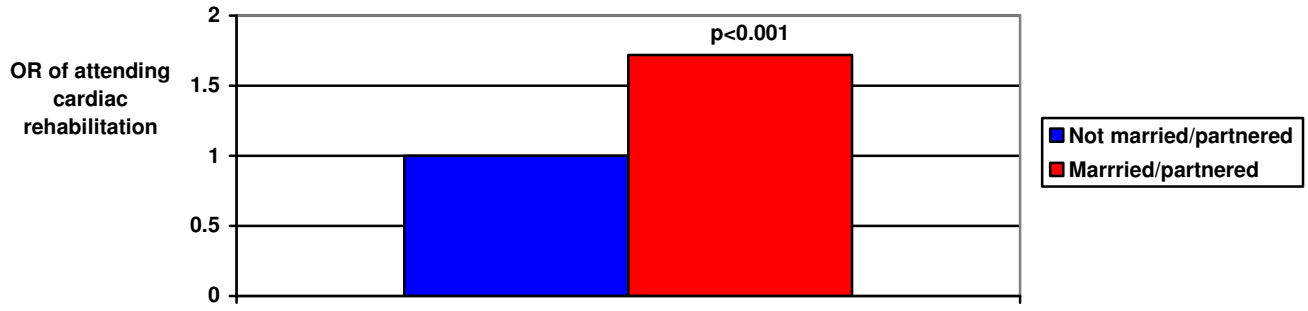
Title: Marital status and cardiac rehabilitation attendance: a meta-analysis
Authors: Molloy GJ, Hamer M, Randall G, Chida Y
Reference: Eur J Cardiovasc Prev Rehabil 2008; 15: 557-561
Type of study: Meta-analysis of published studies
Keywords: coronary heart disease, marital status, cardiac rehabilitation, secondary prevention

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

Background: In patients with established coronary heart disease (CHD), it has been shown that marital status is related to health outcomes perhaps as a result of both pathophysiological and behavioural mechanisms
Research question/s: Is there an association between marital status and attendance at outpatient cardiac rehabilitation (CR)?

Methodology:
- Experimental procedure: In response to a search of electronic databases (including Medline, Science Citation Index), 11 studies were identified that reported any association between a measure of marital or partnered status and cardiac rehabilitation (CR) attendance in patients with diagnosed CHD. A total of 6984 CHD patients were thus included
- Measures of outcome: OR of attending cardiac rehabilitation

Main finding/s:



- There was no evidence of heterogeneity of effects (p=0.42) or publication bias (p=0.12)

Conclusion/s:
- In a meta-analysis, coronary heart disease patients who are married, or have a partner, are 1.5 to 2 times more likely to attend cardiac rehabilitation

Methodological considerations:
Well-conducted study

In COPD patients, a 7-week exercise training program improved endurance and reduced the accelerated whole-body protein breakdown that is observed in these patients - inflammatory markers were not altered by the exercise training program

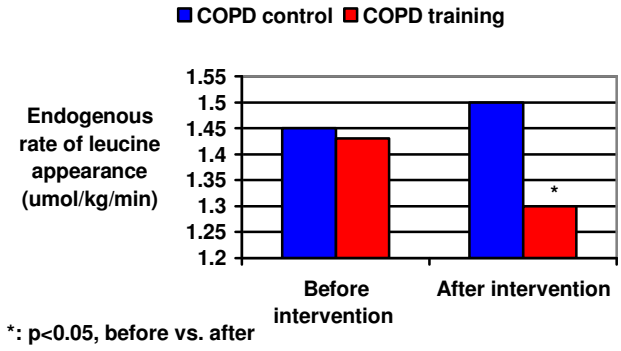
Title: Physical activity counteracts increased whole-body protein breakdown in chronic obstructive pulmonary disease patients
Authors: Petersen AMW, Mittendorfer B, Magkos F, Iversen M, Pedersen BK
Reference: Scand J Med Sci Sports 2008; 18: 537-564
Type of study: Randomized, controlled, clinical trial
Keywords: COPD, exercise training, whole body protein breakdown, inflammation, endurance

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

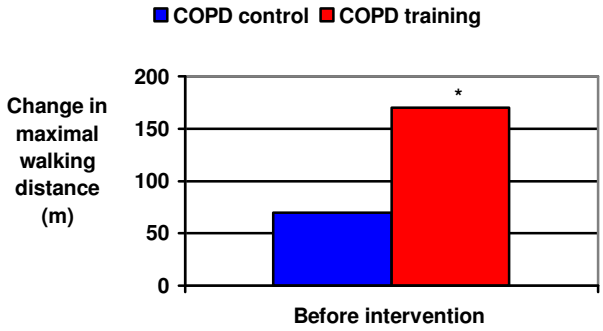
Background: It is well established that chronic obstructive pulmonary disease (COPD) is associated with decreased body mass, increased whole body protein breakdown, and low-grade systemic inflammation
Research question/s: Does regular exercise training induce anti-inflammatory effects and decrease whole-body protein breakdown of patients with COPD?

Methodology:
- Subjects: 19 subjects with severe COPD (COPD, FEV1=31±1) and 20 healthy subjects (HLT)
- Experimental procedure: All the subjects were assessed and COPD subjects were then randomized into an outpatient endurance training group (COPDTr=9, walking at 85% of VO2max), 2/wk, 7wks, and daily home-based training) and a control (COPDcon=10) group. Inflammatory markers in the plasma (CRP, Il-18, Il-6, TNFa, TNF-R1) protein breakdown (plasma leucine concentration, rate of appearance) quality of life (HRQL) and physical performance (walking speed and distance) were measured before and after the intervention
- Measures of outcome: Inflammatory markers, protein breakdown, quality of life, physical performance

Main finding/s:



*: p<0.05, before vs. after



*: p<0.05, before vs. after

- Inflammatory markers: Concentrations of C-reactive protein (CRP) and IL-18 in plasma were increased in the COPD compared with HLT group (p<0.05): leucine rate of appearance (Ra) was also ~15% greater in COPD group (p<0.05). However, training did not alter plasma concentration of inflammatory markers

Conclusion/s:
- In COPD patients, a 7-week exercise training program improved endurance and reduced the accelerated whole-body protein breakdown that is observed in these patients - inflammatory markers were not altered by the exercise training program

Methodological considerations:
Well-conducted study