

# SportsMed Update

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**In a randomized controlled clinical trial, the use of capacitively coupled electric field stimulation did not improve tibial stress fracture healing – however, the device appeared to be more effective in subjects with more severe stress fractures and when compliance to treatment (rest and use of the device) was high**

**Title:** Do capacitively coupled electric fields accelerate tibial stress fracture healing? A randomized controlled trial

**Authors:** Beck BR, Matheson GO, Bergman G, Norling T, Fredericson M, Hoffman AR, Marcus R

**Reference:** Am J Sports Med 2008; 36(3): 543-553

**Type of study:** Randomized, controlled, clinical trial

**Keywords:** lower leg, injury, stress fracture, bone stress injury, treatment, electric field stimulation

**EB Rating:** 7/10

**CI Rating:** 8/10

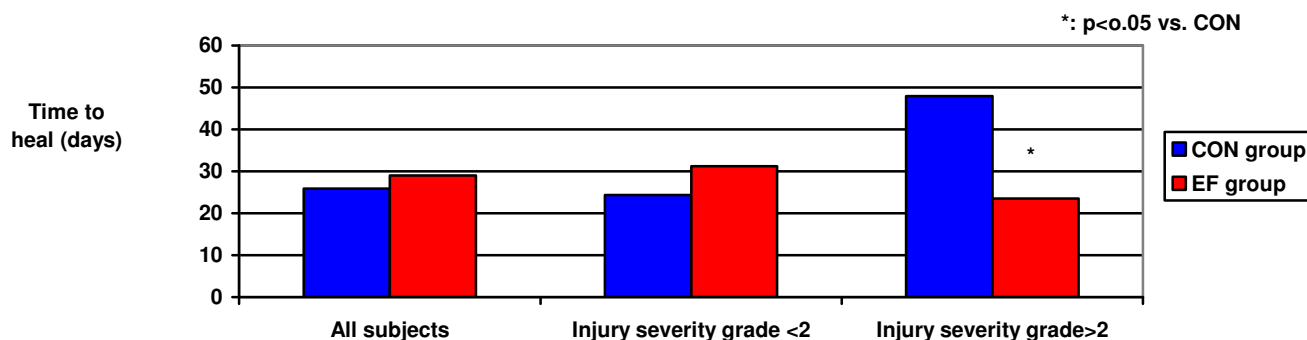
**Background:** It has been documented that electrical stimulation can enhance healing in fractures, but the potential beneficial effect of capacitively coupled electric field stimulation on stress fractures is not known

**Research question/s:** Does capacitively coupled electric field stimulation accelerate healing of a tibial stress fracture?

#### Methodology:

- Subjects: 44 patients (male=20, female=24) with acute posteromedial tibial stress fractures (diagnosed clinically and confirmed on imaging – including MRI)
- Experimental procedure: Following clinical assessment (history, examination, dietary assessment) (used for clinical severity grading) and radiological assessment (also used to grade severity radiological), subjects were randomly assigned to either a placebo (CON=21 male=11) or an active (capacitively coupled electric field stimulation applied for 15 hrs per day until healing – monitored by a daily log) (EF=22, male=8) treatment group. Both groups also received supplemental calcium, and were instructed to rest from provocative training. Subjects were followed up and healing was defined as the point when hopping to 10 cm for 30 seconds could be achieved without pain
- Measures of outcome: Healing time (days)

#### Main finding/s:



- Other observations: Females in the treatment group healed more slowly than males ( $p=0.05$ ), and increased compliance to treatment as well as compliance to rest were both associated with reduced time to heal ( $p < 0.05$ )

#### Conclusion/s:

- In a randomized controlled clinical trial, the use of capacitively coupled electric field stimulation did not improve tibial stress fracture healing – however, the device appeared to be more effective in subjects with more severe stress fractures and when compliance to treatment (rest and use of the device) was high

#### Methodological considerations:

Well conducted study, smaller subject numbers in sub-groups

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## During real time ultrasound imaging to assist patients in the selective recruitment of the lumbar multifidus muscle, a variable feedback program (rather than constant feedback) resulted in greater success in longer term retention (3-4 months after training)

**Title:** Influence of feedback schedule in motor performance and learning of a lumbar multifidus muscle task using rehabilitative ultrasound imaging: A randomized clinical trial

**Authors:** Herbert WJ, Heiss DG, Basso DM

**Reference:** Physical therapy 2008; 88(2): 261-269

**Type of study:** Randomized, clinical trial

**Keywords:** low back pain, multifidus muscle, exercise rehabilitation, visual feedback

**EB Rating:** 7.5/10

**CI Rating:** 7/10

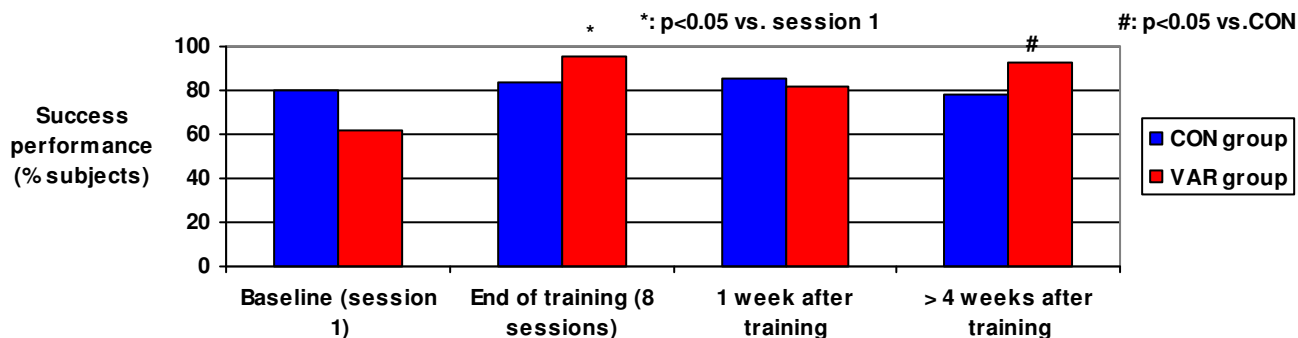
**Background:** It has been shown that low back pain (LBP) is associated with inadequate multifidus muscle function, and that this can be treated by rehabilitation exercises using visual feedback

**Research question/s:** Does varying the frequency and timing of real time ultrasound visual feedback enhance acquisition and retention of multifidus muscle recruitment during exercise

### Methodology:

- Subjects: 28 healthy subjects with no low back pain ( $28 \pm 8.0$  yrs, BMI  $24 \pm 0.7$  kg/m<sup>2</sup>)
- Experimental procedure: Subjects performed multifidus muscle rehabilitative exercises (8 training sessions over 4 wks) and were randomly assigned to either a constant (CON=14, visual feedback during each repetition) or variable (VAR=14, visual feedback after repetitions) real time ultrasound feedback group. Successful performance of the test was defined as isolated isometric recruitment of the S1 multifidus muscle without substitution of extraneous movements. Retention was assessed at 1 week (short-term: ST) and  $\geq 1$  month (long term: LT, n=23)
- Measures of outcome: Success performance (% subjects) at ST and LT

### Main finding/s:



### Conclusion/s:

- During real time ultrasound imaging to assist patients in the selective recruitment of the lumbar multifidus muscle, a variable feedback program (rather than constant feedback) resulted in greater success in longer term retention (3-4 months after training)

### Methodological considerations:

Good study design, small sample sizes, use of healthy subjects rather than those with low back pain limits generalizability

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## In a randomized controlled trial, the use of a functional knee brace following anterior cruciate ligament (ACL) reconstruction did not result in superior outcomes compared with a neoprene sleeve

**Title:** A randomized controlled trial comparing the effectiveness of functional knee brace and neoprene sleeve use after anterior cruciate ligament reconstruction

**Authors:** Birmingham TB, Bryant DM, Giffin JR, Litchfield RB, Kramer JF, Donner A, Fowler PJ

**Reference:** Am J Sports Med 2008; 36(4): 648-655

**Type of study:** Randomized, controlled, clinical trial

**Keywords:** knee, injury, brace, anterior cruciate ligament (ACL) reconstruction

**EB Rating:** 8/10

**CI Rating:** 8.5/10

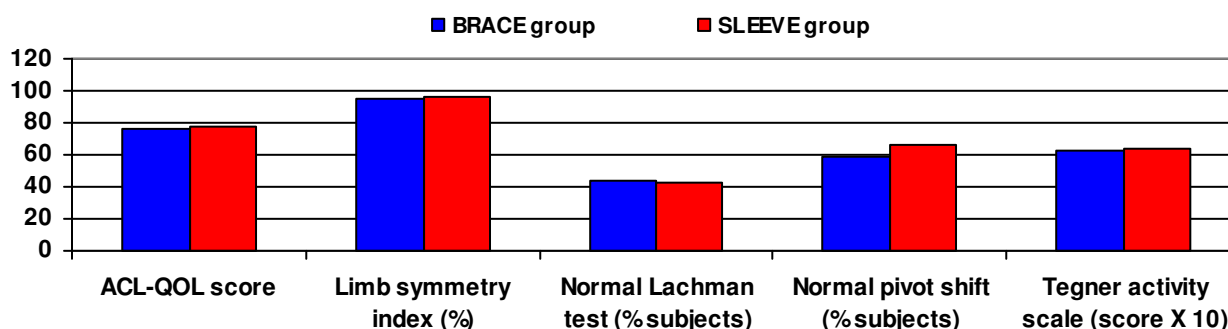
**Background:** Functional knee braces are commonly prescribed to patients after anterior cruciate ligament (ACL) reconstruction but there is little evidence for their effectiveness compared with a soft knee sleeve

**Research question/s:** Does the use of a functional knee brace compared with a soft neoprene knee sleeve result in better postoperative outcomes in patients who underwent an anterior cruciate ligament (ACL) reconstruction?

### Methodology:

- Subjects: 150 patients who underwent a primary ACL reconstruction with a hamstring autograft
- Experimental procedure: Patients were assessed preoperatively, and were then randomized to receive either a functional brace (BRACE=76) or a neoprene sleeve (SLEEVE=74) at 6-weeks postoperative. Repeat assessments for outcome measures (quality of life: ACL-Quality of Life questionnaire [ACL-QOL], anterior tibial translation: KT-1000 arthrometer side-to-side difference, limb symmetry index: single-limb forward hop test, Tegner Activity Scale) were done after 6, 12, and 24 months postoperatively
- Measures of outcome: Outcome measures at 1 and 2 years, subjective ratings of confidence in braces/sleeve

### Main finding/s:



- There were no significant differences between BRACE and SLEEVE groups for any of the outcomes at the 1 and 2 year follow-up
- Subjective ratings of confidence in the knee: Ratings were higher in the BRACE group compared with the SLEEVE group

### Conclusion/s:

- In a randomized controlled trial, the use of a functional knee brace following anterior cruciate ligament (ACL) reconstruction did not result in superior outcomes compared with a neoprene sleeve

### Methodological considerations:

Well conducted study

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## In a cross sectional study, the use of antidiabetic, antihypertensive, and LDL cholesterol-lowering medication was substantially lower when walking more intensely and farther each week, and by including longer walks

**Title:** Reduced diabetic, hypertensive, and cholesterol medication use with walking

**Authors:** Williams PT

**Reference:** Med Sci Sports Exerc 2008; 40(3): 433-443

**Type of study:** Cross-sectional study

**Keywords:** exercise, chronic disease, walking, medication use

**EB Rating:** 7/10

**CI Rating:** 8.5/10

**Background:** It is well established that regular exercise training, such as walking, is beneficial in the management of chronic diseases such as diabetes, hypertension and hyperlipidaemia.

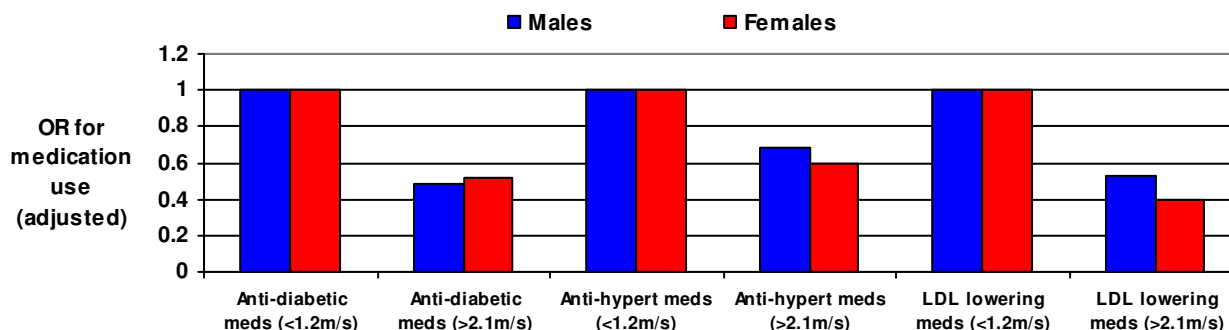
**Research question/s:** Is there a relationship between increased walking (distance, frequency, and intensity) and the prevalence of antidiabetic, antihypertensive, and LDL cholesterol-lowering medication use?

### Methodology:

- Subjects: 40 795 (female=32,683, male=8112) participants of the National Walkers' Health Study,
- Experimental procedure: In the subject population, reported medication use was documented (antidiabetic [AD]- female=2.8%, male=7.4%; antihypertensive [AH] – female=14.3%, male=29.0%; LDL cholesterol-lowering [CL]- female=7.3%, male=21.5%) as well as walking quantity (weekly walking distance, speed, longest weekly walk)
- Measures of outcome: Odds ratio for medication use (AD, AH and CL) adjusted for age, smoking, intake of meat, fish, fruit and BMI

### Main finding/s:

- All walking parameters (weekly distance, speed, longest walk) were inversely related to the prevalence of medication use (AD, AH, CL) in males and females ( $p < 0.01$ ) – this remained significant for both walking intensity and longest weekly walk when adjusted for total weekly distance



- The longest usual weekly walk was a better discriminator of medication status than the total cumulative distance per week, particularly in men

### Conclusion/s:

- In a cross sectional study the use of antidiabetic, antihypertensive, and LDL cholesterol-lowering medication was substantially lower when walking more intensely and farther each week, and by including longer walks

### Methodological considerations:

Well conducted study, large sample sizes, no cause effect can be demonstrated

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## In coronary artery disease (CAD) patients who are taking $\beta$ -blockers, exercise training intensity is best prescribed using the Borg scale or the workload at the ventilatory threshold, rather than heart rate – heart rate based training resulted in training at lower exercise intensities

**Title:** Determination of exercise training level in coronary artery disease patients on  $\beta$  blockers

**Authors:** Tabet J-Y, Meurin P, Teboul F, Tartiere J-M, Weber H, Renaud N, Massabie R, Driss AB

**Reference:** Eur J Cardiovasc Prev Rehabil 2008; 15: 67-72

**Type of study:** Randomized clinical trial

**Keywords:** coronary artery disease,  $\beta$ -blockers, exercise training, heart rate, Borg scale

**EB Rating:** 7.5/10

**CI Rating:** 7.5/10

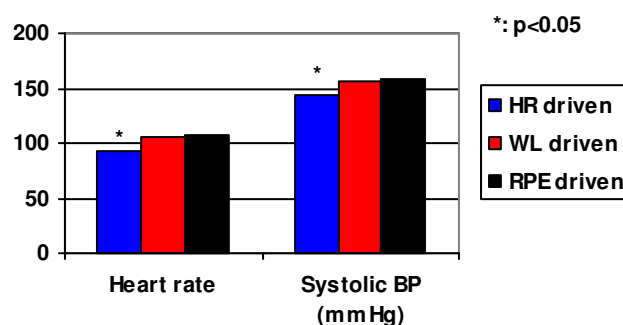
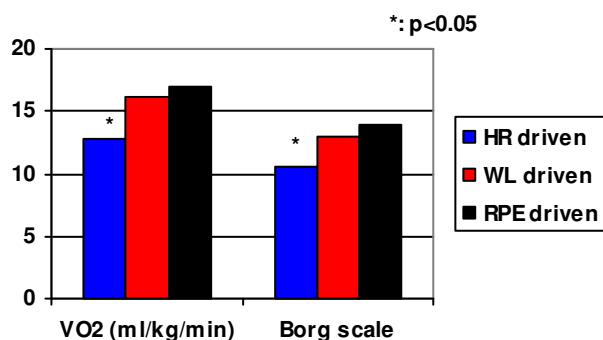
**Background:** The monitoring of training intensity during cardiac rehabilitation program coronary artery disease (CAD) patients is not clear – heart rate, workload, and the Borg scale of perceived exertion have all been used

**Research question/s:** What are the effects of three different measures to assess training intensity on cardiac parameters in patients with coronary artery disease (CAD) who are taking beta-blockers?

### Methodology:

- Subjects: 20 patients with coronary artery disease on  $\beta$ -blockers ( $57 \pm 10$  yrs)
- Experimental procedure: All the subjects underwent a cardiopulmonary exercise test and the heart rate (HR) and workload (WL) at the ventilatory threshold (VT) were determined. Subjects then each performed one bicycle training session/day at an intensity determined by HR at VT (HR driven), WL at VT (WL driven) and patient's feelings (14 on the Borg scale) (RPE driven) in a randomized order.
- Measures of outcome: HR, WL, systolic blood pressure (SBP), oxygen consumption ( $VO_2$ ) and the respiratory exchange ratio (RER) were monitored and compared

### Main finding/s:



- $VO_2$ , WL, HR and systolic blood pressure were significantly higher in the WL driven and the RPE driven interventions than in the HR driven intervention sessions

### Conclusion/s:

- In coronary artery disease (CAD) patients who are taking  $\beta$ -blockers, exercise training intensity is best prescribed using the Borg scale or the workload at the ventilatory threshold, rather than heart rate – heart rate based training resulted in training at lower exercise intensities

### Methodological considerations:

Well conducted study

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