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In a controlled laboratory study in healthy non-injured subjects, the wearing of a mouthguard did not affect the vestibulocollic reflex (VCR), indicating that vestibular sensory information was not affected by wearing a mouthguard

Title: Effect of wearing a mouthguard on the vestibulocollic reflex
Authors: Mizumachi M, Sumita Y, Ueno T
Reference: J Sci Med Sport 2008; 11: 191-197
Type of study: Controlled, clinical trial (laboratory)
Keywords: mouthguard, vestibulocollic reflex, sternocleidomastoid, muscles, surface, electromyography

EB Rating: 7/10

CI Rating: 7/10

Background: It has been suggested that a mouthguard may improve sports performance by changing sensory feedback from vestibular information.

Research question/s: Does wearing a mouthguard influence vestibular information via the vestibulocollic reflex (VCR) in the sagittal plane?

Methodology:

- Subjects: 14 healthy non-injured subjects (7 female, 22-31 yrs)
- Experimental procedure: All the subjects underwent assessment and were then tested in a laboratory setting
 either using mouthguard (MTG) or not (CON). Subjects were tested in the supine position. Testing consisted of
 subjecting the head to abrupt vertical acceleration by sudden free fall under the head's own weight, while
 surface electromyographic (EMG) activity was recorded in the right and left sternocleidomastoid muscles. The
 vestibulocollic reflex (VCR) was tested as vestibular afferent activity (input) and neck muscle activation (output)
- Measures of outcome: Muscle response onset latency (ms) and amplitude (unrectified peak to peak EMG / mean rectified amplitude in the 20ms preceding onset stimulus) of the VCR in the CON and MTG conditions



Conclusion/s:

 In a controlled laboratory study in healthy non-injured subjects, the wearing of a mouthguard did not affect the vestibulocollic reflex (VCR), indicating that vestibular sensory information was not affected by wearing a mouthguard

Methodological considerations:

Well conducted study, applicability to sports specific (upright) movements not tested

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Following ACL reconstruction in athletes, 12 sessions of whole body vibration training improved proprioception and balance significantly more when compared with conventional training

Title: A comparative study of whole body vibration training and conventional training on knee proprioception and postural stability after anterior cruciate ligament reconstruction

Authors: Moezy A, Olyaei G, Hadian M, Razi M, Faghihzadeh S

Reference: Br J Sports Med 2008; 42: 373-378

Type of study: Randomized, controlled, clinical trial

Keywords: knee, injury, ACL, reconstruction, rehabilitation, vibration training, proprioception

EB Rating: 7/10

CI Rating: 7.5/10

Background: Whole body vibration training (WBVT) is a novel form of rehabilitative neuromuscular training that has not been well studied in athletes with injury

Research question/s: Does whole body vibration training (WBVT) improve knee proprioception and postural stability after anterior cruciate ligament (ACL) reconstruction more than conventional training (CT)?

Methodology:

- Subjects: 20 athletes with unilateral ACL reconstruction
- Experimental procedure: All the subjects were assessed and then randomly allocated to either 12 sessions (3/week for 4 weeks) of whole body vibration training (WBVT=10, increasing from 4 to 16 min, static to dynamic) or conventional training (CT=10, strengthening, flexibility and proprioceptive training). Groups were of similar age, height, weight and duration following injury. Joint repositioning error [Two target angles (30° and 60°) using a Biodex dynamometer] and bilateral dynamic postural stability [open and closed eyes; anteroposterior (AP), mediolateral (ML) and overall stability (OS) using the Biodex Stability System] were measured before and after the intervention
- Measures of outcome: joint repositioning error (degrees) at 30° and 60°; AP, ML and OS dynamic postural stability (score)

Main finding/s:

Joint repositioning error: Following the intervention, there was a significantly greater improvement in joint
positioning error in the ACL reconstructed knees of the WBVT group compared with the CT group (p<0.05)



Conclusion/s:

 Following ACL reconstruction in athletes, 12 sessions of whole body vibration training improved proprioception and balance significantly more when compared with conventional training

Methodological considerations:

Well conducted study, small sample size, short term follow-up

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During arm lowering, subjects with shoulder impingement syndrome have reduced middle trapezius to serratus anterior muscle co-activation – scapular stabilizer muscle electromyographic activity was similar to noninjured controls

Title: Scapular muscular activity with shoulder impingement syndrome during lowering of the arms **Authors:** de Morais Faria CDC, Teixeira-Salmela LF, de Paula Goulart FR, de Souza Moraes GF **Reference:** Clin J Sport Med 2008; 18: 2

Type of study: Cross-sectional study

Keywords: shoulder, injury, impingement, muscle, activation, electromyography

EB Rating: 7/10

CI Rating: 7/10

Background: Scapular stabilizer activity has not been well assessed during lowering of the arms in patients with shoulder impingement syndrome

Research question/s: Does isolated electromyographic (EMG) activity of the serratus anterior, upper, middle, and lower trapezius, as well as the co-activation of the upper and middle trapezius/serratus anterior during lowering of the arms differ in subjects with and without shoulder impingement syndrome?

Methodology:

- Subjects: 20 young adults
- Experimental procedure: Subjects were divided into two groups (matched by gender, age, and levels of physical activity): 10 subjects had no complaints or history of previous shoulder lesions (CON, 29.0±5.4 yrs), and 10 subjects had unilateral grade I or II shoulder impingement syndrome (IS: 28.6±5.9 yrs). All the subjects underwent testing in a laboratory. Tests were conducted during arm lowering (injured and non-injured sides). Isolated EMG activity [serratus anterior (SA), upper (UT), middle (MT), and lower trapezius (LT)], and co-activation of the upper trapezius (UT/SA) and middle trapezius/serratus anterior (MT/SA) was measured.
- Measures of outcome: EMG activity of muscles (root mean square calculations, normalized by maximal voluntary isometric contractions), co-activation of muscles

Main finding/s:

 Muscle EMG activity: There were no significant differences in EMG activity during arm lowering of the SA, UT, MT and LT muscles between the CON and IS groups



Conclusion/s:

During arm lowering, subjects with shoulder impingement syndrome have reduced middle trapezius to serratus
anterior muscle co-activation – scapular stabilizer muscle electromyographic activity was similar to non-injured
controls

Methodological considerations:

No cause effect can be determined, small sample size

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In patients with type 2 diabetes mellitus, there is evidence of reduced femoral arterial blood flow (indirect marker of muscle perfusion) during lowintensity exercise performance

Title: Reduced leg blood flow during submaximal exercise in type 2 diabetes Authors: Lalande S, Gusso S, Hofman PL, Baldi JC Reference: Med Sci Sports Exerc 40(4): 612-617 Type of study: Case-control study Keywords: diabetes mellitus, type 2, exercise capacity, muscle blood flow, cardiac output

EB Rating: 7/10

CI Rating: 6.5/10

Background: A decrease in exercise capacity has been observed in patients with type 2 diabetes but the precise reasons for this are not well established

Research question/s: Does reduced cardiac output and/or femoral arterial blood flow contribute to the observed reduced endurance capacity in patients with type 2 diabetes?

Methodology:

- Subjects: 8 patients with type 2 diabetes (DM group), 11 healthy individuals (CON group)
- Experimental procedure: All the subjects were assessed and then underwent testing. During low-intensity leg exercise, cardiac and femoral arterial blood flow MRI scans were performed while maximal aerobic capacity (VO_{2max}) and maximal oxygen pulse were tested during a maximal exercise test
- Measures of outcome: VO_{2max}, and maximal oxygen pulse (maximal exercise); cardiac output (stroke volume and heart rate) and femoral blood flow (low intensity exercise)

Main finding/s:

 Maximal exercise test: There was a significantly lower VO_{2max (}20% lower) reduced maximal oxygen pulse (16% lower) in the DM group (p<0.05)



 Low-intensity exercise: There was a significant increase in heart rate and cardiac output as well as increased femoral blood flow in both groups during exercise (p<0.05) – however, femoral arterial blood flow (indexed to thigh lean mass) and stroke volume (indexed to fat-free mass) was significantly lower in the DM group

Conclusion/s:

 In patients with type 2 diabetes mellitus, there is evidence of reduced femoral arterial blood flow (indirect marker of muscle perfusion) during low-intensity exercise performance

Methodological considerations:

Small samples, absolute and not relative workloads were used, only low intensity exercise was studied

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Burnout in elite athletes is related to a maladaptive motivational profile – in particular perfectionist qualities, fear of making mistakes, and doubting own ability

Title: A social cognitive approach to burnout in elite athletes Authors: Lemyre P-N, Hall HK, Roberts GC Reference: Scand J Med Sci Sports 2008; 18: 221-234 Type of study: Prospective cohort study Keywords: elite athlete, burnout, social-cognitive variables

EB Rating: 7/10

CI Rating: 7/10

Background: It is not well established if athlete burnout is associated with social-cognitive parameters **Research question/s:** Is there a relationship between social cognitive motivational variables at the start of a season and signs of burnout in elite athletes at the end of the season?

Methodology:

- Subjects: 141 elite winter sport athletes (males=81, females=60) (Alpine skiing, Biathlon, Nordic Combined, Nordic skiing, Speed skating)
- Experimental procedure: All the subjects were assessed using questionnaires in the 3 weeks prior to and in the 2 weeks after a season. Testing included a comprehensive motivation assessment package at the start of the season with a further burnout inventory (ABQ athlete burnout questionnaire) at the end of the season
- Measures of outcome: Achievement goals, perceived motivational climate, perceived ability, perfectionism, burnout, cognitive appraisal

Main finding/s:

• The elite athletes could be grouped into two motivational profiles based on variables measured at the start of the season - one group being adaptive (AD=45) and the other maladaptive (MD=96)



Motivational dispositions, measures of the achievement climate, perceived ability and dimensions of
perfectionism were associated with burnout in a conceptually consistent manner

Conclusion/s:

Burnout in elite athletes is related to a maladaptive motivational profile – in particular perfectionist qualities, fear
of making mistakes, and doubting own ability

Methodological considerations:

Well conducted study

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