Core Stability: evaluation of a therapeutic intervention in sitting and standing

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Background

• Poor Core stability in athletes
  – less efficient movement and potential injury
    (Fredericson and Moore, 2005)

• Core stability training
  – prevents injury (Feaver, 2001)
  – enhance performance (Comerford, 2004)
  – accelerate post injury rehabilitation
    (Comerford, 2004)
Background

• Local stabilisers more efficient
  – Anatomy (Bergmark, 1989: Richardson et al, 1999)
  – Co-contraction (Granata and Marras, 2000) (Kavcic, 2004)

• Isolation of the local stabilisers comes from a neutral pelvis/ lumbar spine alignment (O’Sullivan, 2002: Cholewicki, 1997) (O’Sullivan, 2006)

• Rehabilitation – Isolate/ Dynamic mvt/ Function
Present research - Aim

• Investigate any change in bilateral SEMG activity of the trunk stabilisers between upright posture and post facilitation of an active neutral spine
  – Sitting
  – Standing

• No existing evidence of effectiveness
Method

• Design
  – Same subject experimental design

• Sample (N=22) (females = 19)
  – Convenience sample
  – Healthy
  – Age group (mean 21.9 yrs)

• Local ethical approval gained/ Data Protection Act (1998)
Method - measure

• Measurement tool – Surface EMG
  – Pre and post intervention
  – ESLT, EO, LMT, TA/IO

• SEMG bipolar configuration bilaterally.
  – skin prep (Turker, 1993)
  – electrode placement (Freriks, 1999)

• Same day standard protocol
  – Intra tester reliability for abdominals (Ng et al, 2003 - ICC = 0.75-0.89)
  – Reliability for back muscles (MVC (Dankaerts et al, 2003 – ICC 0.91))
Electrode placement

- TA/IO electrodes
- ESLT electrodes
- LMT electrodes
- EO electrodes
- TA/IO ground electrode
- ESLT ground electrode
- LMT ground electrode

references
Intervention

• Start position
  – Standardised

• Intervention
  – Pragmatic approach

• Evaluation of active neutral
  – Visual
  – Palpation
PRE INTERVENTION
INTERVENTION
POST INTERVENTION
Data processing/ analysis

- Recorded over 3 seconds – RMS average requested
- Normalised against the MVC
- Repeated x 3 – mean calculated

- Data analysis
  - Repeated measure ANOVA (post hoc t test)
    ($p=\leq0.05$)
Results
SEMG investigation of facilitation technique in sitting

![Graph showing SEMG (%MVC) for different muscle groups before and after facilitation technique.](image)

- **Pre** Facilitation
- **Post** Facilitation

Muscle groups:
- Left EO
- Right EO
- Left TA/IO
- Right TA/IO
- Left MT
- Right MT
- Left ES
- Right ES
SEMG investigation of facilitation technique in standing
Summary - Intervention

• Results
  – Statistically significant increase in all core stabilisers with preferential recruitment of local over global muscles
  – In sitting there was a change from global strategy (baseline) to local strategy
  – In standing enhanced local strategy
Conclusions

• Facilitation is useful for the initial stages of training core stability ie. learning to isolate the local stabilisers
Thank you for your attention

Acknowledgements to:
Research Centre for Clinical Kinesiology, Cardiff University

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