Low back test

eMotion EMG
Low back pain (LBP)

- Lifetime prevalence is very high (59 - 90 %)
- The most common cause of job-related disability and a leading contributor to missed work
- Most costly injury for employers
- Americans spend at least $50 billion each year on LBP
Prevention of LBP

“Greater erector spinae muscle fatigability was associated with both the existence of, and the risk of developing, serious low back pain.“

Prevention of LBP

“EMG variables recorded from lumbar paraspinal muscles can identify a sub group of subjects at increased risk of developing low-back pain in the future.”

Eur Spine J. 2010 Feb 2.
eMotion EMG system

Wireless EMG sensors → eMotion EMG software → Printer

Low back test - software
Measurement modes

Low Back Test

Biofeedback

Free mode
3 Main reasons to assess back muscle endurance

1) Impaired back muscle endurance is a common phenomenon in LBP

2) Lumbar muscle fatigue leads to abnormal spinal movements due to loss of precise muscular control
   → increasing mechanical loading on passive elements (ligaments and interverbal discs)
   → may cause back injury and pain

3) Poor back muscle endurance predicts future occurrence of LBP

eMotion EMG – Low back test

- Provides a quick and easy test of endurance of back muscles
- Measurement of fatigue is based on scientifically validated analysis of frequency change in EMG signal
- Prevention of future low back pain
- Improving effectiveness of rehabilitation
eMotion EMG system

- Fully assisting software
  → No need for previous experience
  → Easy and fast to use
3 simple steps to results

1. Attach electrodes and sensors
2. Perform 30 second test
3. Get automatically produced printout
Electrode placement

Erector spinae

Multifidus
Test position
Results printout

- Compares to selected reference database
- Calculates balance between L and R side
- Compares to earlier test sessions
- Estimates injury risk
- Gives classification of condition of muscles
- Gives classification of muscle balance
- Gives classification of improvements
- Visualization of muscles
- Gives overall score of test
Fatigue calculation

Frequency in the beginning of the test...

...and in the end of the test

MPF decreases from 101...

...to 83 due to fatigue.
Fatigue classification

Endurance of muscle is classified:
- Good
- Average
- Poor
Biofeedback

- Video projector or tablet PC can be used with biofeedback for greater convenience
Biofeedback training enhances results of rehabilitation
Free mode

- Can be used to do any EMG measurement
- For example to study and improve ergonomics of work
Unique features of Low back test

- One-button operation
- Fully assisting software
- Fully automatic analysis of data
- Automatic comparisons to reference database
- Automatic comparisons to earlier test sessions
- Automatic interpretation of the results
- Reference database manager
- Easy archiving of results
- Automatically produced printouts
More information

www.megaemg.com
Quotes from scientific articles (1/2)

- “EMG variables recorded from lumbar paraspinal muscles can identify a sub group of subjects at increased risk of developing low-back pain in the future.” Eur Spine J. 2010 Feb 2.


Quotes from scientific articles (2/2)


- “The chronic low back pain patients were weaker and fatigued faster than the healthy controls.“ Arch Phys Med Rehabil. 1998 Apr;79(4):412-7.

- “Results from this study demonstrate that low back pain and asymmetrical muscle function in rowers can be assessed on the basis of EMG spectral analysis.“ Med Sci Sports Exerc. 1990 Aug;22(4):463-9.

- ”The protocol used for assessing fatigue in the back extensor muscles proved to be reliable and is recommended for further use.” J Electromyogr Kinesiol. 2000 Jun;10(3):151-8.
Scientific references (1/2)

- The use of non-amplitude components of the myoelectric signal in identifying differences in function between the low back injured and controls. Lehman GJ. J Can Chiropr Assoc. 2004 Sep;48(3):225-34.
Scientific references (2/2)

- Electromyographic amplitude and frequency changes in the iliocostalis lumborum and multifidus muscles during a trunk holding test. Ng JK, Richardson CA, Jull GA. Phys Ther. 1997 Sep;77(9):954-61.
Technical specifications

- 4 channel EMG
- Weight of one sensor: 16 g
- Dimensions: 35mm x 35mm x 15 mm
- Sampling frequency: 1000 Hz
- Battery: Rechargeable Li-Ion battery
- Connection: Bluetooth
- Sensor type: MT-WBA-EMG