In this issue of Science and News we are presenting two articles from a Norwegian RCT project for people with chronic low back pain. This project has compared a low load, biofeedback-guided method (Australian approach) with a general sling exercise program and a general exercise program for people with low back pain. This project has resulted in two articles, one (Vasseljen and Fladmark) looking at contraction thickness and function of abdominal muscles, while the other (Unsgaard Trødel M et al.) was examining pain levels and functional outcomes.

Both articles conclude that there are no significant differences between the interventions. The following factors are important to notice:

- General sling exercise shows equally good results as the acknowledged Australian approach in the treatment of chronic low back pain
- Inexpensive equipment for sling exercise (Redcord) can give equally good results as expensive equipment for precise biofeedback (ultrasound)
- With minimal training (Neurac 1 – 3 days) therapists can learn a method proven as effective as a method that requires extensive experience to utilize (ultrasound for correct muscle activation)

The trends in treatment regimens for people with long term low back pain is gradually changing. From a focus on isolated function of deep stabilizing muscles, today different approaches tend to emphasize more the integration of local and global muscles. This is supported by both research and clinical experience and is a central element in the latest development of the Neurac method. We welcome more research in this field, incorporating our new knowledge and experience.

**Two new publications involving Redcord**

**Redcord in agreement with CRRC in China**

Redcord signed September 8th an agreement with Chinese Rehabilitation Research Centre (CRRC). The agreement was signed as a part of the opening ceremony for Norwegian Healthcare & Life Science Innovation Expo held in connection to the World Expo in Shanghai. CRRC is the leading rehabilitation centre in China and will establish a national centre in China for research, education and treatment based on the Neurac method.

At the picture (from left), the founder of Redcord, Petter Planke, Director of CRRC, Li Jianjun and Redcord representative in China, Mark Wang.

**Neurac 1 Instructor certification**

From June 12th to June 16th Redcord arranged a course in instructor certification at Redcord Clinic in Oslo. Five Neurac 1 course instructor candidates from Greece, Italy, USA and Norway participated in the seminar, which was conducted by Fredrik Halvorsen and Øyvind Pedersen.

**English Neurac courses in Oslo, Norway**

Neurac 1: 4th-6th November
Neurac 2 Back/Pelvis: 10th December
Neurac 2 Neck/Shoulder: 11th December
Neurac 2 Stimula: 12th December

Please contact redcord@redcord.com for more information

Summary: The study conclude that both OKC and CKC strength training were equally effective for improving traditional measures of strength (e.g. 1 RM, isokinetic power). Only CKC exercise improved sling exercise push-ups indicating both specificity of training and functional training superiority of CKC exercise. The portability and ease of use of sling based CKC strength training provides an effective alternative for novice females who may be intimidated by traditional strength training setting.

Abstract: Twenty-six participants were randomized to one of two training interventions: open-kinetic chain exercise training (OKCE) with traditional exercises, and closed-kinetic chain exercise training (CKCE) with sling-based exercises. Participants completed six sets of strength training exercises for each week for 13 weeks. Preand post-training evaluations included: 1 RM leg and bench press; maximum sling exercise push-ups; isokinetic concentric phase peak torque and power for knee extension and for shoulder internal and external rotation; lateral step-down test; and the anterior, postero-medial, and postero-lateral components of the Star Excursion Balance Test. The OKCE group improved 1RM maximum strength (p<0.0001) and maximum push-ups (p<0.0001). There was a significant group x time interaction for 1RM (p<0.0001), 1RM push-ups (p<0.0001), bench press (p<0.0001), and trunk rotation (p<0.0001). In both OKCE and CKCE strength training, similar changes in balance were noted with the exception of the Rey figure test, where the CKCE group showed greater improvement than the OKCE group. Both OKCE and CKCE strength training elicited similar changes in postural control, as measured by the Star Excursion Balance Test. The OKCE group showed greater improvement in balance (p<0.02), while the CKCE group showed greater improvement in trunk rotation, and shoulder external rotation (improvements ranged from 2.7% to 27.7%), with no differences in pre-and post-training evaluations. The OKCE and CKCE groups did not differ significantly in terms of strength or sling exercise push-ups.


Summary: The patients with chronic LBP examined in this study did not show a delayed onset of feed-forward activation during rapid arm movement. The study indicate that sling exercises could be recommended, similar to general exercises and motor control exercises, when aiming to reduce pain and disability in the early phase of LBP rehabilitation.

Abstract: The extent of cortical neural changes has been shown to be a key neurophysiological feature that correlates with the level of functional recovery. Therefore, rehabilitation efforts that attempt to maximize cortical reorganization provide the greatest potential for rehabilitation success. This paper reviews the evidence of cortical neural changes that have been shown to occur in association with experimental or chronic pain disorders. Further, the promising role of novel motor-skill training is discussed in order to best direct the clinician to optimize rehabilitation strategies for patients with musculoskeletal pain disorders.

Boudreau SA et al. The role of motor learning and neuromotorplasticity in designing rehabilitation approaches for musculoskeletal pain disorders. Manual Therapy 2010

Summary: Cortical neuromuscular plasticity is an intrinsic neurophysiological feature that occurs dynamically throughout life and can be defined as a morphological or functional change in neuronal properties, such as strength of internal connections, altered representational patterns or a reorganization of neuronal territories. The review discusses the cortical neuromuscular changes that have been shown to occur in association with experimental or chronic pain disorders in the early phase of a strength-training program in novice women. The fact that only CKCE improved sling exercise push-ups supports previous findings suggesting functional superiority of CKCE.


Summary: The study indicate that sling exercises could be recommended, similar to general exercises and motor control exercises, when aiming to reduce pain and disability in the early phase of LBP rehabilitation. The study conclude that both OKC and CKC strength training were equally effective for improving traditional measures of strength (e.g. 1 RM, isokinetic power). Only CKC exercise improved sling exercise push-ups indicating both specificity of training and functional training superiority of CKC exercise. The portability and ease of use of sling based CKC strength training provides an effective alternative for novice females who may be intimidated by a traditional strength training setting.

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Summary: 6-8 treatments with low load ultrasound guided abdominal drawing-in maneuver, high load sling exercises or general exercises for chronic low back pain patients attained only marginal changes in contraction thickness and slide in deep abdominal muscles.

Abstract: The aim of this study was to assess changes in deep abdominal muscle function after 8 weeks of exercise in chronic low back pain patients. Patients with low back pain reported a significantly greater improvement in the primary outcome of abdominal muscle function (P<0.001) for high load sling exercises compared to the low load ultrasound guided muscle drawing-in maneuver (P=0.004) and general exercises (P=0.005). There was a trend towards a greater improvement in the secondary outcome of abdominal muscle function (P=0.054) for high load sling exercises compared to general exercises. The primary outcome measure was pain reported on the Numeric Pain Rating Scale after treatment and at a 1-year follow-up. Secondary outcome measures were self-reported activity limitation (assessed with the Oswestry Disability Index), clinically examined function (assessed with the Finger-tip-to-Floor Test), and fear-avoidance beliefs after intervention. The study was conducted in a primary care setting in Norway. The participants were patients with chronic nonspecific low back pain (n=109). The interventions in this study were low-load ultrasound guided, high-load sling exercises, or general exercises, all delivered by experienced physical therapists, once a week for 8 weeks. The study found that high load sling exercises were more effective than low load ultrasound guided and general exercises in improving abdominal muscle function.