

# Science & News

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Guthrie RJ et al. The effect of traditional bridging or suspension-exercise bridging on lateral abdominal thickness in individuals with low back pain. *Journal of Sport Rehabilitation*. 2012;21:151-160

**Summary:**

The authors conclude that the bridging exercise, regardless of surface, can be considered an important component of a rehabilitation program for individuals with LBP, but its mechanism of effectiveness does not appear to be related to immediate change in TrA activation

**Abstract:**

Context: Individuals with low back pain (LBP) are thought to benefit from interventions that improve motor control of the lumbopelvic region. It is unknown if therapeutic exercise can acutely facilitate activation of lateral abdominal musculature. Objective: To investigate the ability of 2 types of bridging-exercise progressions to facilitate lateral abdominal muscles during an abdominal drawing-in maneuver (ADIM) in individuals with LBP. Design: Randomized control trial. Setting: University research laboratory. Participants: 51 adults (mean  $\pm$  SD age  $23.1 \pm 6.0$  y, height  $173.6 \pm 10.5$  cm, mass  $74.7 \pm 14.5$  kg, and 64.7% female) with LBP. All participants met 3 of 4 criteria for stabilization-classification LBP or at least 6 best-fit criteria for stabilization classification. Interventions: Participants were randomly assigned to either traditional-bridge progression or suspension-exercise-bridge progression, each with 4 levels of progressive difficulty. They performed 5 repetitions at each level and were progressed based on specific criteria. Main Outcome Measures: Muscle thickness of the external oblique (EO), internal oblique (IO), and transversus abdominis (TrA) was measured during an ADIM using ultrasound imaging preintervention and postintervention. A contraction ratio (contracted thickness:resting thickness) of the EO, IO, and TrA was used to quantify changes in muscle thickness. Results: There was not a significant increase in EO ( $F_{1,47} = 0.44$ ,  $P = .51$ ) or IO ( $F_{1,47} = .30$ ,  $P = .59$ ) contraction ratios after the exercise progression. There was a significant ( $F_{1,47} = 4.05$ ,  $P = .05$ ) group-by-time interaction wherein the traditional-bridge progression (pre =  $1.55 \pm 0.22$ ; post =  $1.65 \pm 0.21$ ) resulted in greater ( $P = .03$ ) TrA contraction ratio after exercise than the suspension-exercise-bridge progression (pre =  $1.61 \pm 0.31$ ; post =  $1.58 \pm 0.28$ ). Conclusion: A single exercise progression did not acutely improve muscle thickness of the EO and IO.

The magnitude of change in TrA muscle thickness after the traditional-bridging progression was less than the minimal detectable change, thus not clinically significant.

Uthaihup S et al. The influence of neck pain on sensorimotor function in the elderly. *Archives of Gerontology and Geriatrics* 2012;18(Epub ahead of print)

**Summary:**

The study concludes that sensorimotor disturbance were greater in elders with neck pain than without neck pain. Elders with neck pain have greater deficits in eye movement control, vertical perception and balance, which supports the notion that altered cervical afferent input may contribute to sensorimotor disturbance

**Abstract:**

Greater disturbances in sensorimotor control have been demonstrated in younger to middle aged groups. However, it is unknown whether or not the impairments documented in these populations can be extrapolated to elders with neck pain. The aim of this study was to investigate the influence of neck pain on sensorimotor function in elders. Twenty elders with neck pain (12 women and 8 men) and 20 healthy elder controls (14 women and 6 men) aged 65 years and over were recruited from the general community. Tests for sensorimotor function included; cervical joint position sense (JPS); computerised rod-and-frame test (RFT); smooth pursuit neck torsion test (SPNT); standing balance (under conditions of eyes open, eyes closed on firm and soft surfaces in comfortable stance); step test and ten-meter walk test with and without head movement. Elders with neck pain had greater deficits in the majority of sensorimotor function tests after controlling for effects of age and comorbidities. Significant differences were found in the SPNT ( $p < 0.01$ ), error in the RFT (frame angled at 108 and 158 anticlockwise) ( $p < 0.05$ ), standing balance (amplitude of sway) – eyes open on a firm surface in the medio-lateral (ML) direction ( $p = 0.03$ ), and total number of steps on the step test, both left and right sides ( $p < 0.01$ ). Elders with neck pain have greater sensorimotor disturbances than elders without neck pain, supporting a contribution of altered afferent information originating from the cervical spine to such disturbances. The findings may inform falls prevention and management programs

Park J et al. Knee-extension exercise's lack of immediate effect on maximal voluntary quadriceps torque and activation in individuals with anterior knee pain. *Journal of Sport Rehabilitation*. 2012; 21: 119-126

**Summary:**

The authors that neither weight bearing nor non weight bearing knee-extension exercises acutely increase maximal voluntary quadriceps torque output or activation in patients with Anterior knee pain.

**Abstract:**

Changes Context: Weight-bearing (WB) and non-weight-bearing (NWB) exercises are commonly used in rehabilitation programs for patients with anterior knee pain (AKP). Objective: To determine the immediate effects of isolated WB or NWB knee-extension exercises on quadriceps torque output and activation in individuals with AKP. Design: A single-blind randomized controlled trial. Setting: Laboratory. Participants: 30 subjects with self-reported AKP. Interventions: Subjects performed a maximal voluntary isometric contraction (MVIC) of the quadriceps (knee at 90°). Maximal voluntary quadriceps activation was quantified using the central activation ratio (CAR):  $CAR = MVIC / (MVIC + \text{superimposed burst torque})$ . After baseline testing, subjects were randomized to 1 of 3 intervention groups: WB knee extension, NWB knee extension, or control. WB knee-extension exercise was performed as a sling-based exercise, and NWB knee-extension exercise was performed on the Biodex dynamometer. Exercises were performed in 3 sets of 5 repetitions at approximately 55% MVIC. Measurements were obtained at 4 times: baseline and immediately and 15 and 30 min postexercise. Main Outcome Measures: Quadriceps torque output (MVIC: N·m/Kg) and quadriceps activation (CAR). Results: No significant differences in the maximal voluntary quadriceps torque output ( $F_{2,27} = 0.592, P = .56$ ) or activation ( $F_{2,27} = 0.069, P = .93$ ) were observed among the 3 treatment groups. Conclusions: WB and NWB knee-extension exercises did not acutely change quadriceps torque output or activation. It may be necessary to perform exercises over a number of sessions and incorporate other disinhibitory interventions (eg, cryotherapy) to observe acute changes in quadriceps torque and activation.

Willard FH et al. The thoracolumbar fascia: anatomy, function and clinical considerations. *Journal of anatomy* 2012

**Summary:**

The article goes through anatomy, function and clinical

considerations for the thoracolumbar fascia (TLF). The TLF receives both proprioceptive innervations although it is not clear at this time what role they give the TLF as a sensory organ. Biomechanical studies have supported the concept that tension applied by surrounding muscles, especially the TrA, can be transmitted through the TLF to stiffen the lumbar spine and increase the force-closure of the sacroiliac joint.

**Abstract:**

In this overview, new and existent material on the organization and composition of the thoracolumbar fascia (TLF) will be evaluated in respect to its anatomy, innervation biomechanics and clinical relevance. The integration of the passive connective tissues of the TLF and active muscular structures surrounding this structure are discussed, and the relevance of their mutual interactions in relation to low back and pelvic pain reviewed. The TLF is a girdling structure consisting of several aponeurotic and fascial layers that separates the paraspinal muscles from the muscles of the posterior abdominal wall. The superficial lamina of the posterior layer of the TLF (PLF) is dominated by the aponeuroses of the latissimus dorsi and the serratus posterior inferior. The deeper lamina of the PLF forms an encapsulating retinacular sheath around the paraspinal muscles. The middle layer of the TLF (MLF) appears to derive from an intermuscular septum that developmentally separates the epaxial from the hypaxial musculature. This septum forms during the fifth and sixth weeks of gestation. The paraspinal retinacular sheath (PRS) is in a key position to act as a 'hydraulic amplifier', assisting the paraspinal muscles in supporting the lumbosacral spine. This sheath forms a lumbar interfascial triangle (LIFT) with the MLF and PLF. Along the lateral border of the PRS, a raphe forms where the sheath meets the aponeurosis of the transversus abdominis. This lateral raphe is a thickened complex of dense connective tissue marked by the presence of the LIFT, and represents the junction of the hypaxial myofascial compartment (the abdominal muscles) with the paraspinal sheath of the epaxial muscles. The lateral raphe is in a position to distribute tension from the surrounding hypaxial and extremity muscles into the layers of the TLF. At the base of the lumbar spine all of the layers of the TLF fuse together into a thick composite that attaches firmly to the posterior superior iliac spine and the sacrotuberous ligament. This thoracolumbar composite (TLC) is in a position to assist in maintaining the integrity of the lower lumbar spine and the sacroiliac joint. The three-dimensional structure of the TLF and its caudally positioned composite will be analyzed in light of recent studies concerning the cellular organization of fascia, as well as its innervation. Finally, the concept of a TLC will be used to reassess biomechanical models of lumbopelvic stability, static posture and movement.



### New publications regarding Redcord

Redcord recently updated our literature page with new relevant published literature regarding Redcord and/or principles that Redcord is based on. Visit [www.redcord.com](http://www.redcord.com) for more information.

### Big Redcord launch in South America

Redcord launched courses and product sales through our distributor AkroStudio Perú in August. Akro Studio Perú is arranging Redcord Active and Neurac courses in Lima. We are proud of the increasing interest for Redcord and Neurac treatment in South America.



### Changes in elderly care

Recent studies show that between half and one third of all graduates from high school after 2025 must choose a job in the health care sector if we are to meet the challenge of the aging population.

The Norwegian minister of local government says that Norway, just like many other countries worldwide, needs to enter a new track.

“We must start doing prevention programs for self-help rather than prioritize medical treatment and increase the number of institutional places for the elderly.”

An increasing number of physiotherapists are arranging exercise classes as a part of their business.

### Weak Link testing of elite athletes

The Norwegian cross country sprinter Oeystein Pettersen recently visited Redcord Clinic Lysaker for weak link testing and Neurac treatment. Now he is using Redcord to prepare for the 2012 season. Despite good training, the results of the testing showed that some improvement in stability and control is needed to reach his goals.

“He needs to work on exercises that are improving his muscle interaction. We are looking forward to working together with him in the coming season”, says Physiotherapist Henrik Pay at Redcord Clinic Lysaker.

Oeystein Pettersen has been using Redcod for a few years now, but he says he is excited about improving his body function to reach his goals in the competitions.

“With Redcord I can work on specific body functions. I use Redcord for stability training because I know it makes me a better skier”, says Pettersen.

