



Core Stability Training

**2012 EHF "Rinck" Convention Open Master
Coach and Licensing Course
Bregenz (Aut) 09 th. – 15. July 2012**

Mag. Andreas Vock – BSPA Wien





CORE STABILITY

Global muscles

Local stabilizers

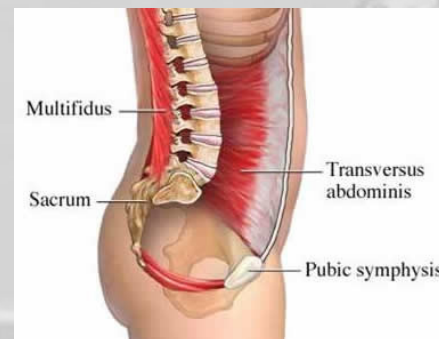
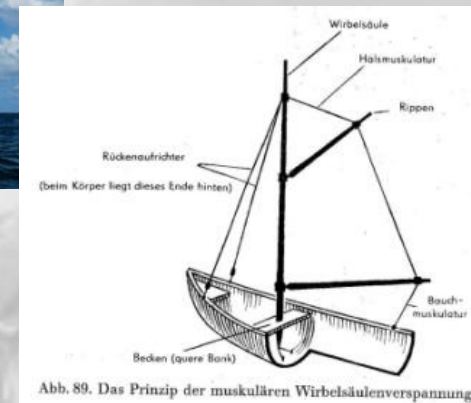
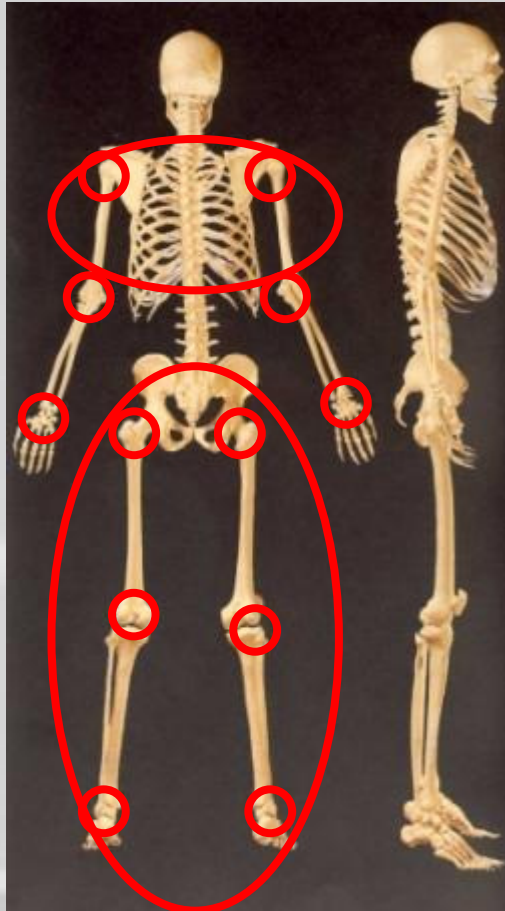
Muscle Chains

Sensorimotor
Activity





What means CORE STABILITY



bracing of the spine and a strong trunk





History

- Australian research group -
Hodges [1990]

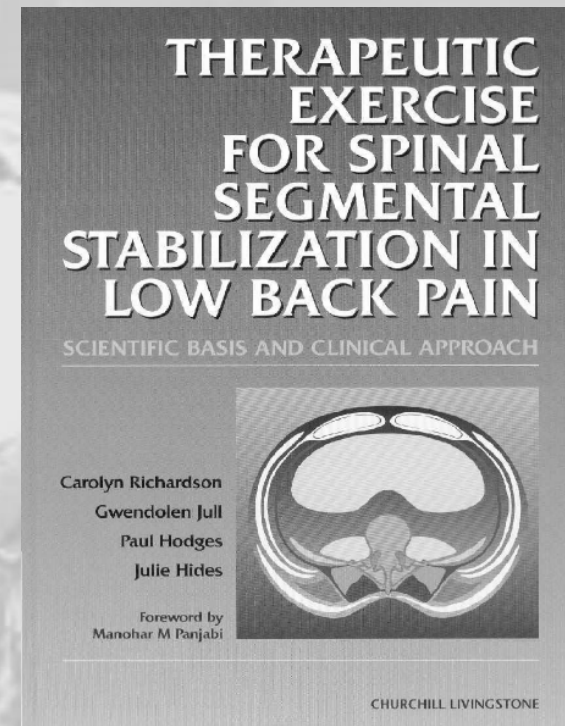
S-E-T concept

- Vidar Vindal, *Gitle Kirkesola* ,
Silvia Kollos

[PT from Norway, Austria and Germany]



Hannspeter (Hape) Meier

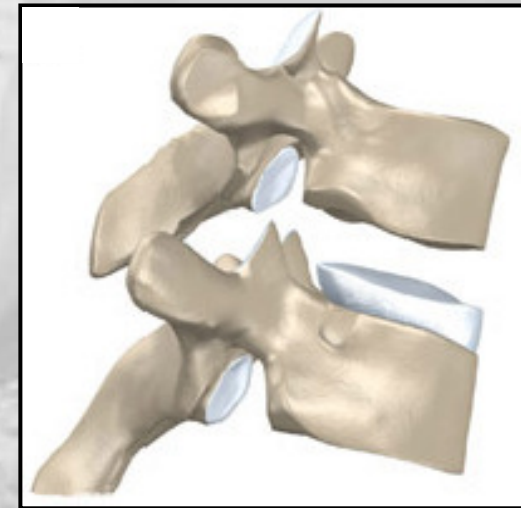


Anatomic basics

Muscle classification

- „global“ and
- „local“ stabilizers

..... to control segments and joints



segment system

Global muscles [lumbar area]

- back muscles [m. erector spinae]
- abdominal muscles [different parts]

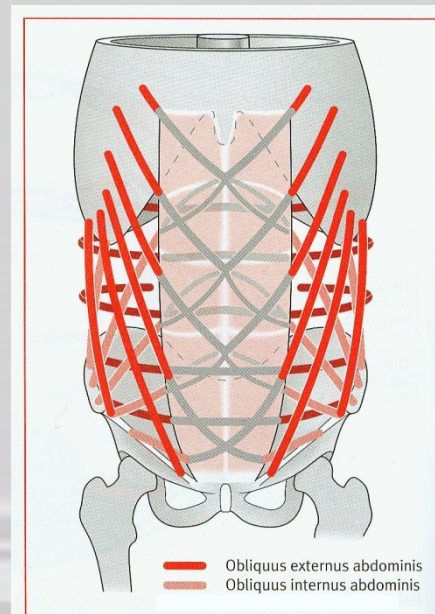
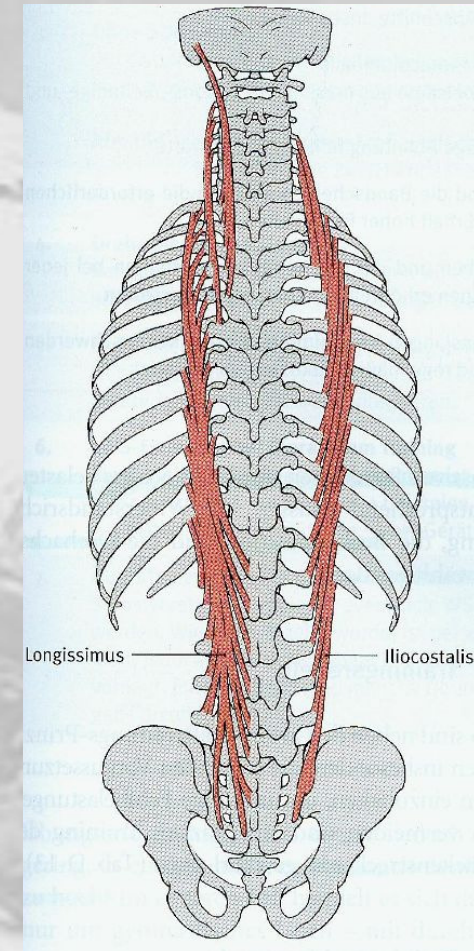


Abb. Gottlob 2001

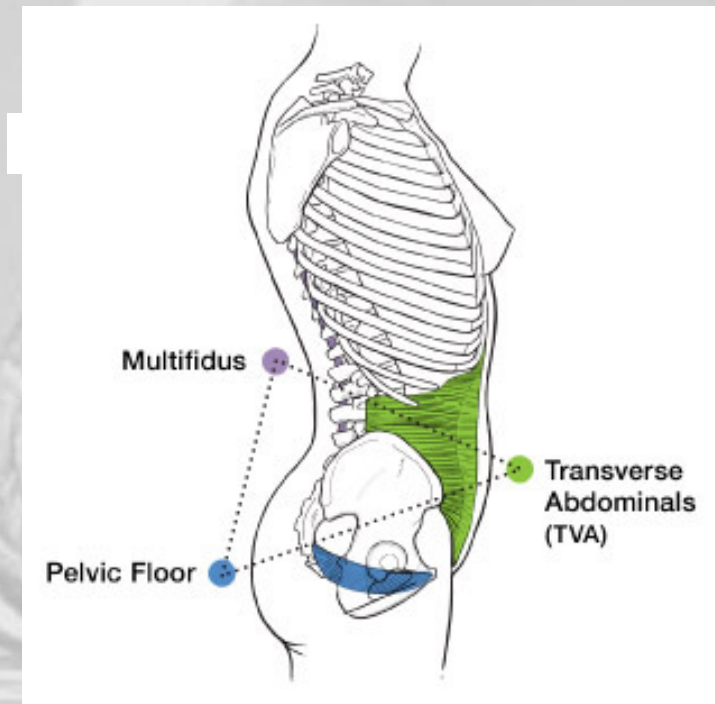
d) vielfältige horizontale, vertikale und schräge Muskelschlingenbildungen



The collective of lumbar stabilization

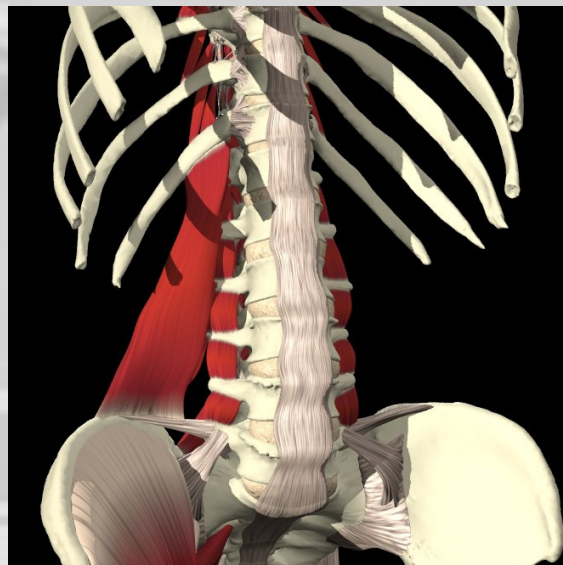
Local stabilizers „first order“ [lumbar area]

- diaphragm
- m. transversus abdominis
- mm. multifidi
- pelvic floor



Local stabilizers „second order“

- m. quadratus lumborum [medial portions]
- m. psoas major [posterior portions]
- m. latissimus dorsi
- m. obliquus internus u. externus abdominis



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Local stabilizers [lumbar area]

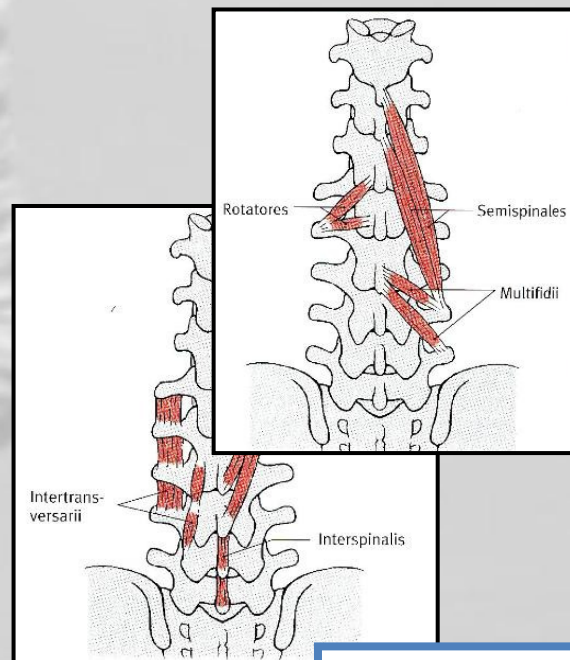


Abb. Gottlob 2001

Properties and abilities

- tonic contraction
- optimal compression of joint surfaces
- „feed-forward“ →



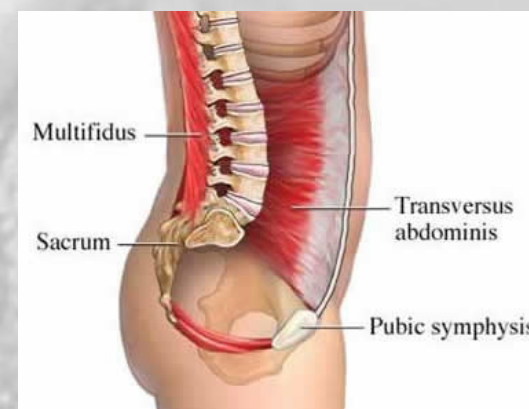
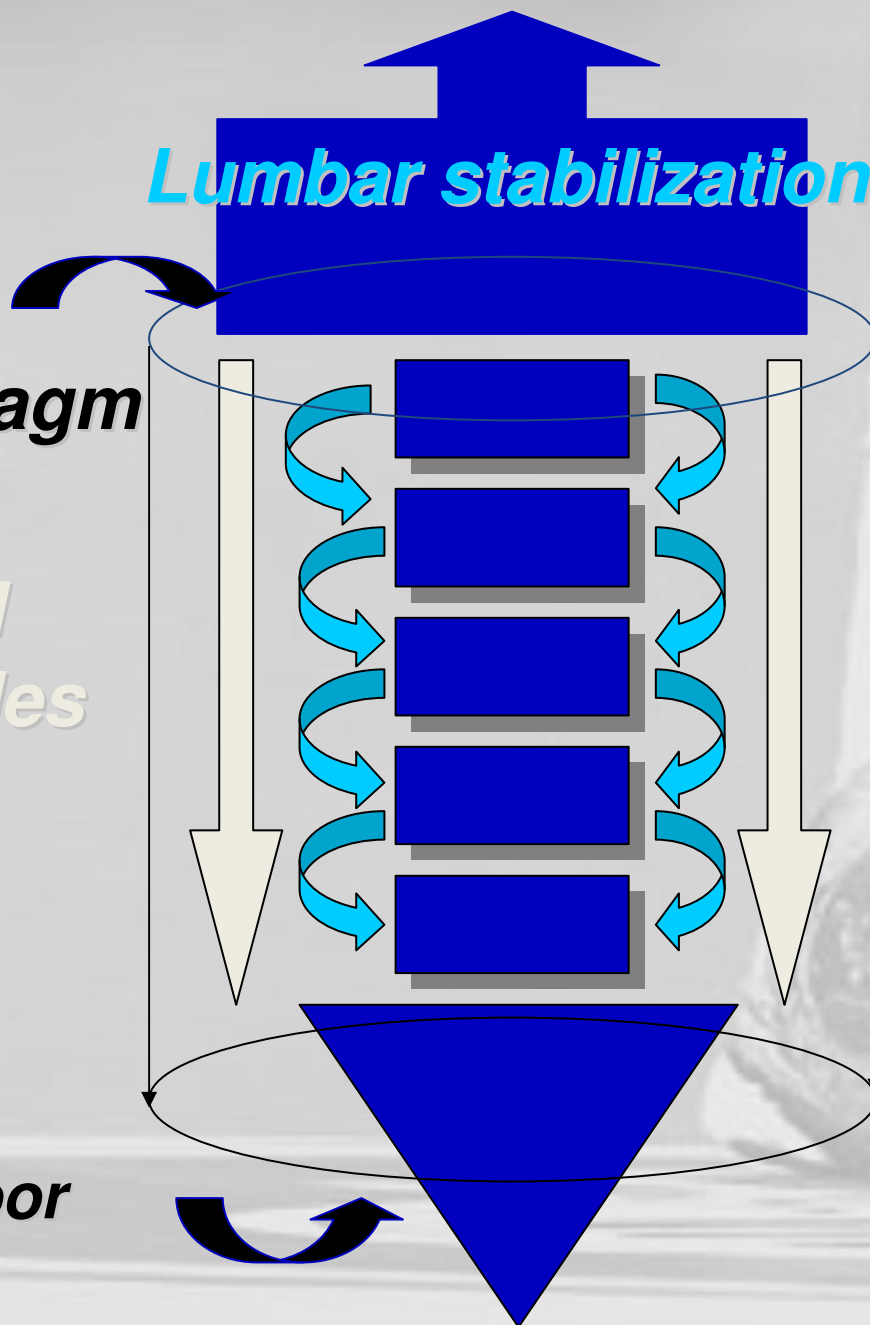
Lumbar stabilization

diaphragm

*global
muscles*

local stabilizers

pelvic floor





Feed – forward – mechanism

Cresswell 1999, Hodges 1997 and 1999

“Transversus abdominis contracts in all quick movements of the trunk, upper extremities, and lower extremities, before the muscles producing the motion are activated.”





Feed – forward - mechanism

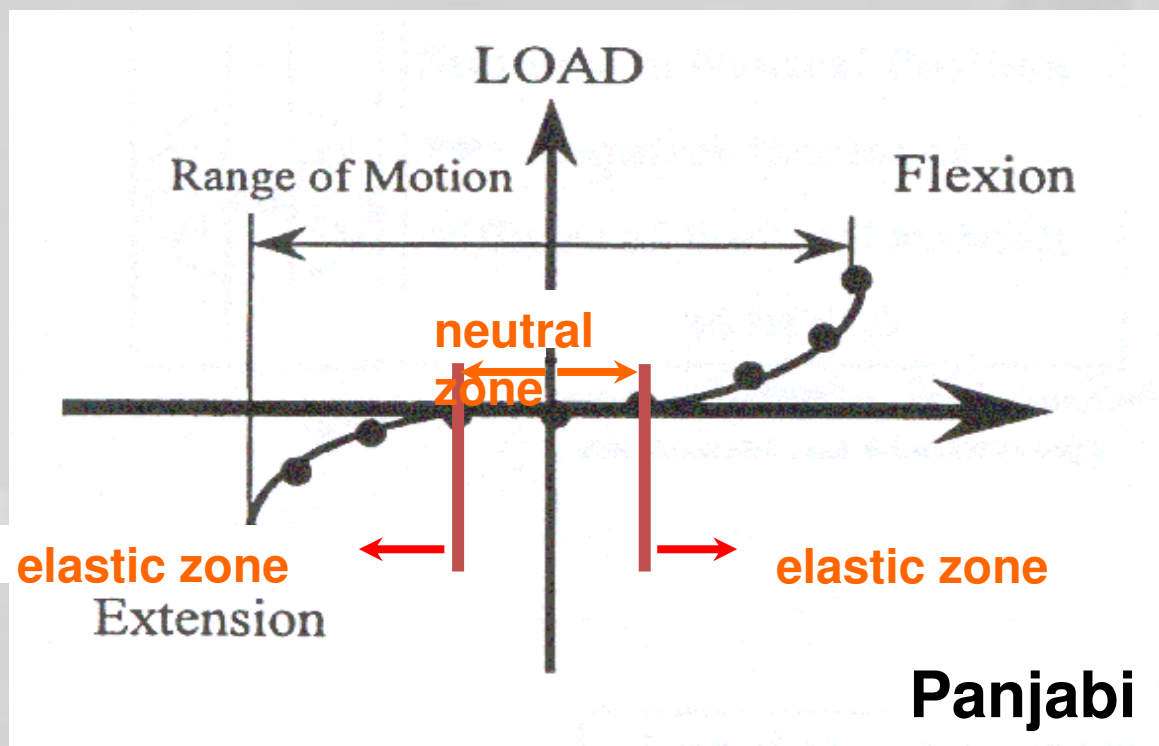
Moseley GL, Hodges PW, Gandevia SC :

“Deep and superficial fibers of the lumbar multifidus muscle are differently active during voluntary arm movements.”

Spine 2002;2:E29-E36



Model of stabilizing systems [lumbar area]



Panjabi 1992



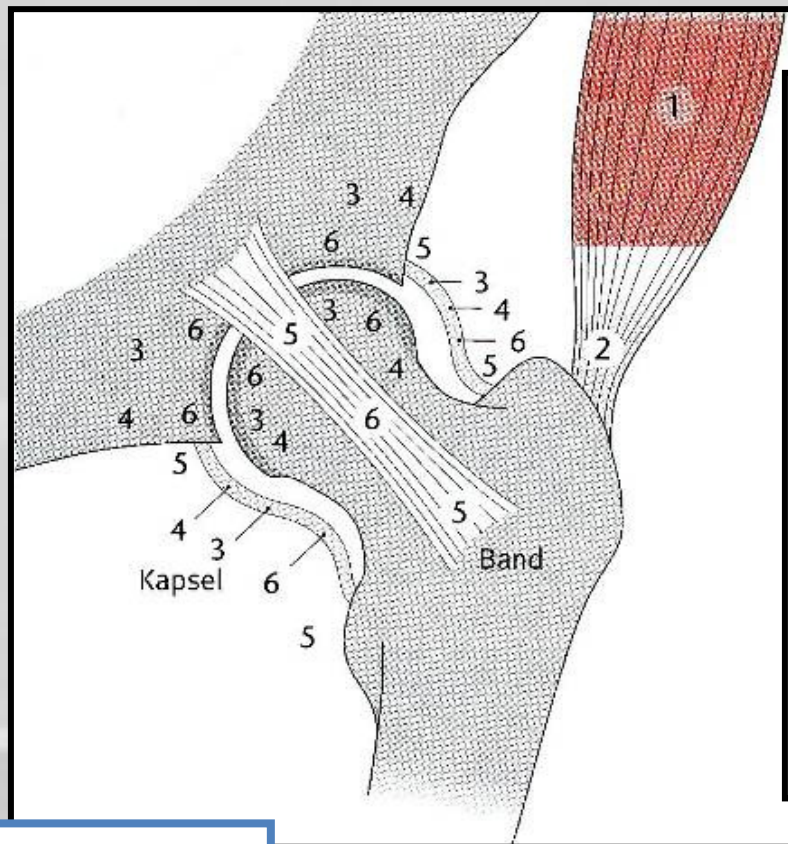
For 75%, the m. multifidus is the most important muscle for stabilization of the segment L4 - 5, during movement in the “neutral zone!”

Wilke 1995



This stabilizing system depends on the performance of the sensorimotoric system!

Sensors



- 1] muscles
- 2] tendons
- 3] joints
- 4] sensors for movement and acceleration
- 5] sensors for pain and injuries
- 6] sensors of the skin

Abb. Gottlob 2001



Sensorimotoric training



Labile und **unstable** training devices





Unstable training devices

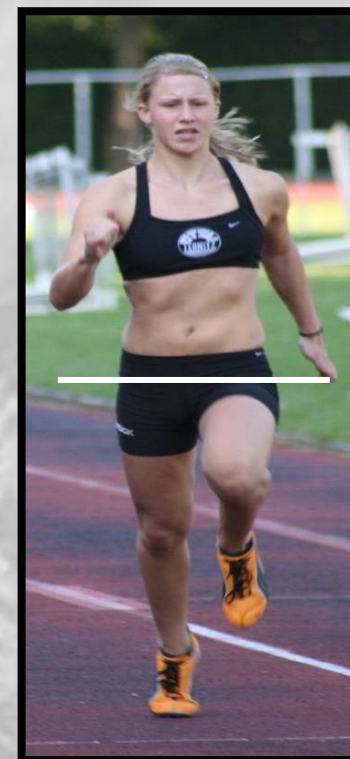
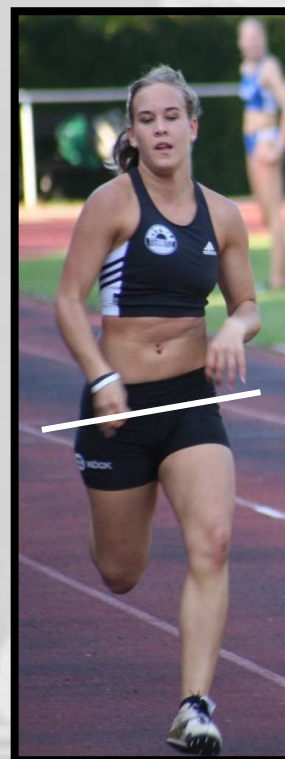
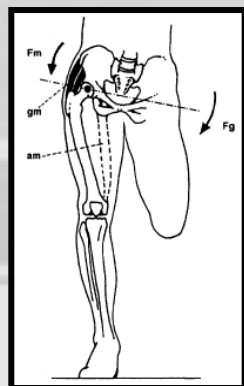
- high sensorimotoric activity based on
- fast, aggressive und unstable stimuli



Sensorimotoric training

Injury prevention and performance development:

- Hypertrophy and synchronous activity of the local stabilizers
- coordinated interaction





Chronic injuries or pain in the locomotor system means



- reduced information from the sensori-motoric system and
- reduced local stabilization
- reduced strength
- shear forces





Emergency programm/ paradoxic innervation The „global“ muscle system

- mainly takes the stabilizing control
- tries to limit painful movement
- hypertension
- coordinated interaction is disordered
- structural muscle shortening





Summary

Without sensorimotoric activity no motoric!

Pain reduces the flow of information from the sensors

„Feed – forward“ mechanism does not work at peak level!

..... paradoxical innervation/relieving posture





Methodological approach

The REHAPE® concept

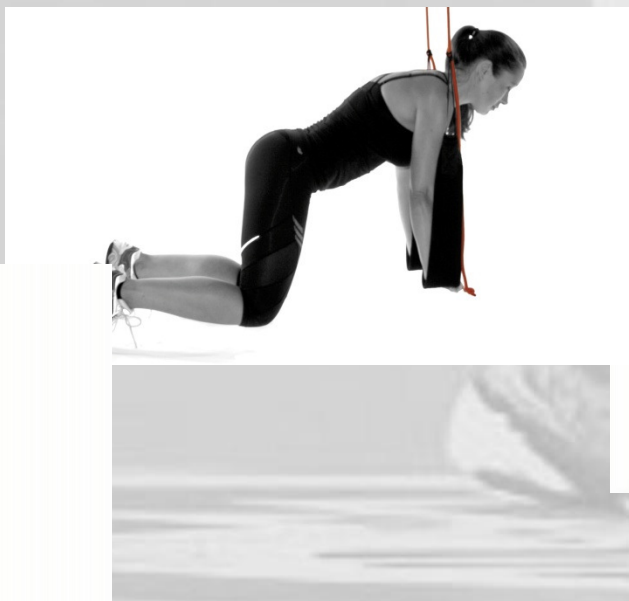
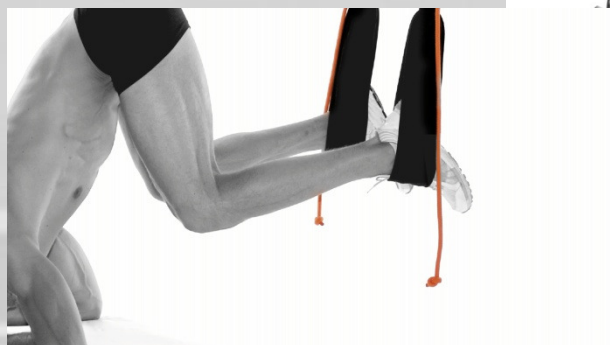
- reduce pain
- reduce tension
- increase metabolism in the global muscle system
- sensorimotoric training





REHAPE® Sling Trainer

- I. First, activate the „local“ stabilizers.
- II. Second, the „global“ muscle system.



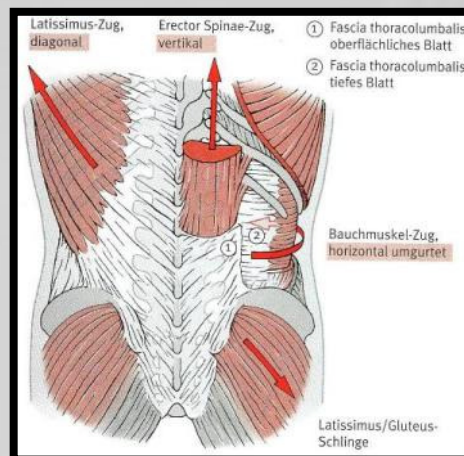
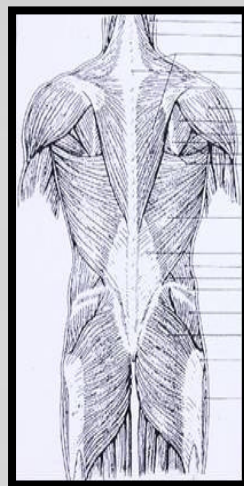
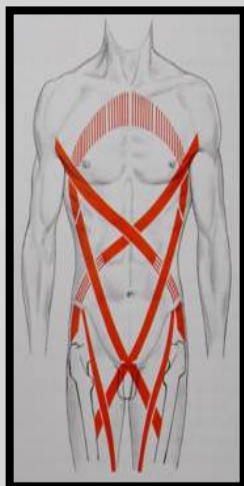


Remember: methodological approach

- high sensorimotoric activity based on
- fast, aggressive und unstable stimuli with and on unstable training devices and ...
- pain free
- open and closed kinetic chains



Muscle chains



Muscle chains are groups of muscles which belong together (structurally and functionally) and which are involved in movements and allow all kind of movement in all directions -> They work together!!!

Anterior (ventral) Muscles Chains
Posterior (dorsal) Muscles Chains
Side (lateral) Muscles Chains

Flexion Chain
Extension Chain





Thank you for ATTENTION



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