

# GO FIT for a functional spine!!!

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# Bad posture leads to:

- Neck and back pain are related to muscular pain
- Weak muscles
- Tight muscles
- Stiff joints
- **Muscle pain !**



Every one has to “pay attention” to its body pain signal !

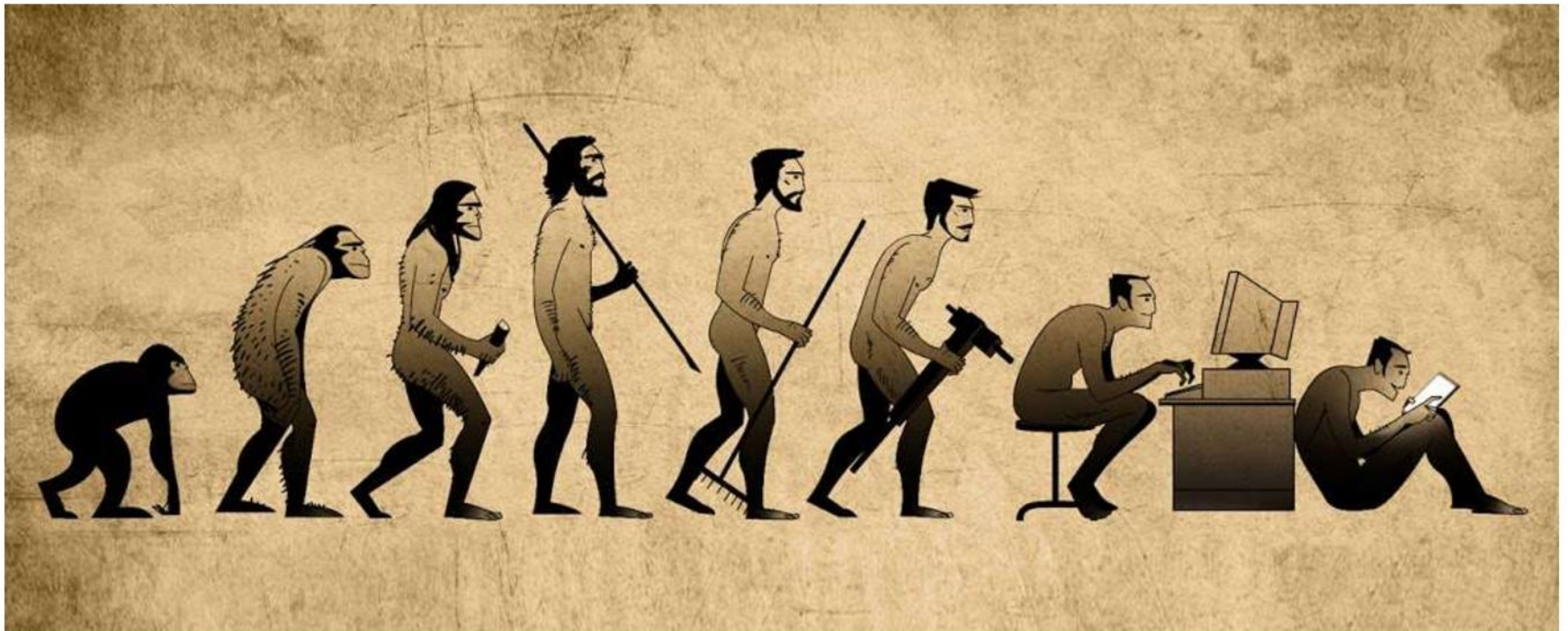


# Functional Movement

- BUT the HMS functions as an integrated system!!!
- The everyday functioning of the human body is an integrated and multidimensional system, not a series of isolated, independent pieces.



# HOW to assess dysfunction?



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# How to assess dysfunction in spine?



Upper crossed syndrome



Asymmetrical shift



Forward head

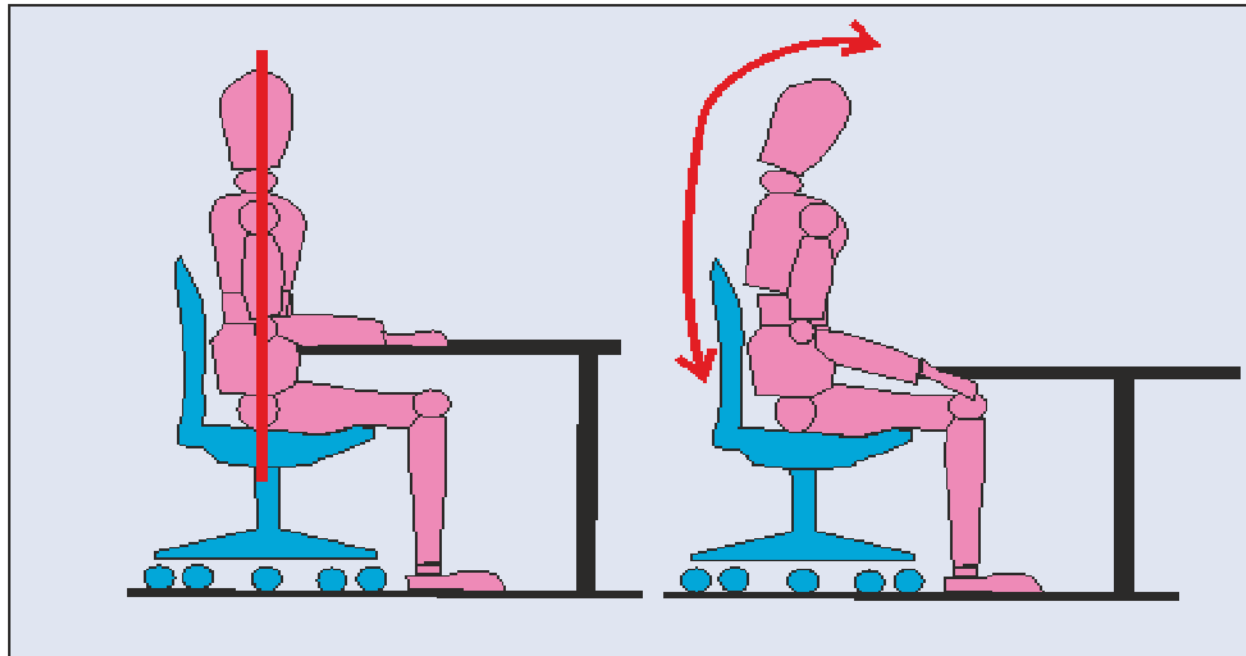


Asymmetrical shift



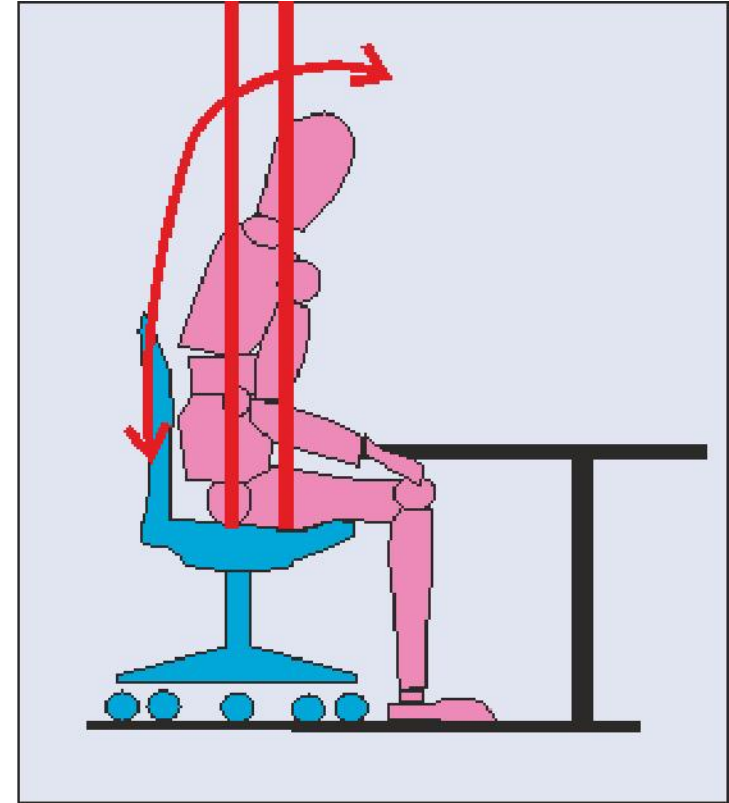
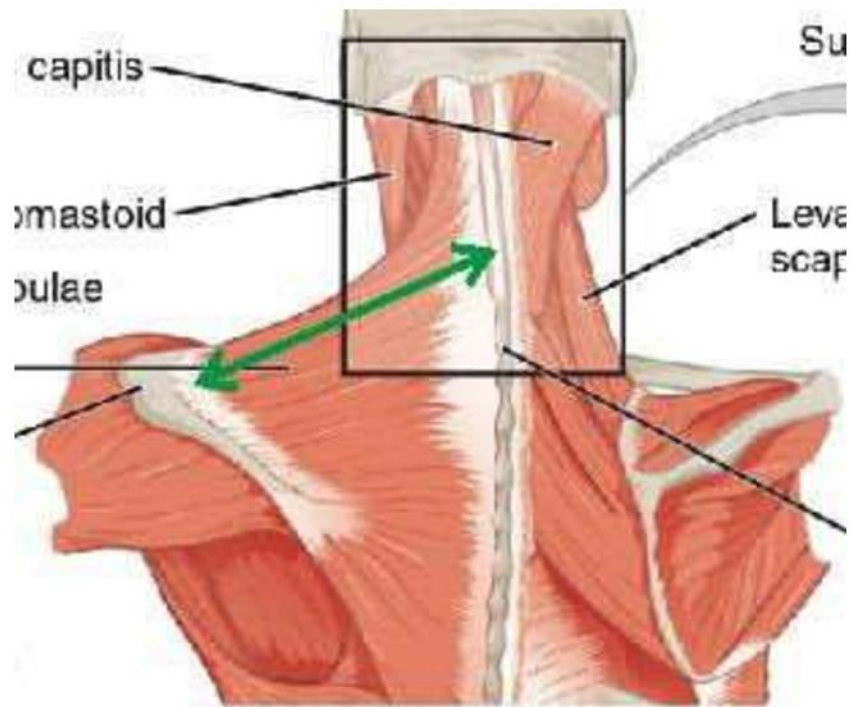
Shoulders elevate

# Muscle function and dynamic spine stabilization



Neck and torso muscles are activated eccentrically during upright position (like wire rope). When the body moves away from the gravity center, these muscles control it while are activated against gravity.

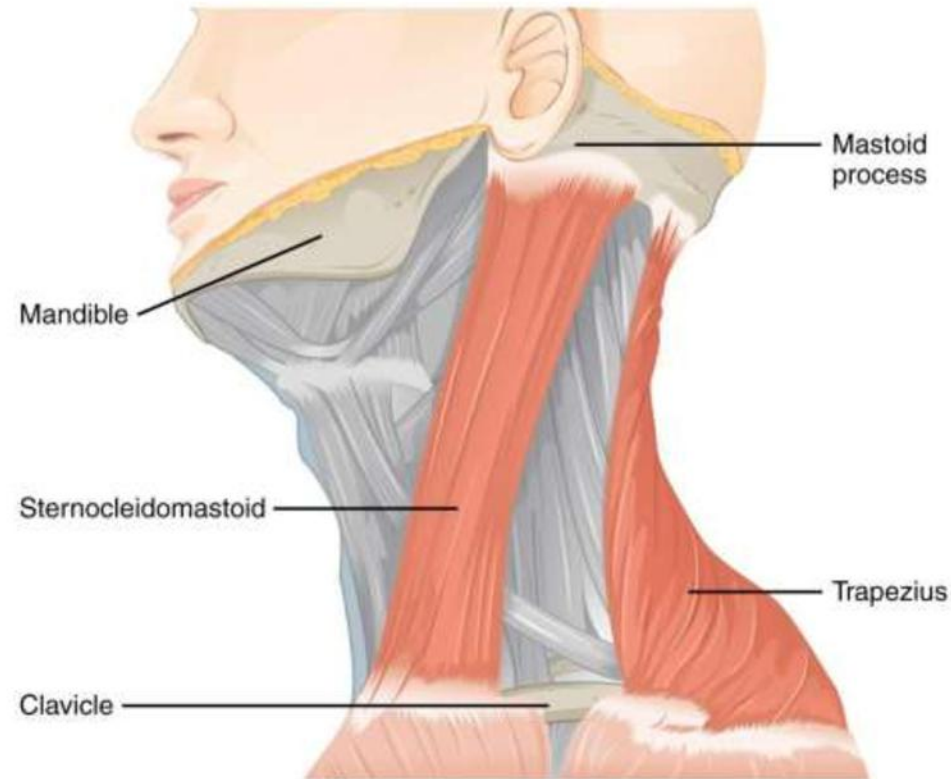
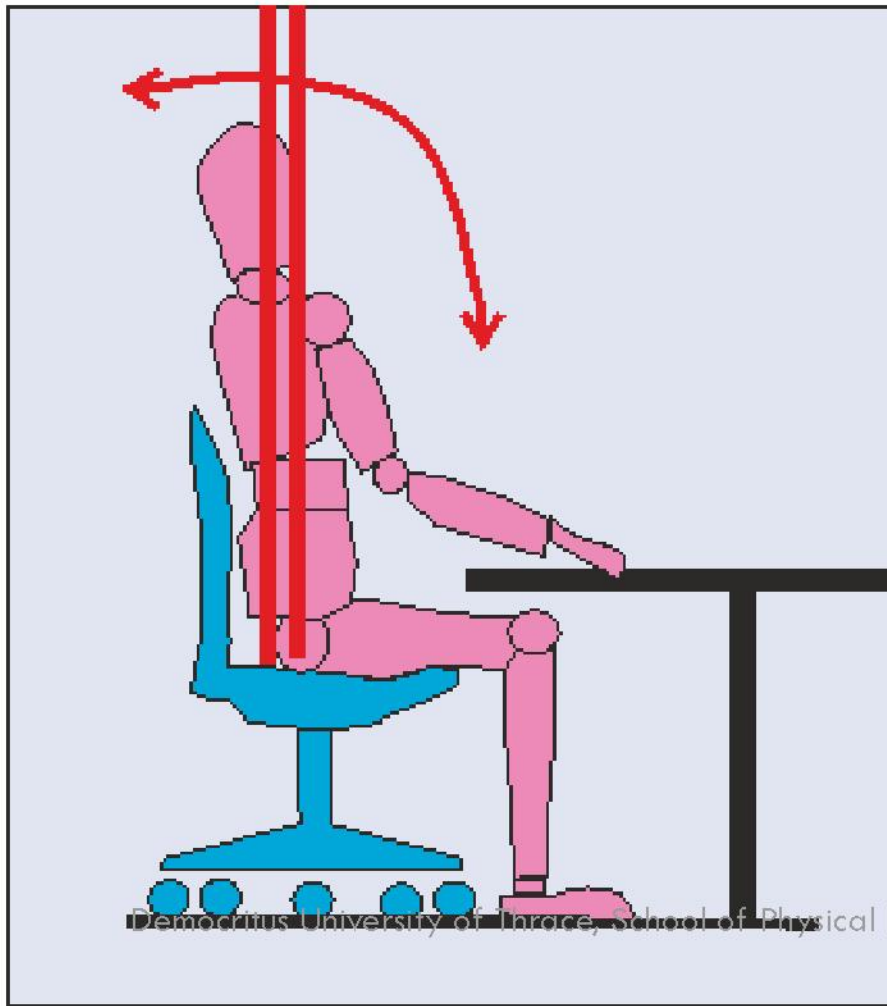
*(Lehmkuhl & Smith, 1983, Kisner & Colby, 1996).*



Gravity line lines forward therefore the back extensors muscle group controls the upper body which include the neck extensors (upper trapezoid muscle, erector spinal group etc).

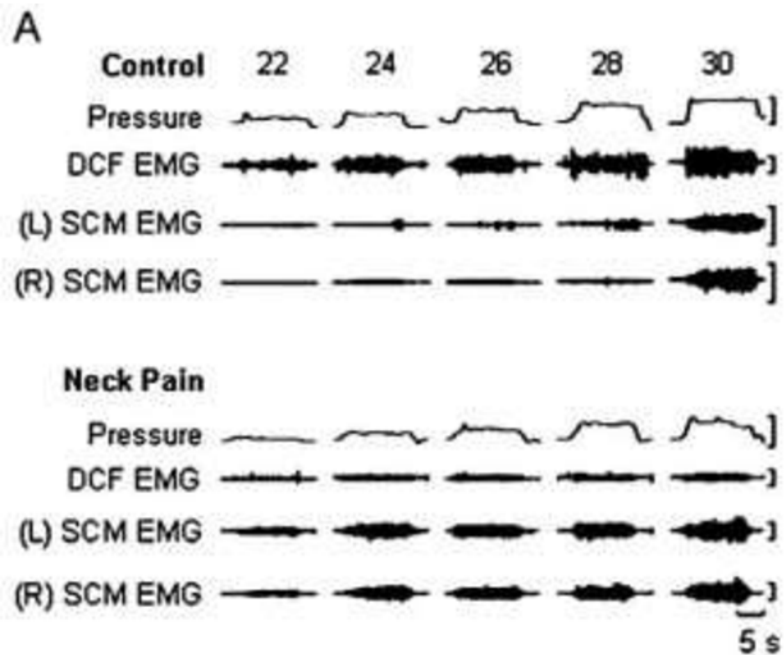


On the other hand when the gravity line lines backward, the back flexor muscle group controls the upper body which include abdominals, sternocleidomastoid etc).





When the gravity line moves laterally the opposite lateral torso muscles are activated.



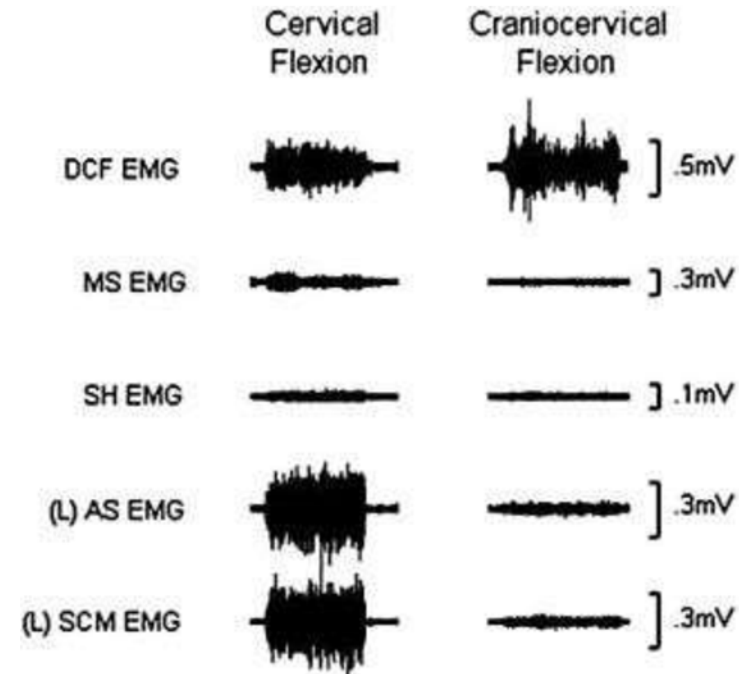
Decreased EMG activity of deep neck flexors and increased EMG activity of SCM in patients with neck pain compared to healthy controls

This represents a change in motor control during craniocervical flexion in patients with neck pain

**Falla et al. 2004 Spine 29: 2108-2114**

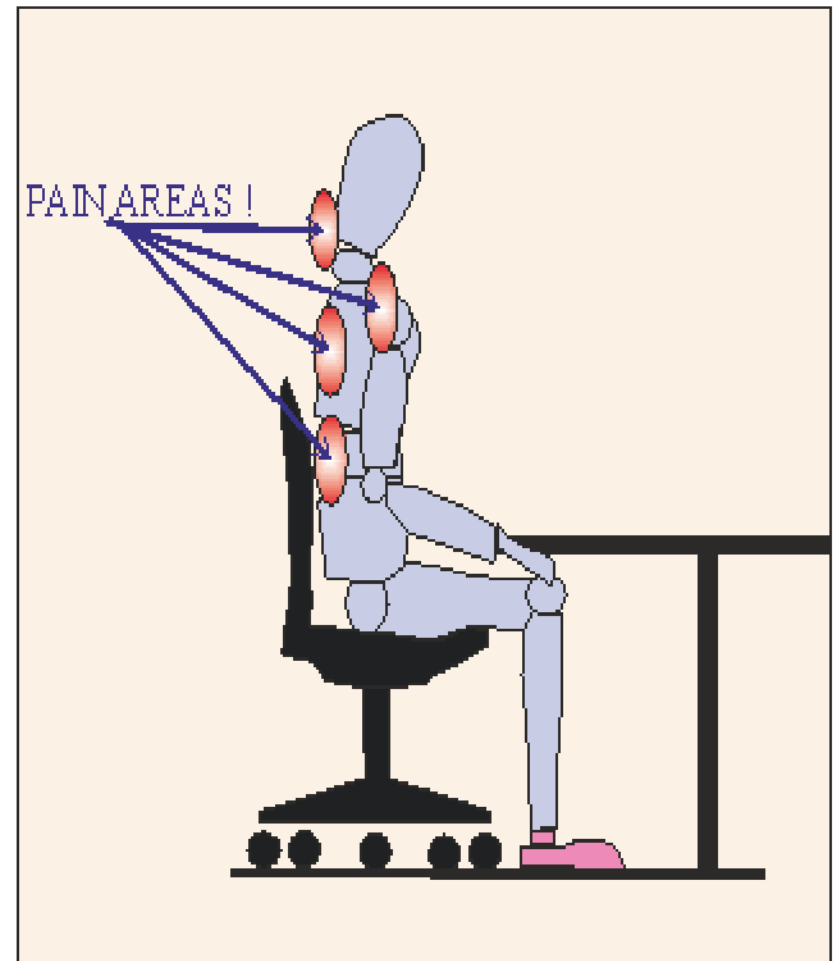
# For the neck the problem is...

- ❖ Deep neck flexors demonstrate constant activation during flexion irrespective of the movement pattern
- ❖ Superficial muscle (scalene, SCM) show EMG silence during craniocervical flexion (head on neck flexion)



# Bad posture causes pain

- Ligaments, facets, muscle etc neurosis.
- Poor muscle physical condition level.
- Mechanical stresses in anatomical structures.
- Inflammation on stressed anatomical structures.



# Cinderella hypothesis!



(referring to Cinderella, who was first to rise and last to go to bed):

- The motor units in the trapezius muscle are recruited in a fixed order
- Small, low-threshold motor units are recruited at low levels of contraction, before larger ones
- These are activated until complete relaxation of the muscle
- Long-lasting activation of these units may cause degenerative processes, damage and pain

# Cognitive factors and mental stress may induce muscle tension.

- Ongoing psychological stress may keep low-threshold motor units active more or less **continuously** (Wærsted 1996, Lundberg, Forsman et al., 2002)



# Stress and pain

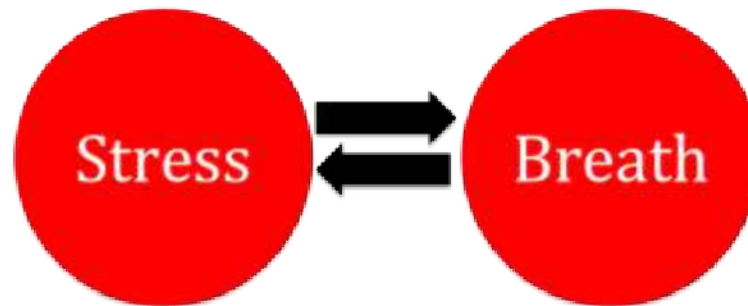
- This means that the same muscle fibers may also be active during breaks at work and after work, unless the individual is able to relax **mentally.**





# Psychobiological explanations of musculoskeletal disorders

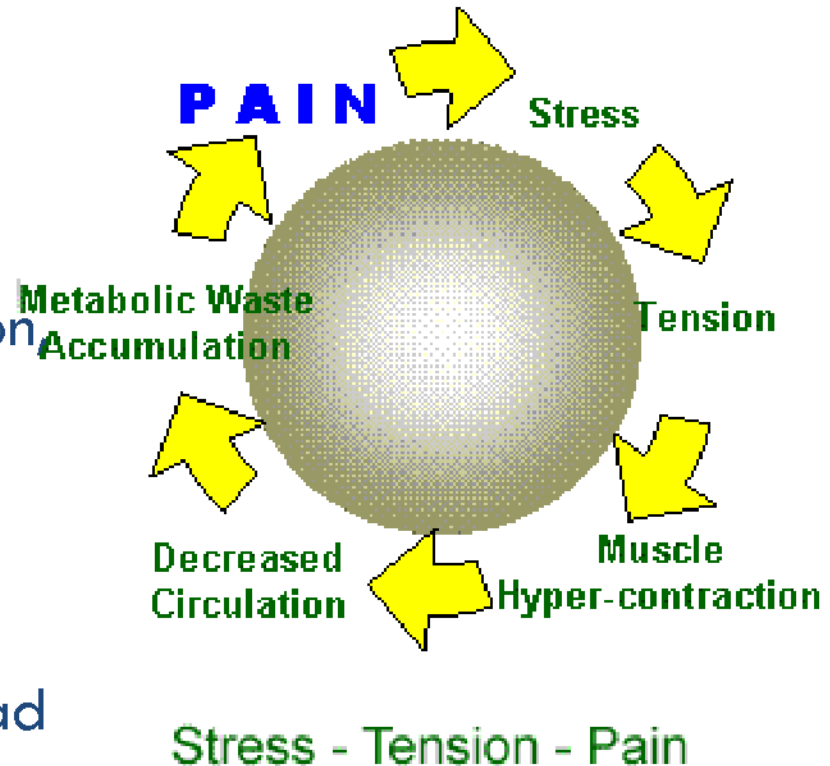
- Stress-induced hyperventilation decreases peak CO<sub>2</sub> levels
- Increases the blood pH level (beyond 7.45 = alkalosis).
- This contributes to elevated muscular tension and a suppression of parasympathetic activity (Schleifer & Ley, 1994)



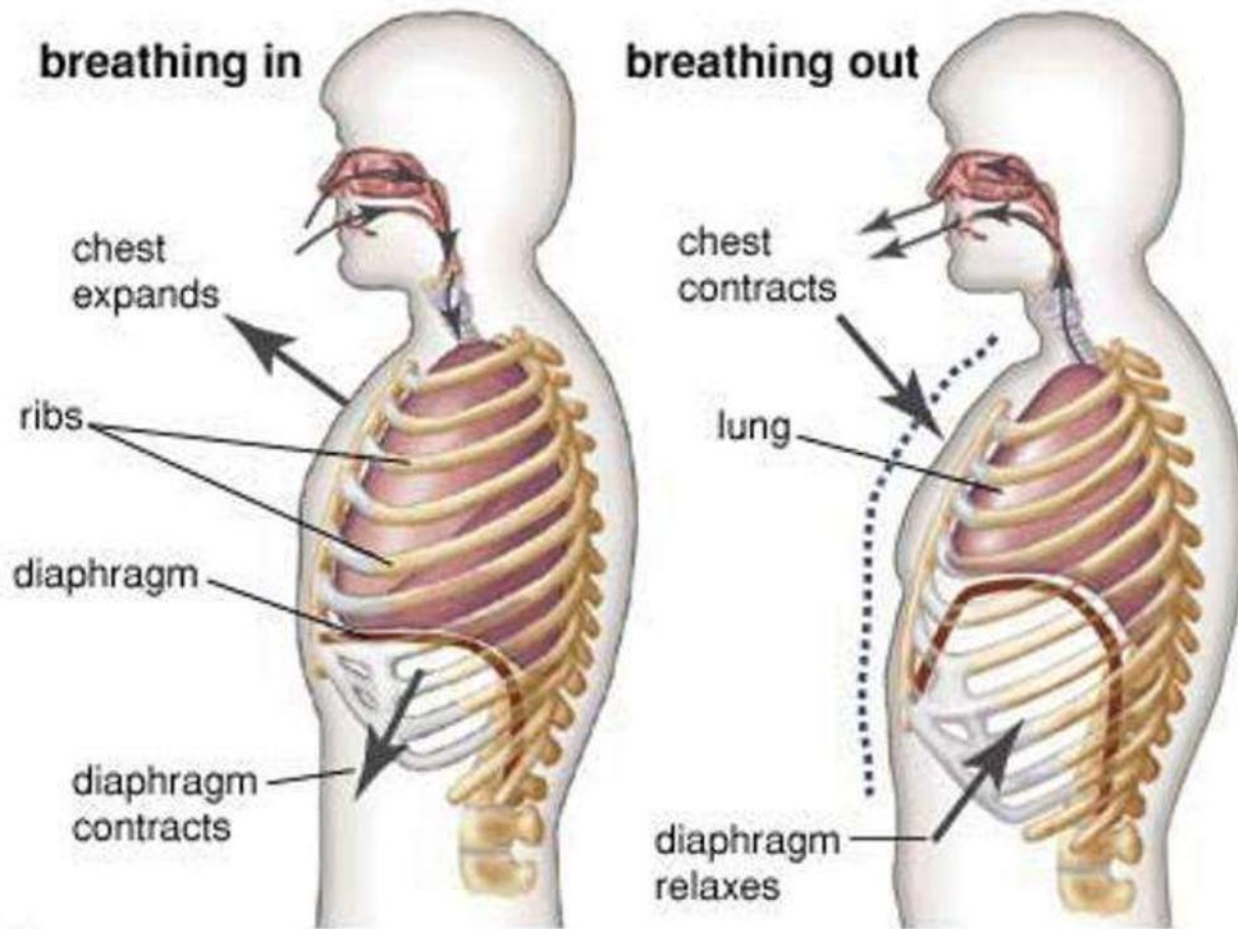
# Vicious circle!

- Vicious circles may start in muscle spindles during stress and repetitive work
- May contribute to elevated muscle stiffness and dysfunctional coordination including co-contractions
- High concentration of inflammatory substances and increased pain sensitivity.
- The pathological processes may spread from one muscle to another via nerve signals (Johansson et al. 2003)

(Schleifer & Ley, 1994)



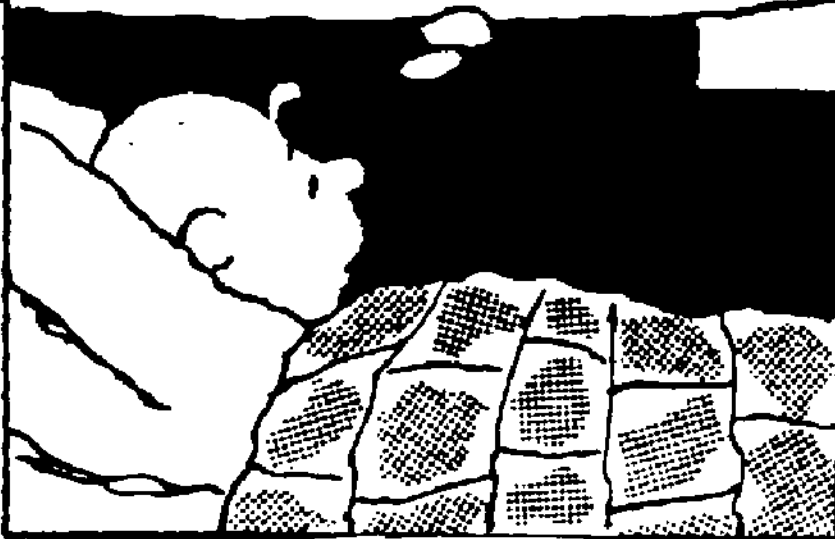
# Breathing movements



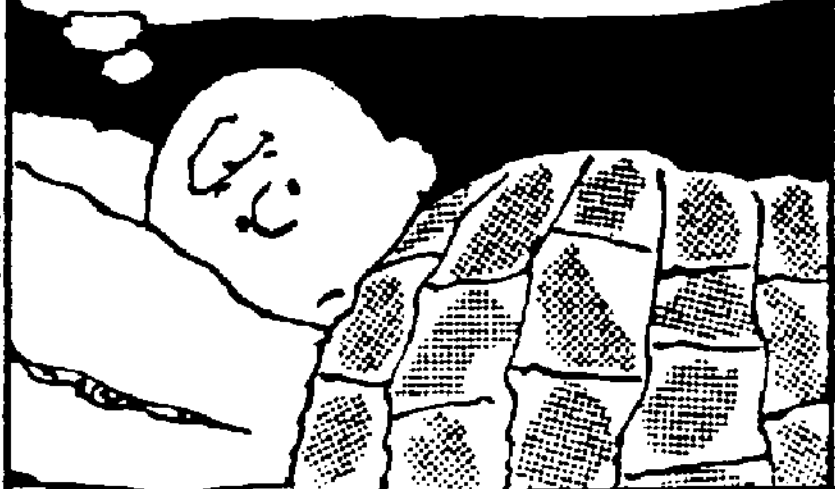
# Our breath is connected to our autonomic nervous system



SOMETIMES I LIE AWAKE AT NIGHT, AND I ASK QUESTIONS..



IS THERE ANY ONE THING A PERSON CAN DO TO MAKE HIS LIFE SUCCESSFUL?



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