

WORKING WITH SCOLIOSIS

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Etiology

- Not only in modern western cultures. Already described by Hippocrates and depicted in stone age cave drawings.
- Infantile scoliosis: more often in boys and left convex C-curve. Higher percentage among premature babies. Usually improve spontaneously, except for severe cases.
- Idiopathic Sc: most common form (90%). Majority in girls. Majority is right convex at thorax. Starts mostly just before puberty, yet progresses without treatment until end of skeletal maturity (men at 16 ½, women at 17 ½ - 18 yrs).
- Under the following circumstances the scoliosis may continue to increase beyond skeletal maturity:
 - Strong genetic factors
 - Severely unbalanced curve (i.e. plumbline from C7 passes far away from the anal fold)
 - Very hypotone musculature
 - Women with several pregnancies plus being overweight plus lack of movementThen the scoliosis tends to increase 1-2 degrees per year, or 5-8 degrees per pregnancy.
- Genetic factors seem quite likely: If one parent has it, child has 30% chance of getting it. If both parents have scoliotic genes (even if one parent does not exhibit it), chances of the child getting it are even much higher. Probably sex-linked trait (i.e. can be transmitted from mother to either a son or a daughter, yet from the father only to a daughter). The trait may not pass on to every generation (incomplete penetrance) and when it expresses it may be more severe in the child than in the parent or vice versa (variable expression).

Two exciting new research discoveries:

1) There seems to be a link between **defects in proprioception** and the development of scoliosis.

(Keessen et al, Proprioceptive accuracy in idiopathic scoliosis, SPINE, vol. 17 #2, 1992, pp. 149-55)

2) A study on **polysynaptic spinal cord reflexes** (which are intimately involved in postural equilibrium) showed that the neuromuscular adaptation in these reflex regulations happens slower and less accurately than in normal people or in non-idiopathic cases of scoliosis.

(Maquire et.al, Intraoperative Long-Latency Reflex Activity in Idiopathic Scoliosis Demonstrates Abnormal Central Processing, a possible cause of idiopathic scoliosis, SPINE vol. 18 #12, 1993, pp 1621-26)

Further details on both studies at: www.somatics.de

Other research findings:

Based on a MEDLINE search under 'idiopathic scoliosis'

- Attempts to prove the HEUER theory of different bone growth rates (i.e. the vertebral body line growing faster than the vertebral arc line) have failed so far.
- Attempts to link idiopathic scoliosis with anomalies in genetic collagen morphology have failed.
- Several attempts to influence the scoliosis by cutting the psoas did not yield any success.
- Some studies have shown postural sway aberrations, yet these have not been confirmed by others. Same for a finding of electroencephalographic irregularities in same patients, which has not been confirmed by others.
- Pinealized chicken develop scoliosis. Their biomechanics are similar to idiopathic scoliosis in humans.
- There were early findings of a correlation between lack of melatonin and the development of scoliosis in animals. Detailed studies in humans could not verify this.
- Multifidus fibers around the apex tend to become more fast twitch types on the concave side. Probably as result not cause of the scoliosis.
- Microscopic examination of spinal muscles has shown a reduction in the number of muscle spindles in scoliosis.
- In general the morphology of scoliotic clients has less mesomorphic features. This seems to be also a prediction factor: if the mesomorphic values are very low in the SHELDON typology, the scoliosis has a high probability to increase with age.
- MRI studies have shown a significant higher frequency of abnormalities in the brain stem area (as well as in the spinal cord) among idiopathic scoliosis clients when compared with other types of spinal asymmetries or normal people.
- Postural coordination (i.e. balancing on a wooden beam) is less developed in scoliotic people.

Spinal Biomechanics

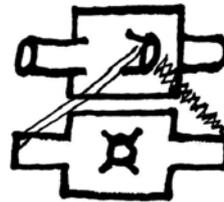
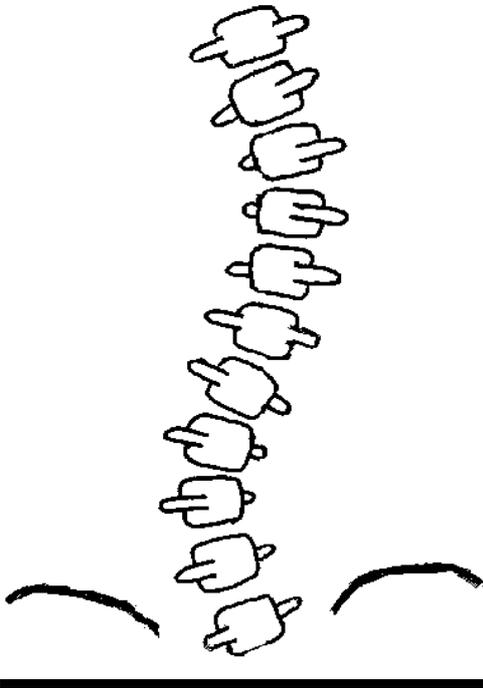


Illustration above:
Shortening of the small rotator muscle on the right side contributes to a rotational movement of the upper vertebrae to the left (i.e. its spinous process is rotated towards the side of the shortened rotator muscle)

- 'As a *goup*' the vertebrae in a right convex curvature are rotated (with their front) towards the left; and in a left convex curvature towards the right. Yet when looking at each vertebrae individually in relation to its neighbour below, this is only true *inferior* of the apex of the curvature. *Superior* of the apex each vertebrae is rotated more towards the concaveside in relation to its neighbour below.
- The following spinal erectors are shortened:
 - longitudinal fibers on concave side of each curvature
 - transverse fibers on concave side of each curvature, yet only inferior of the apex. (Also the transverse fibers on the convex superior of the apex are geometrically short. Yet this can be seen as 'useful' in terms of helping these vertebrae to rotate less away from the sagittal plane.)

Five Suggested Treatment Approaches:

1. Specific Work on Shortened Spinal Erectors (see detailed description below)
2. General Widening Approach
3. Psychological/Social/Environmental
4. Antigravity Sensor Function
5. Micromovements for Refinement in Proprioception

My Favorite Three Scoliosis Techniques:

- 1.) **Specific work on Shortened Spinal Erectors** (in rotated sidelying position, as described below)
- 2.) Client **sitting on ball. Leaning with both lower arms on the backrest** of a chair in front of him. Engaging her in micromovements from within during the myofascial work on the back.
- 3.) Client **standing on soft foam** (variation: with closed eyes) while balancing a small soft cushion on top of head. "Come and meet me"-micromovements at different areas of touching.
Variation: holding a Swiss Ball overhead, moving it around in large slow circles in order to open up different areas of the thorax.

Description of Technique 1:

Specific Work on Shortened Spinal Erectors

- client lying on convex side of the curvature to be treated
- apex of curvature placed over pillow

For sidebending:

- lengthening work on ceiling side of spine on the longitudinal erector fibers
- asking client to actively lengthen this side simultaneously
- maybe using 'Post-Isometric Release' technique before

For rotation:

- in rotated sidelying position: manubrium rotated towards ceiling, pelvis in opposite direction, legs & arms positioned such as to increase this trunk rotation
- lengthening work on deep spinal transverse fibers on ceiling side of spine, yet only inferior of apex.
- asking client to actively rotate more while you work
- Front work: Lengthening of external abdominal oblique fibers going from lateral ribs on ceiling side towards hip on table side.

General Working Tips

- Besides work on the primary shortened tissues, help them with your hands to become overall a taller and bigger person.
- **Core muscles:**
 - Quadratus lumb.
 - Paraspinal musculature
 - Intercostals
 - Often generally short: Iliopsoas, hams, triceps surae (then typical unspringy gait)
 - If there are limitations in ROM of shoulder joint:

- pectorals (convex side),
 - latissimus (concave side),
 - maybe also serr.ant. (convex side) and upper traps (both sides).
 - Highest leverage point neurologically: suboccipitals. Work at least 5 minutes there every single session.
- Help regaining lost flexibility:
 - Lumbar forward bending and sidebending
 - Cervical movements in all directions
 - Trunk rotation and sidebending opposite to their pattern..
 - Encourage a lifestyle with lots of physical activity (e.g. Gyrotonics, Pilates)
 - Encourage postural balance activities (e.g. inline skating, snowboarding)
 - Rolfing Movement: reach or push motions with clear two-directional extension (e.g. upwards and downwards)
 - Don't spend the whole session with them on the table. Finish each session with at least several minutes of active work in gravity (sitting on ball, balancing on board, actively reaching, etc.)
 - Make them feel good about themselves
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Note: The video 'Working with Skoliosis' (available at the Rolf Inst.) from a previous presentation from me, is to about 70% congruent with this newer lecture above. It includes a demonstration of the first of the above three favorite working techniques.

Review Quiz

Answers in small print below

- 1.) Give 3 reasons why working with scoliosis **can be hell**
- 2.) The majority of idiopathic scolioses are**(left/right) convex** in the thorax.
Idiopathic scoliosis is **more common among** (boys, girls) in puberty.
3. What do you know about the etiology of **infantile** scoliosis?
4. Describe the **direction of rotation** of the individual vertebrae in a left convex scoliotic curve.
5. Do you know of any correlation between scoliosis and **SHELDON's** morphological body typology?
6. Under what conditions does a scoliosis **tend to increase** even after the age of skeletal majority at 16-18 yrs?

Quiz Solutions:

1. A) It is not uncommon for the scoliosis to appear worse after a session
B) Nobody really knows what is going on in a scoliosis and why it is doing this weird thing.
C) The psychodynamic triangle betw. child – mother – practitioner can be a tricky if not hopeless setup for a real growing up.
2. Right convex More common among girls.
3. More often in boys and left convex thoracic.
Curiously more often in England.
Assumed to be related to birth process.
Usually gets better by itself, except in severe cases.
4. Below the apex each vertebrae is rotated (with its front) toward the concave side = right side (rotated in relation to the vertebrae below).
Above the apex the vertebrae start to rotate the other way, i.e with their front towards the convex side = the left side.
5. If weak on mesomorphic values (i.e. less muscle definition) higher chance of scoliosis and higher chance that scoliosis may progress.
6. Strong genetic factors (several other scoliosis cases in family)
Severely unbalanced curve (i.e. plumbline through C7 passes way off the anal fold)
Very hypotone musculature
Several pregnancies PLUS being overweight PLUS lack of movement