Rotatie in de wervelkolom tijdens het gaan.
Mobiliteit van de lumbale wervelkolom:

<table>
<thead>
<tr>
<th>Segment</th>
<th>Flexie</th>
<th>Rotatie</th>
<th>Lateraal</th>
<th>Totaal</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1/2</td>
<td>5°</td>
<td>15°</td>
<td>5°</td>
<td>25°</td>
</tr>
<tr>
<td>L2/3</td>
<td>5°</td>
<td>15°</td>
<td>5°</td>
<td>25°</td>
</tr>
<tr>
<td>L3/4</td>
<td>5°</td>
<td>15°</td>
<td>5°</td>
<td>25°</td>
</tr>
<tr>
<td>L4/5</td>
<td>5°</td>
<td>15°</td>
<td>5°</td>
<td>25°</td>
</tr>
<tr>
<td>L5/S1</td>
<td>5°</td>
<td>15°</td>
<td>5°</td>
<td>25°</td>
</tr>
</tbody>
</table>

Totaal: 25° 25° 25° 25°
LITERATUUR

ZITTEN EN RIJKSPIEREN

LITERATUUR
Zie ook volgende sheet

Kirschner wires were inserted into the L1, L2, L3, L4, L5, and S1 spinous processes. The wires were clamped together, and reflective imaging modalities are not conducive to gait applications. Evaluated motions during gait. While several imaging-based studies of spinal motion have been reported, the restrictions in measurement volume that are inherent to normative data were obtained to better understand the effects of spine disorders on vertebral motion with retroreflective markers and motion capture. Two previous studies in which bone pins were used were limited to instrumentation of two vertebrae, and neither contribute flexion motion in an offset phase pattern.

Conclusions: The lumbar spine chiefly acts to contribute abduction during stance and adduction during swing to balance the relative motions between the trunk and pelvis. The lumbar spine acts in concert with the thoracic spine. While the lumbar spine chiefly contributes to frontal plane motion, the thoracic spine contributes the majority of the transverse plane motion. Both pelvis. The lumbar spine acts as a distinct functional segment in the spine during running, chiefly contributing lateral flexion to balance the relative motions between the pelvis and limbs.

Assessment of Three-Dimensional Lumbar Spine Stretched Motion During Gait with Use of Indwelling Bone Pins
Bryan A. MacWilliams et al.

Conclusions: The lumbar spine acts as a distinct functional segment in the spine during running, chiefly contributing lateral flexion to balance the relative motions between the pelvis and limbs. The pelvis had significantly greater range of frontal plane motion, and the thoracic spine had significantly greater range of transverse plane motion with running. Skin-mounted studies reported as much as 4 times the motion range determined by the indwelling bone pin techniques, indicating overestimation and only instrumented a single vertebra.

Results. Lumbar spine flexion and pelvic rotation patterns in running were reversed compared with walking. Increased lumbar spine motions during running. The pelvis had significantly greater range of frontal plane motion, and the thoracic spine had significantly greater range of transverse plane motion with running. Skin-mounted studies reported as much as 4 times the motion range determined by the indwelling bone pin techniques, indicating overestimation and only instrumented a single vertebra.

Methods. Eight healthy volunteers participated in this observational study. Study Design. Eight healthy volunteers participated in this observational study. Samples were obtained from the literature and subjected to the statistical analysis. Results. Lumbar motion and pelvis motion patterns were consistently compared with walking. Increased lumbar spine motion during running. The pelvis had significantly greater range of frontal plane motion, and the thoracic spine had significantly greater range of transverse plane motion with running. Skin-mounted studies reported as much as 4 times the motion range determined by the indwelling bone pin techniques, indicating overestimation and only instrumented a single vertebra.

Objective. Quantify 3-dimensional motions of the lumbar vertebrae during running

Method. Reflective marker triads were attached to Kirschner wires inserted into the spinous processes of L1–S1. Anatomic registration between each vertebra and attached triad was achieved using spinal computed tomographic scans. Skin-mounted trunk markers were used to assess end of each wire couple. Subjects underwent spinal computed tomography to anatomically register each vertebra to the attached triad. Subjects then walked several times in a calibrated volume at self-selected speed while 3-dimensional motion data were collected.

Three-Dimensional Lumbar Spine Stretched Motion During Running Using Indwelling Bone Pins
Bryan A. MacWilliams, Adam Rosenfeld, Andrew N. Swanson, Roy Wervey, Day21C. Dykes, Steven Novacheck and Michael J. Adolescente
SPINE Volume 39, Number 26, (2014) pp E1560 - E1565

Figure 2

Three-Dimensional Lumbar Spine Stretched Motion During Running Using Indwelling Bone Pins
Bryan A. MacWilliams, Adam Rosenfeld, Andrew N. Swanson, Roy Wervey, Day21C. Dykes, Steven Novacheck and Michael J. Adolescente

LITERATUUR

Summary of Background Data. Lumbar spine motions in running are only reported in 1 series of articles using a skin-mounted technique subject to overestimation and only instrumented a single vertebra.
Reliability and validity of gait-related coordination patterns during treadmill walking in persons with thoracic spine pain — preliminary study

By: Erin M. Mannen, John T. Anderson, Paul M. Arnold, Elizabeth A. Friis

BMC Musculoskeletal Disorders (2013), 14:345

Objective: The aim of this study was to explore gait-related coordination patterns during normal walking in persons with thoracic spine pain. We hypothesized that persons with thoracic spine pain would exhibit an altered coordination pattern compared with healthy controls. Methods: The time series motion of the spine over C7, T8 and sacrum were measured at five treadmill walking speeds (0.67, 0.89, 1.12, 1.34, 1.56 m/s) in 19 persons with thoracic pain and 19 healthy control subjects. With the use of force plates, motion sensors, and markers attached to the pelvis and the upper thigh, we calculated the average relative phases of the transverse plane rotation of the thoracic spine (C7-T8), the lumbar spine (L4-L5 and L5-S1 segments) in sagittal plane during a weight-lifting (3.6 kg in each hand) activity. The CORs of the lumbar spine were also assessed. Results: The average relative phases of the thoracic spine C7-T8 in persons with thoracic pain varied from in-phase to anti-phase with walking speed. The CORs of the lumbar spine (L4-L5 and L5-S1 segments) in sagittal plane during a weight-lifting activity varied from 0° to 3.5° at extension position of the body, respectively. The CORs of the lower lumbar spine were segment-dependent and changed with the body postures. The CORs of the L4-L5 and L5-S1 segments were 2.9, 5.1 and 2.8 degrees, respectively. The C7-T8 relative phase was found to be related to the walking speed. The C7-T8 relative phase predicted about 60% of the variance of this contribution. The results of the present study suggest that thoracic spine pain impacts gait-related coordination patterns during normal walking. The present study was not designed to assess thoracic pain-related gait changes. Further investigation is needed to clarify these findings. Conclusion: The C7-T8 relative phase showed measurable reliability, and some correlation between gait patterns and thoracic pain was found. The thoracic spine may be a potential target for future research. Keywords: Thoracic spine, Coordination, Walking, Thoracic pain.
Flexion Relaxation and Its Relation to Pain and Function over 10 Years: A Multivariate Study of 42 Lumbar Spines

Sanjum P. Samagh et al.

Journal of the American Academy of Orthopaedic Surgeons

Abstract: The goal of this study was to investigate the dependencies of pain and function on the range of motion (ROM) of the lumbar spine. The transient lower back pain (LBP) group had significantly greater pain and disability scores than the chronic LBP group, and the transient group had higher pain and disability scores than the non-pain group. The transient group had significantly greater pain and disability scores than the chronic LBP group, and the transient group had higher pain and disability scores than the non-pain group.

Results: ROM was significantly greater for females than for males in FE, LB and AT. Results indicated that there were significant differences in ROM between the levels, with L2-3 being greater than L3-4 (p=0.024), and L4-5 and L5-S1 FE ROM were significantly greater than L1-2 (p=0.001). The FRR and ERR were both significantly greater in the SLM during standing flexion compared with slumped sitting. The ERR was significantly greater than the FR R in the SLM during standing flexion. The significance of differences between the levels, postures, and sex was also significant.

Conclusions: The transient LBP group had significantly greater pain and disability scores than the chronic LBP group, and the transient group had higher pain and disability scores than the non-pain group. The transient group had significantly greater pain and disability scores than the chronic LBP group, and the transient group had higher pain and disability scores than the non-pain group.
Study Design. Water intake analysis activity is a weight-dependent phenomenon, evaluated during waking hours. The amount of water intake, urine, and stool was measured across various conditions.

Objectives. To estimate the role of water intake analyzed activity in modifying the proportion of urine and stool among participants.

Summary of Background Data. Cross-sectional studies have demonstrated the relative role of alcohol, coffee, and tea on urinary and fecal water intake. These factors were assessed in the study with the objective of determining their contribution to water intake. In contrast, the activity of the water intake was not significantly altered by the consumption of these beverages.

Results. The activity of the intestinal effluent was significantly higher in the sitting position than in the standing position. The latter position led to a decrease in the proportion of water intake from stool and urine. In contrast, the activity of the water intake was not significantly altered by the consumption of these beverages.

Conclusions. From these cross-sectional findings, we conclude that the primary factors in modifying the water intake are the activity of the intestinal effluent and the consumption of beverages.