Abstracts

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The aim of this investigation was to determine the dimension of adaptation of the thoracolumbar spinal profile to sport-specific mechanical loading in water polo. Therefore, the process line of the thoracolumbar spine (C7 to S2) of 51 male competitive water polo players (27.8 ± 3.7 years) with an averaged sporting exposure of 18.3 ± 4.6 years and of 1347 male non-sportsmen (24.2 ± 4.1 years) was recorded in the upright bipedal standing position by means of the ultrasonic-topography.

In the sagittal plane, the water polo players showed a significant greater thoracic kyphosis (46.7° ± 7.1°) and inclination (3.4° ± 3.8°), as well as a tendentially increased lumbar lordosis (28.3° ± 6.5°) than the control group (37.4° ± 6.7°/2.3° ± 3.2°/27.6° ± 5.1°). Likewise, there were statistical relevant differences in the frontal and transversal projection. A significant line up of the lateral inclination (2.5° ± 5.7°), the shoulder-pelvic obliquity (3.3° ± 6.1°) and the shoulder-pelvic rotation (4.3° ± 7°) to the right side of the body has been manifested in the water polo group. However, in the control group only a slight deviation of the lateral inclination (0.4° ± 3.5°) and of the shoulder-pelvic rotation (1.1° ± 3.2°/0.9° ± 4.2°) could be proved.

The modifications of spinal curvature verified can be interpreted as functional adaptations of the vertebral column to the motoric demands in water polo consisting of swim-specific movement patterns inducing an increasing thoracic kyphosis and of throwing the ball involving asymmetrically spinal loading. Further investigations have to scrutinize, whether the sport-specific spinal shape in water polo possesses any kind of pathogenetic potency or if the spinal modifications are to be seen as a pre-condition for succeeding in sporting competition.

**Problem:** 50–80% of golfers are stated to have back pain. The main part of golf-induced orthopaedic injuries concern the spine.

**Questions:** Does strength of the lumbar extensors, flexors, lateral flexors and rotators differ between golfers with back pain, golfers without back pain and a reference group of untrained persons without complaints? Is there a difference in strength between golf professionals and amateurs?

**Method:** 102 male amateur golfers (47 with and 55 without back pain) with different handicaps and 16 golf professionals without complaints were analysed. The reference group consisted of 286 male untrained persons without complaints. Torque was measured during maximal isometric contractions at FPZ-Systems (Schnell Co.).

**Results:** Golfers with back pain have considerable strength deficits in all directions. All golfers show a strong muscular dysbalance in sagittal and transversal plane. Better handicaps correlate with higher strength values. The golfers (all right-handers) tend to, or have, significantly stronger trunk muscles on left side.

**Conclusion:** Golf sets increased demands on spine. Nevertheless, many golfers show poor conditional state. Above all the flexors, which are highly stressed when hitting into the ground, are deconditioned frequently. Because there is also a correlation between strength level and handicap, strength training of spine-stabilizing muscles seems to be advisable for two reasons: Firstly as protection from overload and injury, secondly it could support improvements in handicap.