

Supplement 1
Vol. 20
September 1999
Page S 1 – S 126

International Journal of Sports Medicine

Editors in Chief

H. Kuipers, Maastricht (NL)
W. M. Sherman, Columbus (USA)

Associate Editors

H.-J. Appell, Köln (FRG)
D. Böning, Berlin (FRG)
R. J. Shephard, Toronto (CDN)

Responsible Editor for supplements

H. Weicker, Heidelberg (FRG)

Editorial Board

J. Carlson, Melbourne (AUS)
P. Cerretelli, Genève (CH)
C. de Créé, Bedford (UK)
B. Dufaux, Köln (FRG)
H. Freund, Strasbourg (F)
H. Galbo, Copenhagen (DK)
A. Gollhofer, Stuttgart (FRG)
J. Hagberg, College Park (USA)
B. Helal, Broxbourne (UK)
W. Hollmann, Köln (FRG)
H. Hoppeler, Bern (CH)
M. Joyner, Rochester (USA)
J. de Koning, Amsterdam (NL)
P. Lijnen, Leuven (B)
H. Löllgen, Remscheid (FRG)
H. Mairbörl, Heidelberg (FRG)
R. J. Maughan, Aberdeen (GB)
M. Miyashita, Tokyo (JAP)
K. Nazar, Waszawa (PL)
T. Noakes, Cape (SA)
J. R. Poortmans, Bruxelles (B)
S. Powers, Gainesville (USA)
D. Sale, Hamilton (CDN)
M. Sawka, Natick (USA)
D. Schmidtbleicher, Frankfurt (FRG)
L. Spriet, Guelph (CDN)
J. Stegemann, Köln (FRG)
A. Viru, Tartu (Estonia)
R. T. Withers, Adelaide (AUS)

*This journal is
indexed and abstracted by
Index Medicus,
EMBASE/Excerpta Medica,
Current Contents/Life Sciences,
Science Citation Index and
Elsevier BIOBASE/Current Awareness
in Biological Sciences*

Int J Sports Med ISSN 0172-4622 (main publ.)
Int J Sports Med ISSN 0943-917X (suppl.)

36th German Congress of Sports Medicine and Prevention Abstracts

September 30 – October 2, 1999
Freiburg i. Br., Germany

Edited by

M. Halle

Centre for Internal Medicine
Department of Prevention, Rehabilitation
and Sports Medicine
University of Freiburg i. Br.
Freiburg i. Br., Germany



Thieme

Georg Thieme Verlag Stuttgart · New York
Thieme New York

Focusing on dynamic strength gradation, the lower back extensor muscles (+5.9% [A], +4.0% [B]) showed more accurate values than the flexor muscles (+14.3% [A], +17.7% [B]). The elite athletes revealed more accurate values in strength gradation. Regarding static strength gradation, the lower back flexion values (-14% [A]; -9.4% [B]) were more precise than the extension values (-30.2% [A], -23.2% [B]).

These findings point to an incremented sensory input during dynamic extension movements of the lower back and can be explained by more accurate proprioceptive adjustments during dynamic exercise compared to static exercise.

D-092 Spondylolisthesis in Competitive Sports: Long-Term Results

Schmitt H, Brocai DRC
Orthopädische Universitätsklinik Heidelberg,
Germany

To consider the effects of several years of competitive sports training on low back pain with or without spondylolisthesis 20 years after finishing the sports career we carried out a retrospective radiological and clinical study of 21 former elite javelin throwers. We wanted to show which problems occur many years after finishing the sports career and whether there is a progress of slipping.

To judge the daily activity we used the FFbH-R (Funktionsfragebogen Hannover). Subjects were tested on a sagittal Cybex 6000 unit for a strength trial. After a follow-up time of nearly 20 years on average 14 of 21 athletes stated that they had a slight low back pain. Seven of them felt disturbed in their daily activity (FFbH-R $93 \pm 14\%$). 10 of 21 athletes had a spondylolisthesis ($8 \times L5/S1$, $2 \times L4/L5$). All showed a progression of slipping of less than 5 mm. We found no difference in trunk muscle activity between the athletes with or without spondylolisthesis. Increased risk for slipping is found in the presence of an increased lumbosacral kyphosis.

The incidence of low back pain in former elite javelin throwers with or without spondylolisthesis was not higher than in the normal population. Increased risk for low back pain exists in athletes with spondylolisthesis exceeding 10 mm, early onset of symptoms and a low lumbar index. Athletes in predisposing sports disciplines should be under good medical supervision.

D-093 The Effect of the Tennis-Specific Load Characteristic on the Thoracolumbar Spinal Profile

Dalichau S¹, Scheele K², Huebner J¹
¹ BG Unfallbehandlungsstellen Bremen, Germany
² Universität Bremen, Institut für Sportmedizin,
Germany

The aim of the study was to verify the influence of the tennis-specific load characteristic on the spinal profile. 94 male tennis players (21.5 ± 4.6 years) with a sporting exposure of 14.2 ± 4.8 years (training 4.5 ± 0.8 h/week) were investigated. The control group consisted of 271 healthy male non-athletes (20.3 ± 4.2 years). The process line of the thoracolumbar spine (C7 to S2) was recorded three-dimensionally by means of an ultrasonically-assisted contact rod in both groups when standing upright. In the sagittal plane there were no differences between the groups. In the test group a significant increase ($p \leq 0.01$) could be proved in shoulder obliquity (left: 4.1° /right: 3.9°), in lateral inclination (left: 2° /right: 2.3°) and in rotation (left: 2.9° /right: 3.7°) to the side of the dominant arm. All parameters rose when using the both-handed back hand. However, independent of the dominant side the data obtained for the control group concentrated around $\pm 1^\circ$. The asymmetrical physical requirement in tennis induces a functional adaptation in the thoraco-

lumbal spinal profile. Especially the serve, the open forehand and both-handed backhand determine the intensity of this adaptation. To avert sport-induced injuries of the spine it is necessary to check for the technique and to strengthen the trunk musculature.

D-094 Training-Induced Adaptations of Trunk Muscles in Patients with Chronic Low Back Pain

Weishaupt P
Institut für Prävention & Diagnostik Regensburg,
Germany

Problem: Patients with chronic low back pain show muscular deficits and/or muscular dysbalances in the main function of muscles of the spine. Does progressive dynamic strength training induce a similar adaptation of spine-stabilizing muscles in the three movement planes (sagittal, frontal and transversal plane) of the trunk? Does it reduce pain?

Methods: 18 patients with chronic low back pain and primary or secondary defects of intervertebral discs participated in a 12-week progressive dynamic strength training program for trunk muscles. Before and after the program, isometric maximal voluntary contraction forces of spine-extensors, -flexors, -lateral flexors and -rotators and subjective parameters of pain and well-being were evaluated.

Results: Trunk muscles showed a mean force increase of 33.2%. While adaptations in frontal plane (left and right) and transversal plane (left and right) showed no considerable differences, the different muscular adaptation in the sagittal plane was striking. Force values of lumbar extensors and flexors increased 25.0% and 40.1%. Eight patients (44.4%) were free of pain after the program. Intensity of pain was reduced at all patients. Personal well-being increased 37.3%. Days with back pain decreased 64.3%.

D-095 Identification of Somatic Risk Factors of Back Pain Patients

Schifferdecker-Hoch F
FPZ Köln, Germany

The trunk and cervical extensors, flexors, lateral flexors are of central importance among the biological components of back pain. Deficits and imbalances of trunk, cervical and neck muscles are regarded as somatic risk factors. Up to now unambiguous diagnostic procedures for the identification of extensors, flexors, lateral flexors on the basis of a medical certificate were missing.

A reliable and valid procedure for a quantification of trunk and cervical extensors, flexors, lateral flexors and rotators now offers the possibility to survey and differentiate muscular parameters by using special analysing systems. Therefore longitudinal examinations of 8,214 men and women between 13–85 years of age provide age-specific and sex-specific reference data. On the basis of these calculations it is possible to distinguish between different stages of muscular weaknesses which allow a quantification according to the muscular spinal functional capacity (stages 0–4), and thus the possibility of a more complex approach.

Back pain patients show significant deficits in strength and power capacity of all main functional trunk and cervical muscles (lumbar and thoracic extensors, flexors, rotators and lateral flexors or cervical extensors, flexors and lateral flexors). The average deficit in maximum strength of their trunk muscles is 12.2% and that of their cervical muscles is 24.4%.

The analysing procedure presented above allows an identification of potential biological risk factors of back pain (e.g., maximum strength, muscular imbalance, and dynamic power capacity of trunk and cervical extensors, flexors, lateral flexors and rotators). The selection and suitability of participants for the following recon-