

Special Section: Summaries of Presentations from the Wrestling Medicine Conference & Wrestling Team Physician Course, United World Wrestling, Budapest, October 24-26, 2019

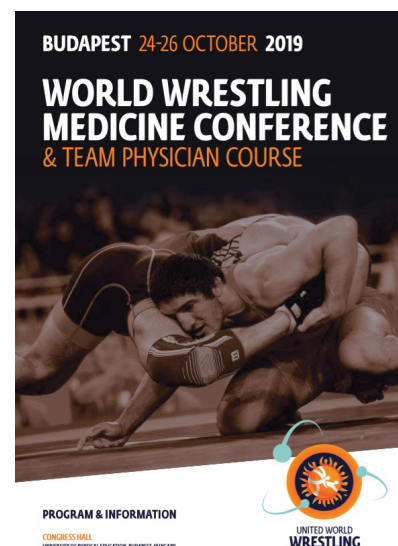
CAN I PROTECT THE WRESTLERS' SPINE FROM LONG-TERM DAMAGE?

Eckart D. Diezemann



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ПРОДВИЖЕНИЕ НАШЕГО СПОРТА ЧЕРЕЗ ЗНАНИЕ

PROGRESO PARA NUESTRO DEPORTE MEDIANTE CONOCIMIENTO

CAN I PROTECT THE WRESTLERS' SPINE FROM LONG-TERM DAMAGE?

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INTRODUCTION

I received an email from my colleague, David Curby (Secretary of UWW Scientific Commission) in February 2018 who asked for my reaction to the following:

I am involved in a project to improve the neck and back health of wrestlers.....It began with a question from a parent asking: "Is the wrestler's bridge a safe exercise?"

A very simple question about an exercise that has been firmly entrenched in the training of wrestlers for centuries, but upon closer investigation, there is not very much information available to provide a definitive answer

Hence, this letter requesting your observations and recommendations for the creation and implementation of an age-appropriate program of neck and back strength and flexibility development that is based on science and medicine. Our intent is not to "ban" bridging exercises. The bridge and back arch, though they can be seen as "extreme," are fundamental positions employed in wrestling for both offense and defense.

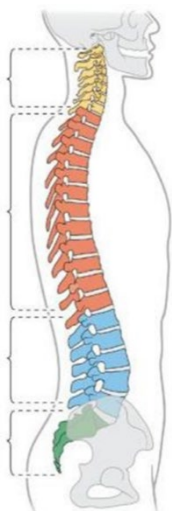
Orthopaedic-traumatological sports medicine is not only based on the knowledge of the shape and function of the musculoskeletal system, but must also deal with the mechanical stresses to the musculoskeletal system caused by the sporting activities.

Biomechanics of the spine

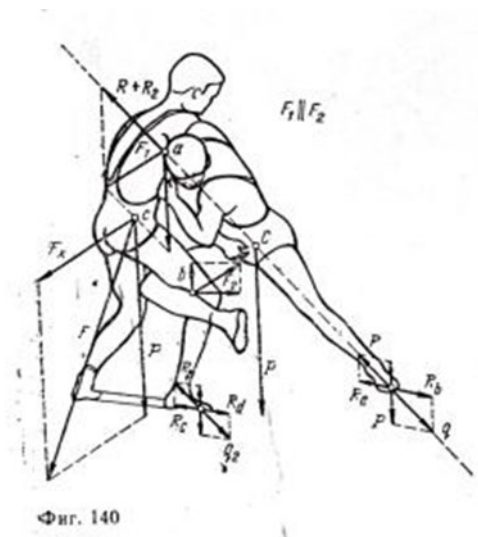
Performance of the biological structures of the spine

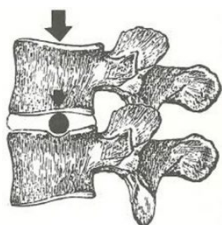
Biomechanics is an interdisciplinary science that describes, investigates and evaluates the movements generated by the musculoskeletal system. It deals with interactions between movements generated by the musculoskeletal system and the resulting biological reactions in sporting activities

Reference: Brüggemann, G.-P.: Biomechanik. In: Klümper A., Sporttraumatologie, ecomed, Landsberg/Lech (04/01, III-2)1-60



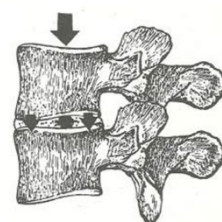
The maximum forces causing fracture of a vertebral body clearly increase from the cervical spine to the lumbar spine





The spine prefers to have the stress pressure exactly in the middle of the intervertebral discs

The vertebral body takes over the main load



The lowest resistance is found at the lateral edges of the posterior areas

The vertebral joint only takes over approx. 10%

Brüggemann, G.P.: Biomechanik. In: Klümper A., Sporttraumatologie, ecomed, Landsberg/Lech (04/01, III-2)1-60
Keller, T.S.; Hansson, T.H.; Abram, A.C.; Spengler, D.M.; Panjabi, M.M.: Regional variations in the compressive properties of the lumbar vertebral trabeculae: effects of disc degeneration. Spine, 14 (1989) 1012 -1016

Hyperextensions combined with rotational loads may lead to premature degenerative changes in the spine

Reference:

Schmitt H: Degenerative Gelenkerkrankungen nach Leistungssport.
Deutsche Zeitschrift für Sportmedizin 10 (2006) 248-254

The skeleton is held by the muscles. Wrestlers must be able to tolerate enormous opponent forces. To prevent injuries, they need a powerful supporting and protective muscular core.

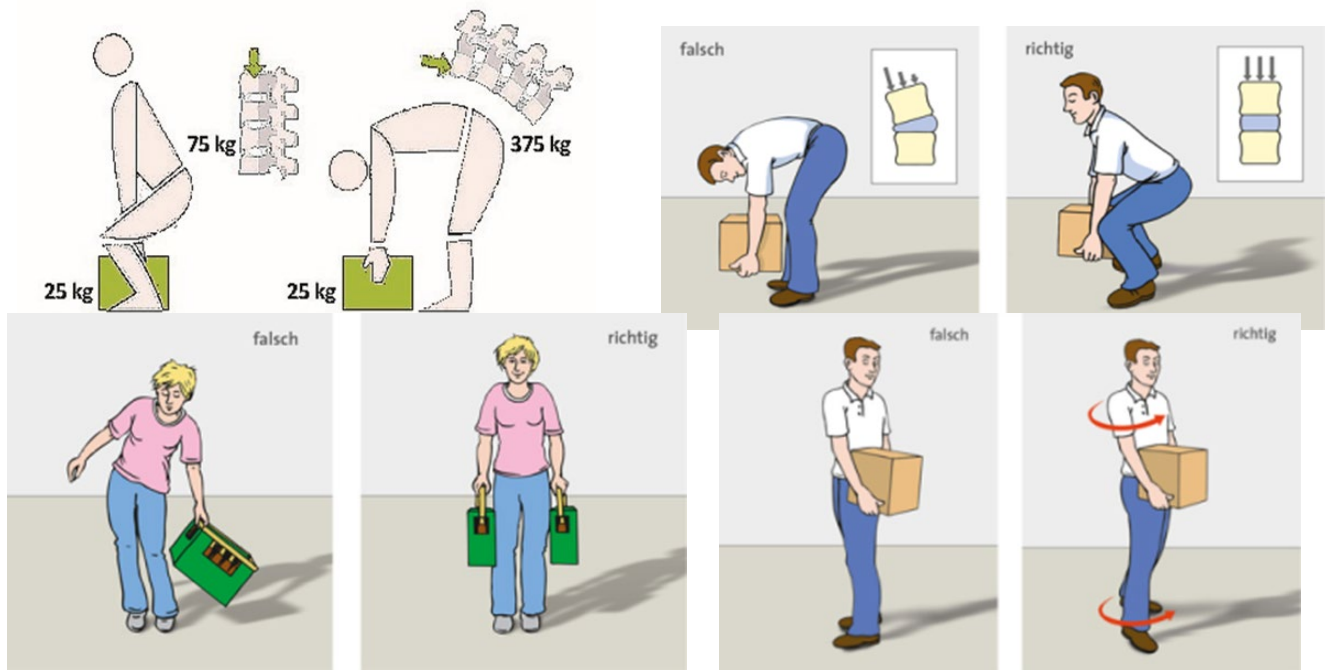
References: Hartmann J., Tünnemann H.: Das große Buch der Kraft, Sportverlag Berlin (1990) 243
Rohlmann A., Wilke H.-J., Mellerowicz H. Graichen F., Bergmann G.: Loads on the spine in sports.
Deutsche Zeitschrift für Sportmedizin 52 (2001) 118-123



Reference: Tittel K.:
Beschreibende und funktionelle Anatomie,
Urban & Fischer (2003)



Examples from everyday life

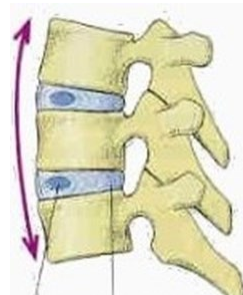


Mechanical stress of the spine in wrestling

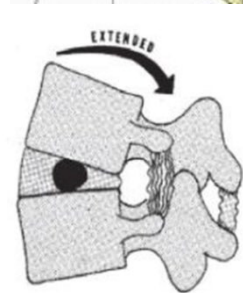
“Knowledge of mechanical laws and detailed information on the physical activities and mechanical movements occurring in wrestling and the loads on biological structures are a necessary requirement in order to avoid possible over-stress and to identify and understand damage”

Reference: Brüggemann, G.-P.: Biomechanik. In: Klümper A., Sporttraumatologie, ecomed, Landsberg/Lech (04/01, III-2)1-60

Extension

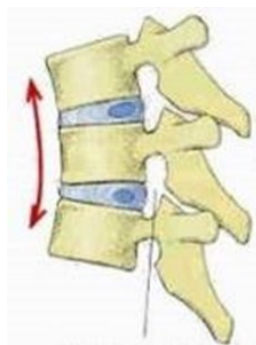


Intervertebral disk

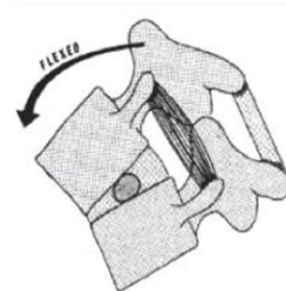


Nucleus pulposu

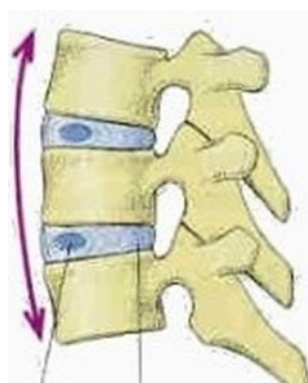
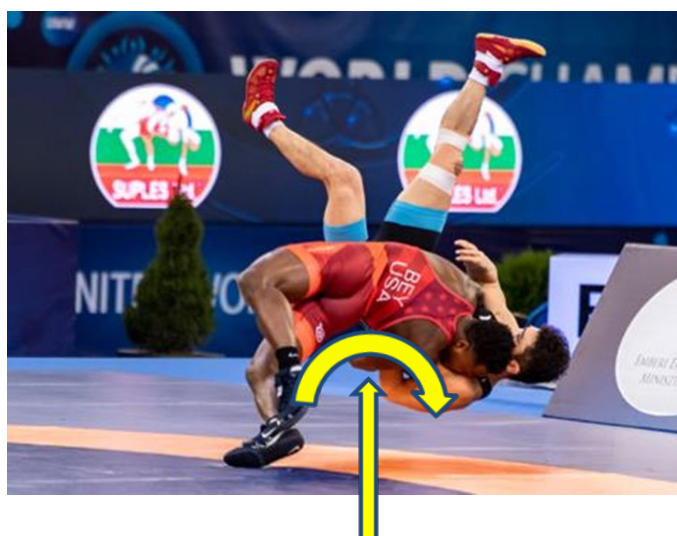
Flexion



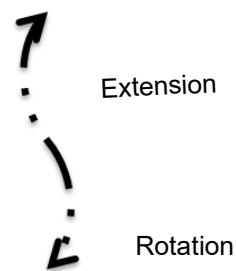
Foramen Intervertebrate



Nucleus pulposus



Nucleus Intervertebral disk pulposus



Mechanical stress of the spine in wrestling

Performance of the biological structures of the spine



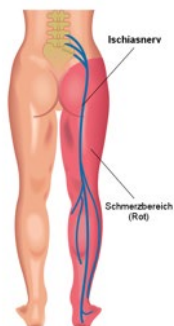
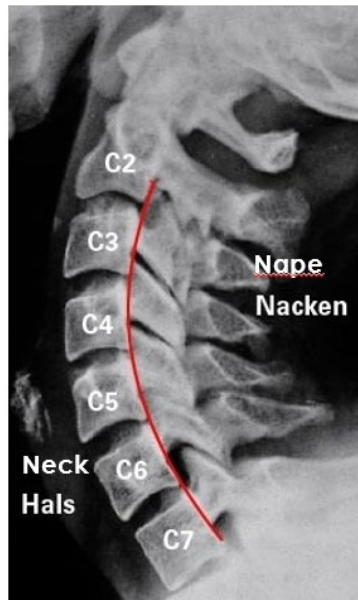
Foto: J. Richter



Source: usa wrestling



What chronic damage do we observe on the spine? And can I prevent this damage?



Do former wrestlers really have degenerative changes in the spine more often than the normal population?

References:

*Hellstrom M, Jacobson B, Sward L, Peterson L:
Radiologic abnormalities of the thoraco-lumbar spine in athletes.
Acta radiologica 31 (1990) 127-132*

*Lundin O, Hellstrom H, Nilsson I, Sward L:
Back pain and radiological changes in the thoracolumbar
spine of athletes. A long-term follow up.
Scand J Med Sci Sports 11 (2001) 103-109*

Summery:

"In male wrestlers, radiologically degenerative changes were found more frequently compared to a control group particularly in the area of breast and lumbar spine"

The goal of our sports medicine activities should be to accompany the athletes through their sporting careers, keeping injuries and the risk of late damage as low as possible.

What options are there to prevent late damage in wrestling?

Wrestling-specifics parameters for late damage are:

Exogenous factors:

- Injuries
- Sport-specific stress on the spine
(Hyperextensions combined with rotational loads)
- Intensity of the sporting load
(Double load: Own body weight plus opponent's body weight, explosiveness)
- Duration of the sporting load
(Start of the wrestling career at about 6 years end often at over 30 years)

A German idiom says: "Constant dripping wears the stone"

Do the constant unfavorable loads in wrestling "hollow out" the spine over 30 years?

On which parameters do we as sport-physicians really have influence?

Endogenous factors:

Sports medical examination and subsequent
meeting with parents and responsible trainers

Exogenous factors:

Injuries (?)

Sport-specific stress

Competition (no!)

Training (?)

Slow adaptation of youngsters to wrestler-specific loads.

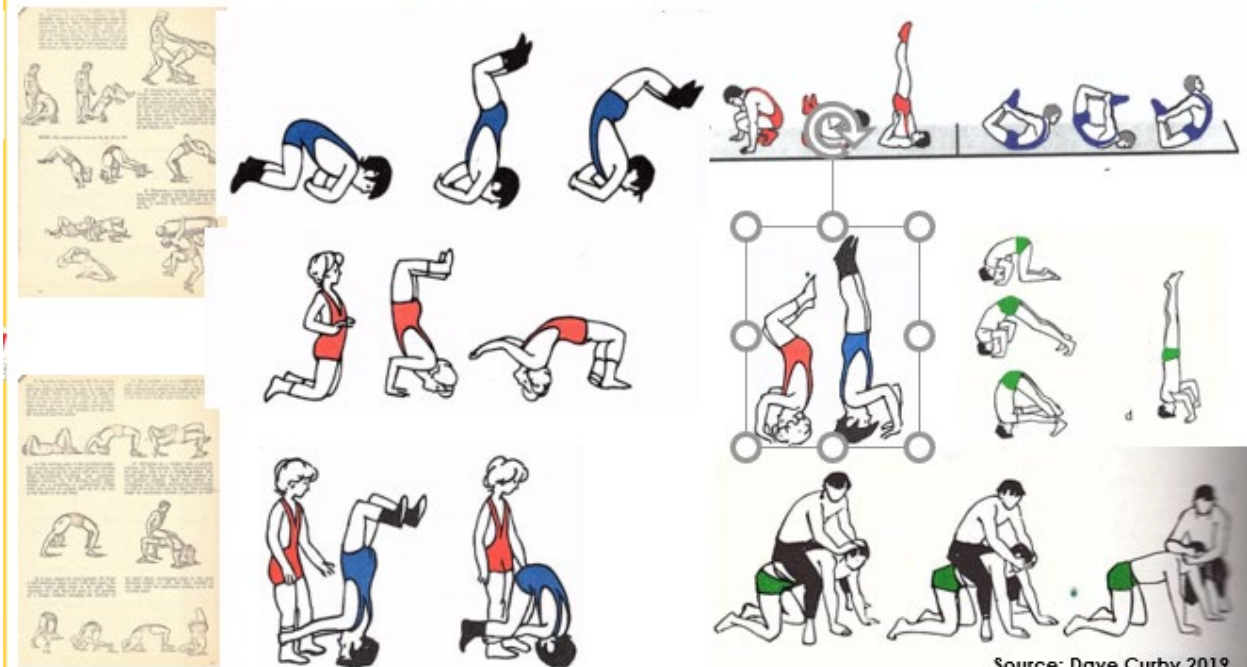
A trainer entrusted with youngsters also need basic knowledge of the shape and function of the musculoskeletal system. He should consider the mechanical stresses of the musculoskeletal system caused by sporting activities and their possible consequences

Intensity and duration of the sporting load (no!)

Are these exercises still up-to-date? We should consider alternatives. What has been good for decades does not always have to be so.

- Reduction of spine loads in training by alternative strength & flexibility training on suitable equipment is necessary to develop strength of the musculature.
- Abnormal loads of the spine in wrestling should be reduced in light of the fact that this sport is practiced for decades.

Examples of static abnormal stress in training



Alternative strength training (?)



4-way neck - front

4-way-neck - rear

4-way neck - side

Reference:
Kieser Werner,
Ein starker Körper kennt keinen
Schmerz, Heyne (2003)