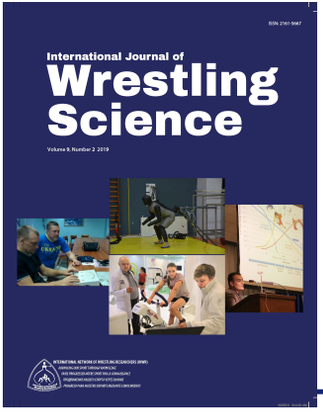

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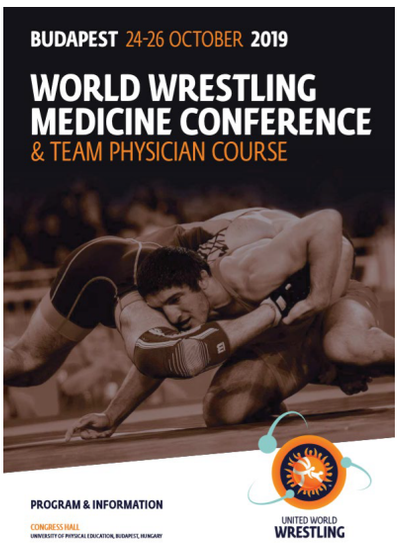

PRINCIPLES OF MUSCULOSKELETAL INJURY PREVENTION IN WRESTLING

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PRINCIPLES OF MUSCULOSKELETAL INJURY PREVENTION IN WRESTLING

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Importance of the topic

Wrestling holds worldwide popularity,

- Russia, former Soviet Union
- Asia (Iran, Japan, Korea, Mongolia, India)
- Europe (Scandinavia, Greece, Turkey, former East-block, France, Germany, Italy)
- Traditional wrestling (Africa, Mongolia, Canary Island, Pakistan)
- America: USA, Canada, Cuba, Brazil,

United States: Large numbers of high school and college males (health system general DATAS!!!). But Barroso (Brasil), Kordi (Iran), Pasque, Otero (USA) and Yamaner (Turkey) is focusing on wrestlers!!!! However, the sport's arduous nature results in high injury rates.

INJURY; is a barrier for sport participation and development

1. Therefore, sport organizations need to have a good understanding of nature, specifications, patterns, risk factors, and mechanisms of injuries

- in order to prevent sport injuries,
- and promote the sport.

This requires establishing Injury Surveillance systems.

Shadgan B, Molnar S, Sikmic S and Chahi A: Wrestling Injuries During the 2016 Rio Olympic Games. Br J Sports Med 2017;51:387.

Injury definition – what is an injury?

• Kersey and Rowan: any incident in which an official halted a match

the likelihood of overreporting is high, where a bloody nose or stalling tactics by a wrestler may be included as data.

Kersey RD, Rowan L. Injury account during the 1980 NCAA wrestling championships. Am J Sports Med. 1983 May-Jun;11(3):147-51.

Injury definition – what is an injury?

• Strauss and Lanese: any incident that reached the athletic training room

(tournament injuries /this leaves the potential for many minor injuries to be under-reported)

Strauss RH, Lanese RR. Injuries among wrestlers in school and college tournaments. JAMA. 1982 Oct 22;248(16):2016-9.

Injury definition – where was it documented?

• Lorish et al.; Pasque and Hewett; Kordi:

• (1) limitation of function to an extent that the athlete sought treatment by an athletic trainer or physician;

• (2) restricted participation of at least one day beyond the initial injury

Injury definition – where was it documented?

• Kordi: any injuries that requires substantive professional attention before the athlete's return to participation is permitted

• Hospitalization

• Operation

Kordi R, Heidarpour B, Shafiei M, Rostami M, Mansournia MA. Incidence, nature,and causes of fractures and dislocations in olympic styles of wrestling in iran: a 1-year prospective study. Sports Health. 2012 May;4(3):217-21

Kordi R, Ziaee V, Rostami M, Wallace WA. Sports injuries and health problems among wrestlers in Tehran. J Pak Med Assoc. 2012 Mar;62(3):204-8.

Injury definition – Babak Shadgan 2017 – UWW MC

Any musculoskeletal or soft tissue complaint incurred during the competitions, that required medical attention regardless of the consequences with respect to absence from sport.

Shadgan B, Feldman BJ, Jafari S. Wrestling injuries during the 2008 Beijing Olympic Games. Am J Sports Med. 2010 Sep;38(9):1870-6.

Shadgan B, Molnar S, Sikmic S and Chahi A: Wrestling Injuries During the 2016 Rio Olympic Games. Br J Sports Med 2017;51:387.

Injuryrate:Howtomeasure?

Injury Incidence / rate
No I = number of injuries **vs** **No IW = number of injured wrestler**
1 wrestler shoud be injured several times and in different body parts
No S / H = Number of surgery / Hospitalization

No I / 100 wrestler / competition
No I / 100 wrestler / team (/lifetime) vs No IW / 100 wrestler / team (/lifetime)
No I / 100 wrestler / team / season or year vs No IW / 100 wrestler / team / season or y
No I / 100 bouts / competition
No I / 100 practise (different length) vs No IW / 100 practise / team
No I / 100 wrestling-exposure vs No IW / 100 wrestling-exposure
No S / 100 injured wrestler and No H / 100 injured wrestler

Injury–when and where: season, competition
When:
Preseason, Season, Postseason
Where:
Practice, Competition

Lorish TR, Rizzo TD Jr, Ilstrup DM, Scott SG. Injuries in adolescent and preadolescent boys at two large wrestling tournaments. Am J SportsMed. 1992 Mar-Apr;20(2):199-202.

Strauss RH, Lanese RR. Injuries among wrestlers in school and college tournaments. JAMA. 1982 Oct22;248(16):2016-9.

Injury: onset and location
• Injury onset:
• Acut
• Overuse
• Reinjury
• Chronic
• Injury location: body region
• head/spine/trunk (range of 24.5–48%)
• upper extremity (range of 9.3–42%).
• lower extremity (range of 7.5–45.1%) and
• skin (range of 5–21.6%).
Hewett TE, Pasque C, Heyl R, Wroble R. Wrestling injuries. Med Sport Sci. 2005;48:152-78.
Requa R, Garrick JG. Injuries in Interscholastic Wrestling. Phys Sportsmed. 1981 Apr;9(4):44-51.

Action or activity
• the exact mechanism of injury is not always easily identified.
• Pasque and Hewett: most of the injuries occurred during takedown, but more specifically, when the athlete was at a disadvantage or in the defensive position.
• Closed kinetic chain – open kinetic chain (Rögler)
Hewett TE, Pasque C, Heyl R, Wroble R. Wrestling injuries. Med Sport Sci. 2005;48:152-78.
Pasque CB, Hewett TE. A prospective study of high school wrestling injuries. Am J Sports Med. 2000 Jul- Aug;28(4):509-15
Rögler G, Molnár SzL, Berkes I, Barna T, Farkas G, Gál V: Sport Specific Rehabilitation of Wrestlers following an ACL injury. International Journal of Wrestling Science. 3(2): 130 (2013).

Chronometry – importance of fatigue?
• Lorish et al.: was unable to calculate injury by match, but could determine an injury rate of 3% for all wrestlers in the first period.
• Strauss and Lanese: reported the greatest number of injuries to be in the second period
• Pasque and Hewett: reported a trend toward more injuries in the latter half of practice and during the second periods.

Injury severity
Type:
• muscle strains - shoulder or lower back
• joint sprains - ankle, knee or hand/wrist
• abrasions, lacerations - face area, extremities
• contusions - knee, chest and head

- bleeding – nose
- hematoma – auricular (cauliflower)
- luxation – AC, GH, elbow, knee cap
- fracture – fingers, forearm, foot
- concussions
- catastrophic

Injury - severity Shadgan 2017

Injury Severity

- Mild Injuries fully treated on the mat.
- Moderate injuries treated primarily on the mat but needing more attention after the competition, by which injured athletes were referred to the venue clinic.
- Severe injuries resulted in termination of the match; injured athletes were referred to the hospital.

Shadgan B, Feldman BJ, Jafari S. Wrestling injuries during the 2008 Beijing Olympic Games. Am J Sports Med. 2010 Sep;38(9):1870-6.
Shadgan B, Molnar S, Sikmic S and Chahi A: Wrestling Injuries During the 2016 Rio Olympic Games. Br J Sports Med 2017;51:387.

Prevention: definition–primary/ secondary/ tertiary

- Primary–avoidance of injury
- Secondary – early diagnosis and treatment
- Tertiary – focus on rehabilitation, reduce and correct the disability

Prevention: targeting injury prevention – Hewett 2005

There are several potential areas for decreasing injury risk in wrestlers, including

- equipment,
- coaching,
- officiating and
- training.

However, informed decisions with regard to preventing injuries are dependent upon the quality of the basic epidemiological data available, and at that time (2005), analyses of risk factors and potential preventive measures were lacking in wrestling.

Hewett TE, Pasque C, Heyl R, Wroble R. Wrestling injuries. Med Sport Sci. 2005;48:152-78.

Prevention: Targeting Injury Prevention - Kordi 2012

Steps:

- Surveillance – data on occurence of injury
- Risk factor identification – baseline survey
- Intervention evaluation - important information for determining the priorities for
- interventions and to inform policy makers and decision makers about the likely extent and impact of a problem
- Implementation

Kordi R, Ziaee V, Rostami M, Wallace WA. Sports injuries and health problems among wrestlers in Tehran. J Pak Med Assoc. 2012 Mar;62(3):204-8.

UWW MC 2017-20

Steps:

1. Surveillance (data) - feed backs from the Competitions (medical reports), literature review (articles)
2. Risk factor identification (baseline survey) - feed backs (medical reports), Annual Medical Commission meeting
3. Intervention evaluation (interpretation to policy and decision makers) - presentation in Coach and Referee Clinic, IOC meeting, circular letters, protocols
4. Implementation; UWW Medical Conference, change of Medical Rules, education (Referees, Local Medical Teams, UWW doctors)

Injuries by different body parts

- Head/Ear/ Dental
- nose bleeds or minor abrasions
- Facial lacerations
- Acute facial trauma
- Dental injuries
- Auricular hematoma or ‘wrestler’s ear’
- Contusion
- Concussions

Spine: Cervical and Lumbar/Trunk

Non-catastrophic:

- Sprains
- Strains
- neurological trauma such as stingers

Bone trauma:

- fractures
- subluxations or dislocations of the spine occur and can result in devastating catastrophic injuries

Upper Extremity – common due to the heavy forces placed on this region and the extreme joint positions:

- Sternoclavicular
- Acromioclavicular
- Glenohumeral
- Biceps
- Elbow
- Wrist and hand

Lower Extremity

- Hip
- Femur muscles – hamstring, quadriceps
- Knee – distortion, ligament, meniscal injury, patellar dislocation
- Shin
- Ankle
- Foot

Skin

- Skin infections continue to be a problem
- Most caused by a fungus ('ringworm')
- or the herpes virus
- and staphylococcus or streptococcus bacterial infections.

Risk factors

a. Nature: Contact, collision, extreme demands entire body
b. Exposure (incidence, No, practice, bout)
c. Training methods / technical preparation / strength / anaerobic, aerobic conditioning
d. Protective equipment (head gear, knee pads, mouth guards) / facilities (training, regenerative and medical)
e. Proper staff: trainers, physiotherapists, masseur, medical staff, team doctor, nutritionist
f. Nutrition, Hydration, Dehydration, fasting and weight loss method
g. Fatigue, Circadian rhythm, sleeping, time zones
h. Age, level (correlation with exposures), Weight
i. Practice / Competition
j. Referees, trainers
k. Compliance: athlete / trainer / team leader

a. Nature: Contact, collision, extreme demands entire body
b. Exposure
    - Incidence rates are higher during competition, but more injuries occurred during practice
    - (significantly more time is spent in practice.
    - 63% in practice, 37% injuries during competition
    - Injuries per exposure: 5 injuries per 1,000 practice-exposures versus 9 per 1,000 match-exposures
    - Boden et al.: significantly greater number of catastrophic injuries during match competition
    - (80%) or live wrestling (86% of practice injuries)

Hewett TE, Pasque C, Heyl R, Wroble R. Wrestling injuries. Med Sport Sci. 2005;48:152-78.

Strauss and Lanese: Increasing the level of competition and the amount of time- spent wrestling will increase the exposure of a wrestler to injury
Pasque and Hewett: injuries among high school wrestlers - injured wrestlers had significantly more years of wrestling experience.

c. Training methods / conditioning

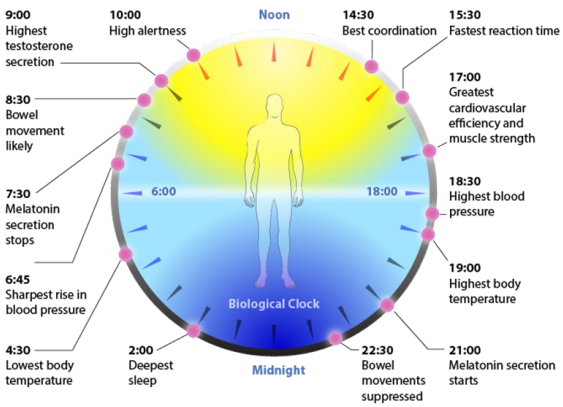
- Inadequate supervision of a wrestling team, especially in younger athletes
- Inadequate wrestling technique
- Poor officiating, rules infractions, and dangerous moves

d. Protective equipment / facilities
   - Headgear
   - knee pads, shoes
   - mouth guards
     not obligatory – their use is low
     Kvittem: about 70% of the wrestlers sustained at least one orofacial injury.
     Parents reported 206 instances of oral trauma. Eighty-eight occurred without mouthguards and only 12% with mouthguards.
   - The wrestling mat - largest piece of equipment.
     - A mat in good condition is essential for aiding in the prevention of serious injuries.
     - If mats are in poor condition, their ability to absorb shock may deteriorate -increase injury risk when wrestlers land on them.
     - Cleaning: without daily disinfection, counts of microorganisms on the mat will increase - transmission of dermatological infections from mat to wrestler.
     - Unpadded walls, obstacles such as columns or bleachers, inadequate space, and extreme heat or humidity are obviously detrimental.
     - It is important to replace or recondition wrestling mats when they become worn.
   - Training facility
     Regenerative and Medical areas

Proper staff:
- trainers,
- physiotherapists,
- masseur,
- team doctor,
- medical staff,
- nutritionist

f. **Nutrition, Hydration, Dehydration, fasting and weight loss methods**
- Wrestlers often loose large amounts of weight in a short period of time.
- Fluctuations in weight frequent throughout the season.
- Weight loss practices: 3–20% of the body weight is lost prior to certification or competition.
- Most of this weight loss occurs on the final day or days before the official weigh-in.
- 3 deaths after rapid weight loss in 1997/98 US High school
- UWW - New health regulations for weigh in ON THE DAY OF THE COMPETITION

g. **Fatigue, Circadian rhythm, sleeping, time zones**



h. Age, level (correlation with exposures), Weight
- Differs in different age, level and weight
- Proper matching of athletes-Do Not let wrestle kids from different weights, age and levels

i. Practice/ Competition
j. Referees, trainers – proper basic medical preparation
k. Compliance: athlete / trainer / team leader
   (Usually NO) preparticipation physical exam
   When to receive medical care
   NOT Stress / force to continue
   NOT Stress/ force to compete with injury

Intervention and evaluation

Establish a good Healthcare team

- Team physician + physiotherapist
- Prior to the start of the season, all athletes would undergo a preparticipation evaluation,
- including an orthopedic screening, to detect any potential preexisting conditions.
- Dentist + dermatologist

Competition

- UWW health regulation
- Surveillance system
- Education of the local medical team
- Presentation in Coach and Referee Clinic, IOC meeting, circular letters, protocols

Implementation of Preventative Measures

Limiting bleeding time (4 min bleeding time)

More attention to penalize dangerous actions

- Brutal actions
- Strangulation
- Heading, Fisting, Kicking
- Twisting one-leg, arms, fingers

Preventing rapid weight loss (RWL) attempts before competition weigh-in

Reducing overloaded competitions

- increasing weight classes to 10
- 2-day competition

Improving referee-doctor communications

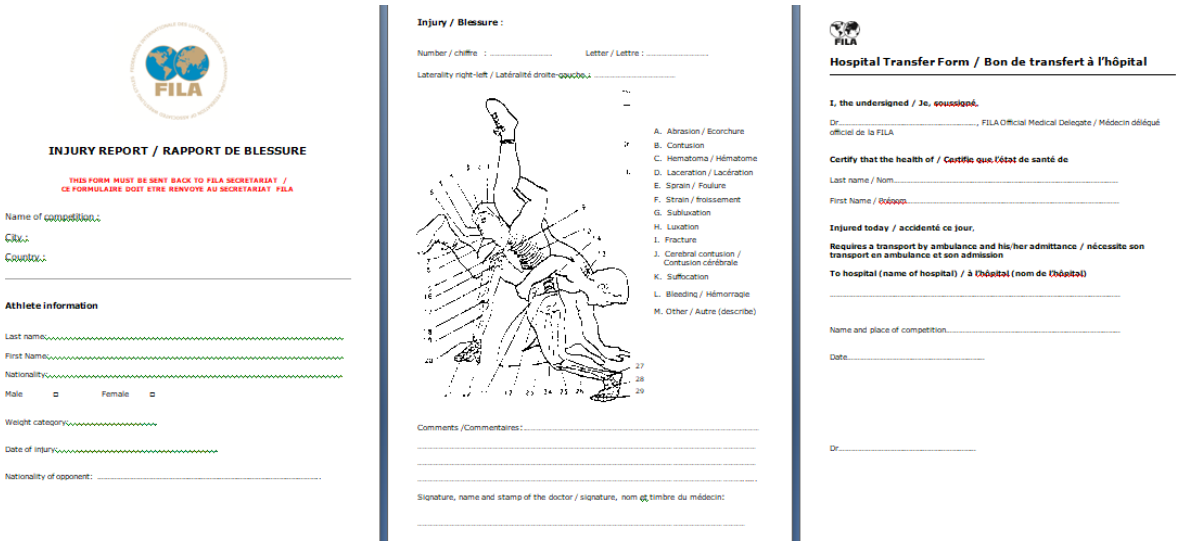
- A sign language is developed and will be applied Revision of UWWMC Medical Coverage Guideline

Educational Programs:

- Team Doctors
- Coaches Clinics
- Referees
-

UWW Wrestling Injuries Surveillance Program

Started at 2004 Athens Olympic Games, By direct observation and recording all injuries; UWW started from 2016 Rio



INJURY REPORT / RAPPORT DE BLESSURE

THIS FORM MUST BE SENT BACK TO FILA SECRETARIAT / CE FORMULAIRE DOIT ETRE RENVOYE AU SECRETARIAT FILA

Name of competition:
City:
Country:

Athlete information

Last name:
First Name:
Nationality:
Male ☐ Female ☐
Weight category:
Date of injury:
Nationality of opponent:

Injury / Blessure :

Number / chiffre : Letter / Lettre :

Laterality right-left / Latéralité droite-gauche:

A. Abrasion / Ecorchure
B. Contusion
C. Hematoma / Hématome
D. Laceration / Lacération
E. Sprain / Foulure
F. Strain / froissement
G. Subluxation
H. Luxation
I. Fracture
J. Cerebral contusion / Contusion cérébrale
K. Suffocation
L. Bleeding / Hémorragie
M. Other / Autre (describe)

Comments /Commentaires:

Signature, name and stamp of the doctor / signature, nom et timbre du médecin:

Hospital Transfer Form / Bon de transfert à l'hôpital

I, the undersigned / Je, soussigné,

Dr....., FILA Official Medical Delegate / Médecin délégué officiel de la FILA

Certify that the health of / Certifie que l'état de santé de

Last name / Nom

First Name / Prénom

Injured today / accidenté ce jour,

Requires a transport by ambulance and his/her admittance / nécessite son transport en ambulance et son admission

To hospital (name of hospital) / à l'hôpital (nom de l'hôpital)

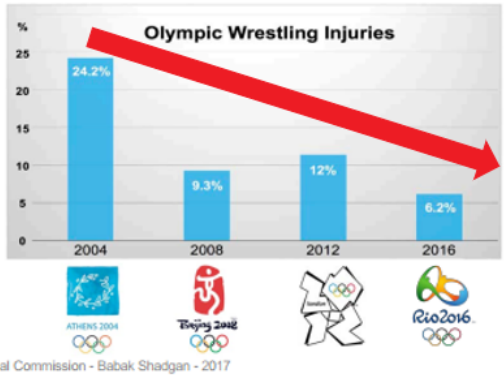
Name and place of competition

Date

Dr.....

Wrestling Injury Rates, 2004 – 2016 Olympic Games

The rate of wrestling injuries during 2016 Rio Games (6.2% per athlete) were lower than 2012 London (12%), 2008 Beijing (9.3%) and 2004 Athens (24.2%) Olympic Games.



UWW Medical Commission - Babak Shadgan - 2017

Shadgan B, Molnar S, Sikmic S and Chahi A: Wrestling Injuries During the 2016 Rio Olympic Games. Br J Sports Med 2017;51:387. http://dx.doi.org/10.1136/bjsports-2016-097372.262, IF: 6,724

	Overall Inj. Rate	Wrestling Inj. Rate
2004 Athens	-	-
2008 Beijing	9.6%	9.4%
2012 London	12.9%	12%
2016 Rio	9.8%	5.5%

Conclusions

- ✓ Wrestling is a safe, active and attractive sport.
- ✓ UWW is leading one of the most successful Injury analysis and prevention programs.
- ✓ Confirmed by IOC, the rate of injuries in wrestling is less than many other Olympic sports.