

ŠPORT IN POŠKODBE

mehanizmi poškodovanja in dejavniki tveganja

doc. dr. Vedran Hadžić, dr. med.

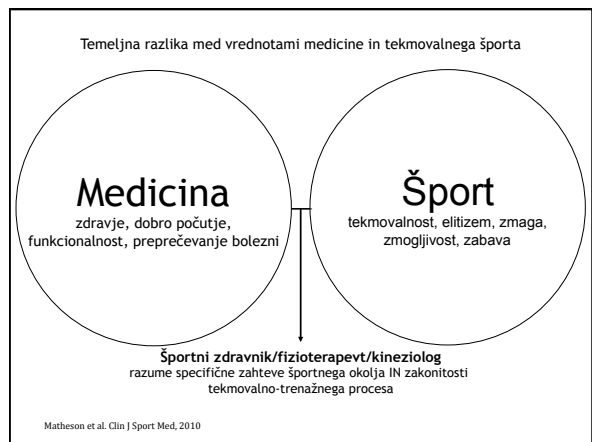
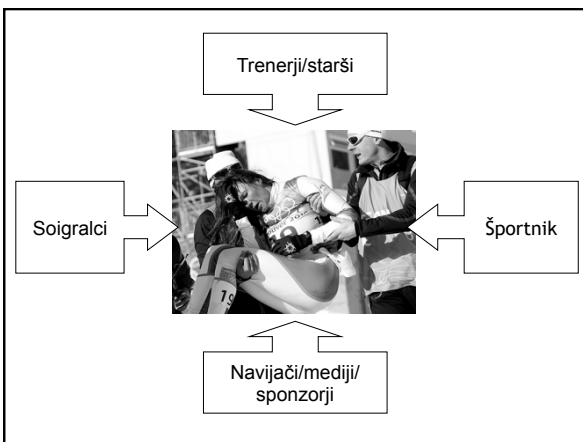
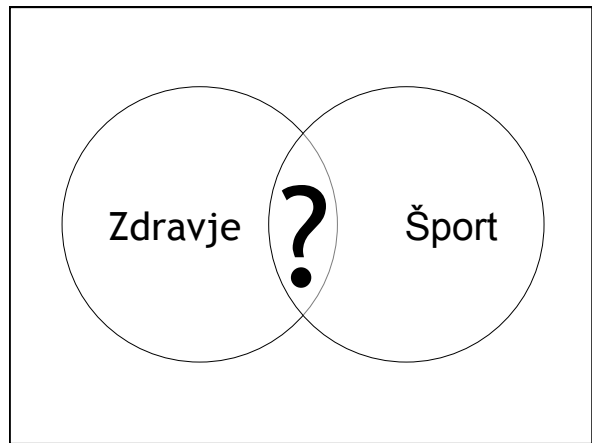
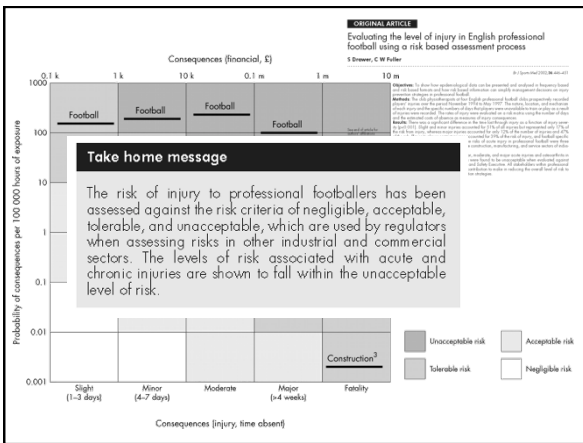
KORISTI IN TVEGANJA ŠPORTA

KORISTI

- Pozitivni učinki na kazalce zdravstvenega stanja posameznika.

TVEGANJA

- Več dejavnosti pomeni tudi višje tveganje za poškodbe tako za vrhunske kot tudi za rekreativne športnike.



OPREDELITEV ŠPORTNE POŠKODBE

Vsaka telesna težava igralca, ki je neposredna posledica tekme ali treninga ne glede na potrebo po medicinski oskrbi ali kasnejši odsotnosti iz tekmovalno-trenažnega procesa.

REVIEW

Consensus statement on injury definitions and data collection procedures in studies of football (soccer) injuries

C W Fuller, J Ekstrand, A Junge, T E Andersen, R Bahr, J Dvorak, M Hägglund, P McCrory, W H Meuwisse

Br J Sports Med 2006;40:193-201. doi: 10.1136/bjsm.2005.025270

DELITEV ŠPORTNIH POŠKODB

- **Glede na nastanek**
 - Akutne
 - Kronične
- **Glede na resnost**
 - zanemarljive poškodbe <3 dni
 - lahke poškodbe 4-7 dni
 - zmerne poškodbe 8-28 dni
 - hude poškodbe >28 dni
 - fatalne

AKUTNE POŠKODBE

Herman Maier,
ZOI Nagano, 1998



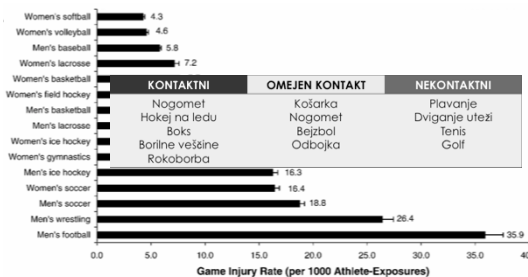
“TIME LOSS” definicija

- Akutna športna poškodba je vsaka poškodba, ki nastane med športno dejavnostjo in zaradi katere mora športnik prenehati s telesno aktivnostjo ter izpustiti vsaj en trening/tekmo.

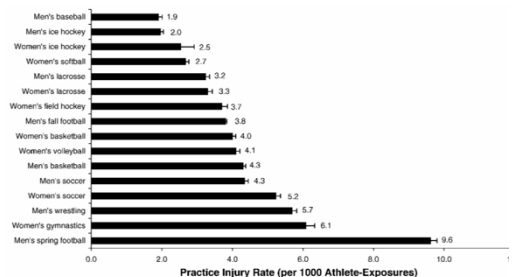
AKUTNE POŠKODBE

- **Pred** poškodbo je športnik brez bolezni/poškodbe.
- Nastanejo **nenadoma**.
- Akutne poškodbe izražamo z **incidenco** - številco poškodb v določenem obdobju.
- Poškodbe se normalizirajo **glede na obremenitev**.





AKUTNE POŠKODBE PRI RAZLIČNIH ŠPORTNIH PANOGAH



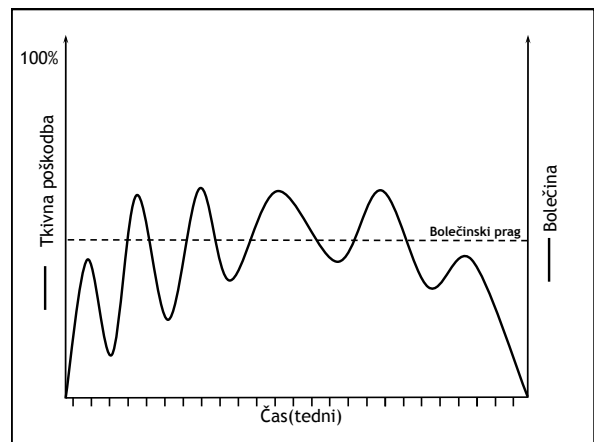
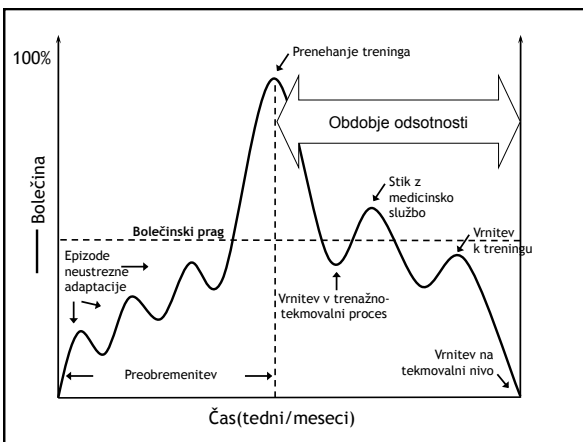
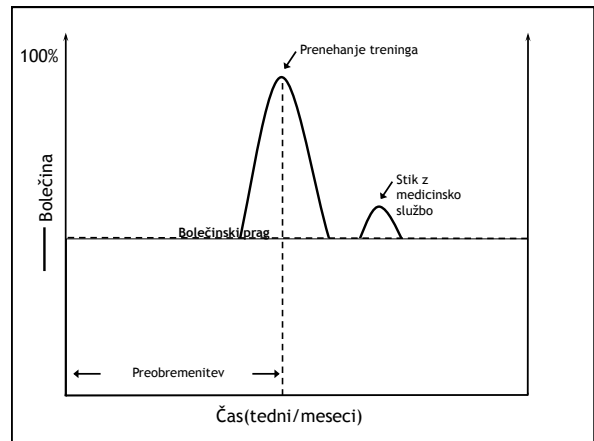
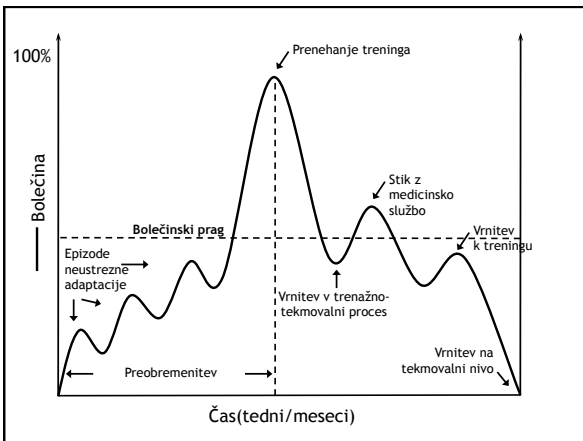
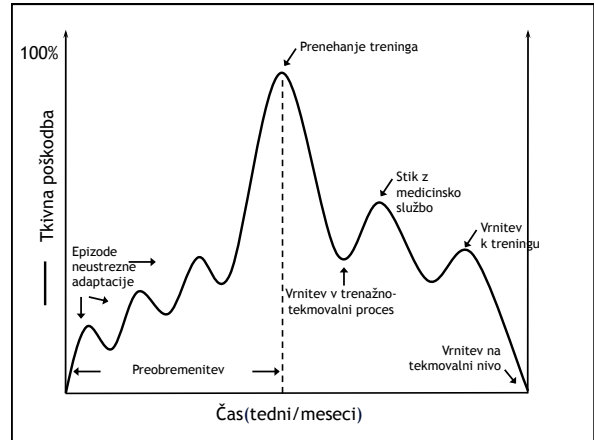
AKUTNE POŠKODBE PRI RAZLIČNIH ŠPORTNIH PANOGAH

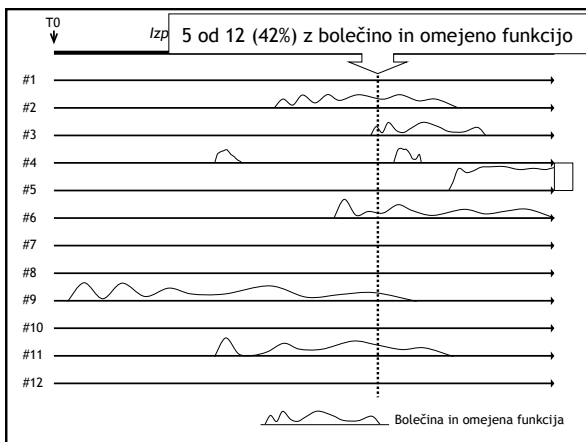
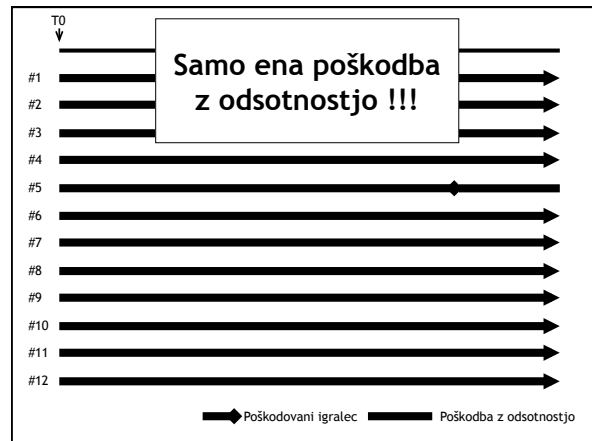
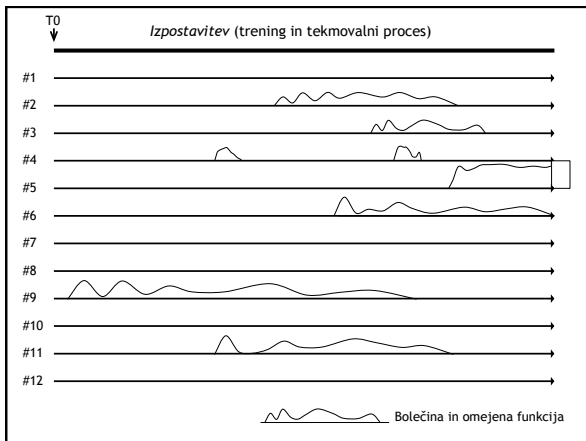
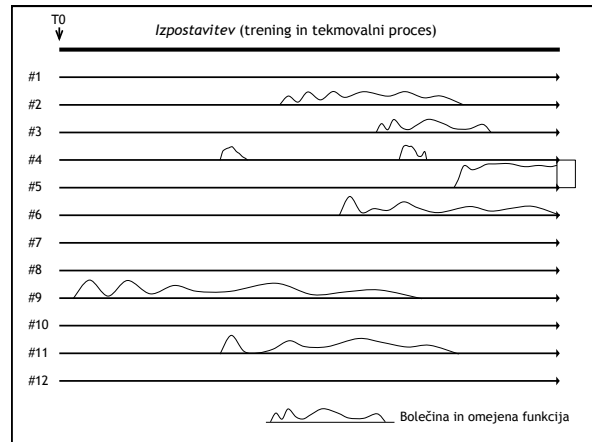
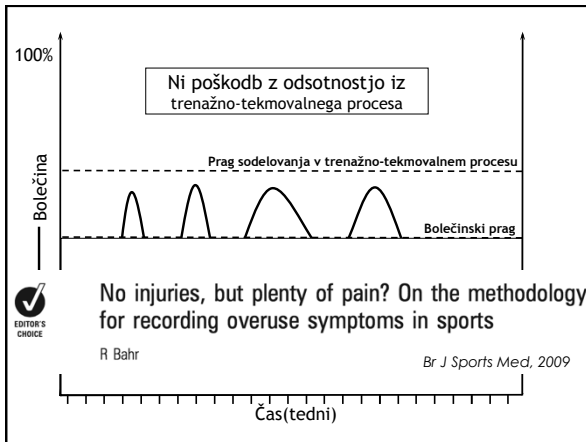


KRONIČNE POŠKODBE

- **Preobremenitveni sindromi.**
- Merilo je **prevalenca v %.**
- Nastajajo **postopoma.**
- Temeljna problema sta **bolečina in omejena funkcija.**





SPOROČILO?

Development and validation of a new method for the registration of overuse injuries in sports injury epidemiology: the Oslo Sports Trauma Research Centre (OSTRC) Overuse Injury Questionnaire

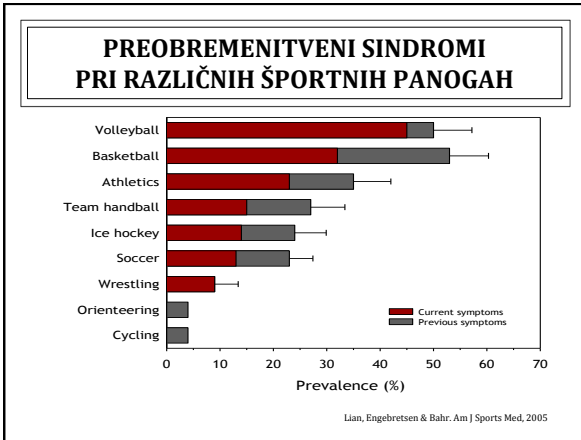
Benjamin Clarsen, Gøthe Myklebust, Roald Bahr

Br J Sports Med, 2013

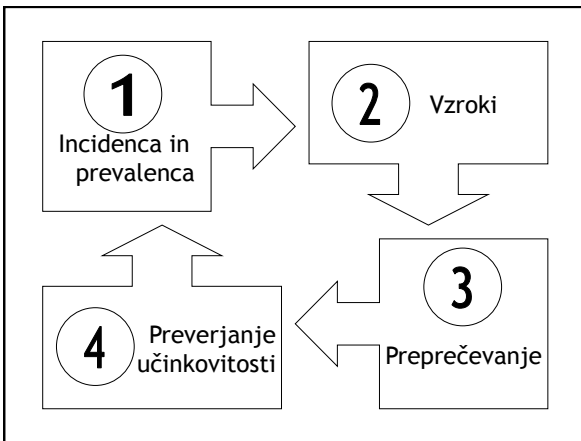
OSTRC vprašalnik o preobremenitvenih sindromih gibal

Ustrezna odgovorja, kateri so redki odgovori, v primeru, da niso priloženi, poudarite odgovorje, najhujšemu poškodovanemu igralec. **TEMNO VRTIČKO OPISUJE BOLAČINO, STRIPASTO OPISUJE OMEJENO FUNKCIJO NA OBLASTI, KATERI JE POVEZANA S SINDROMOM OBLASTI.**

VPRŠANJE	OPIS TILAV	Skupna					Skupna													
		1	2	3	4	5	1	2	3	4	5									
Ste imeli v zadnjih šestih mesecih 10 ali več dni brez trenajne ali tekmovalne dejavnosti zaradi bolečine ali omejene funkcije v katerikoli delu telesa?	Da																			
V katerem delu telesa ste imeli bolečino ali omejeno funkcijo v katerikoli delu telesa v zadnjih šestih mesecih?	Sprednji del telesa																			
	Zadnji del telesa																			
	Sprednji del noge																			
	Zadnji del noge																			
	Sprednji del stopala																			
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	Zadnji del telesa																			
	Sprednji del noge																			
	Zadnji del noge																			
	Sprednji del stopala																			



KAKO PREUČUJEMO ŠPORTNE POŠKODBE ?



1

Incidenca in prevalenca

→

2

Vzroki

3

Preprečevanje

4

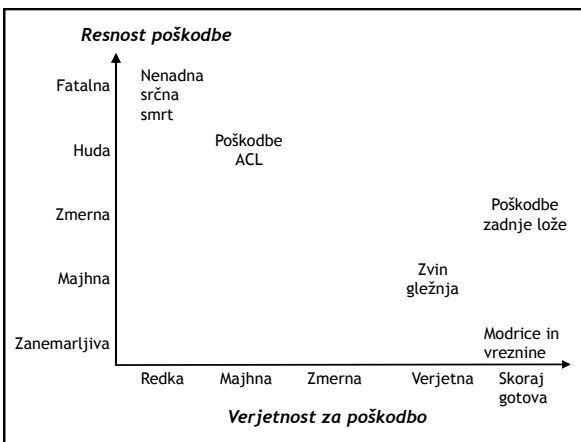
Preverjanje učinkovitosti

1

Incidenca in prevalenca

- Pregled poškodb iz vsaj ene sezone za izbrani šport.
- Možnosti večletnega prospektivnega spremljanja.
- Pregled že razpoložljive znanstvene literature o poškodbah v izbranem športu.

**OPREDELITEV
VELIKOSTI
PROBLEMA**

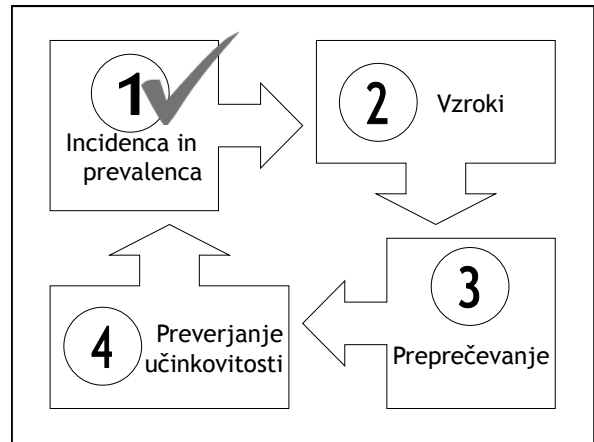
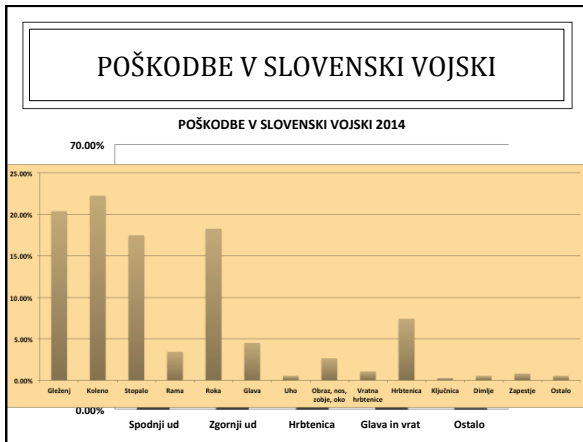


ZNAČILNOSTI POŠKODB PRI ODBOJKI

1. Zvin gležnja
2. Poškodbe kolena
3. Bolečine v rami

Eerkes, 2012
Agel et al., 2007
Verhagen et al. 2004
Bahr & Bahr, 1997

PHOTO ILLUSTRATIONS BY BEN OHENSI | ILLUSTRATION BY JOSH MCCULLOUGH

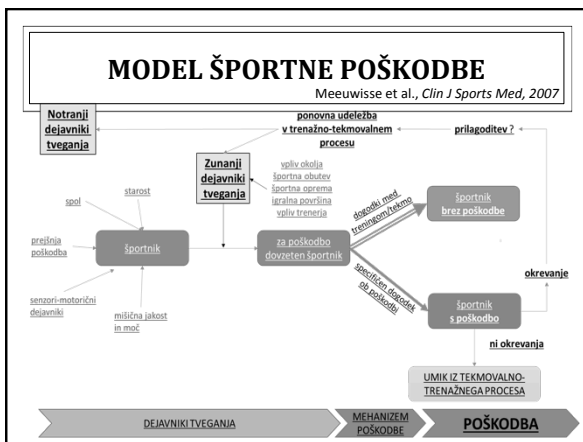
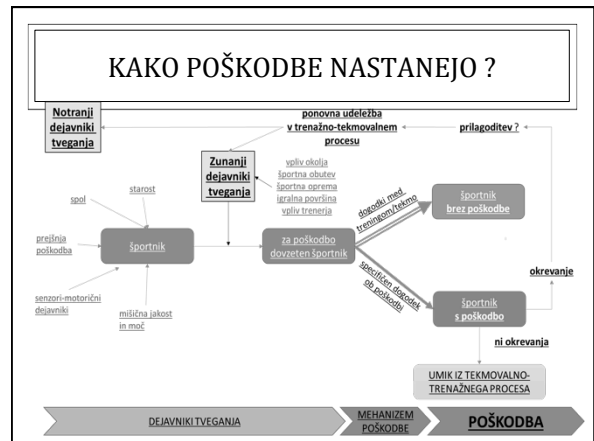


2 Vzroki

- Spremljanje tekmovalnega in trenažnega načrta
- Prospektivno beleženje poškodb
- MORAJO sodelovati trenerji !!! in igralci

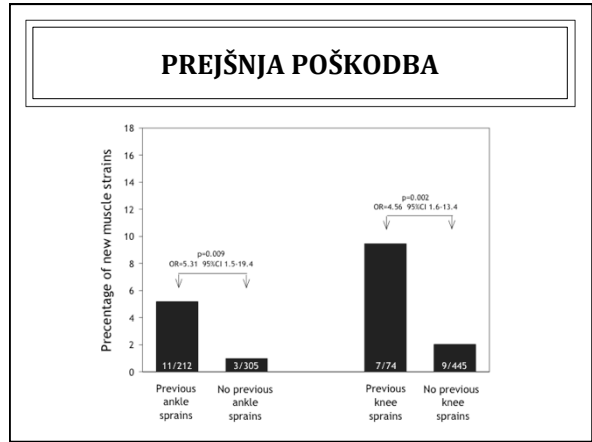
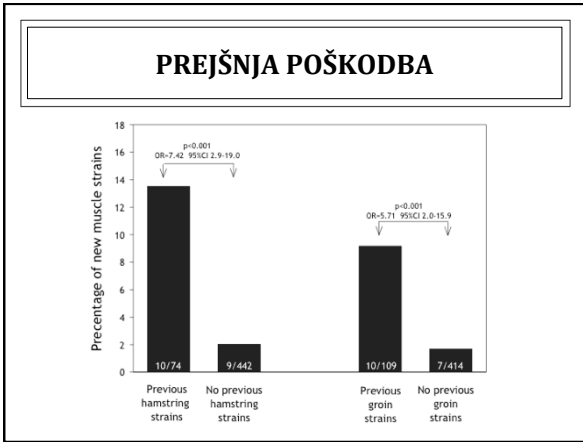
KAKO POŠKODBE NASTANEJO ???

McIntosh & Bahr. Sports Injury Prevention. Blackwell, 2008



HADDONOVA MATRICA

	Pred poškodbo	Ob poškodbi	Po poškodbi
Športnik	Tehnika Neuro-mišična funkcija	Trenažni status Slaba tehnika	Zdravljenje (P)Rehabilitacija
Športno okolje	Igralna površina Pravila igre	Varnostna mreža Uporaba čelade	Ustrezna prva in nujna medicinska pomoč
Oprema	Športni čevlji Športni rekviziti	Opornica ali bandaža Smučarske vezi	Oprema za NMP Ambulantno vozilo



PREJŠNJA POŠKODBA

- Prejšnji zvin gležnja je pomemben dejavnik tveganja za vnovični zvin gležnja pri odbojkaricah.

Prediktor	Hi kvadrat/ relativno tveganje	p vrednost/ 95% interval zaupanja
Prejšnja poškodba	5.098	p=0.024
prejšnji zvin	5.38	1.18 – 24.26
brez prejšnjega zvina	0.76	0.47 – 1.21

SPOL

1st World Congress of Sports Injury Prevention

Br. J. Sports Med. 2005;59:373-308

[O31] INFLUENCE OF SEX ON THE SPORTS INJURIES RATE AMONG SLOVENIAN TOP ATHLETES

E. Denicic, V. Medic, Faculty of Sport, Ljubljana, Slovenia

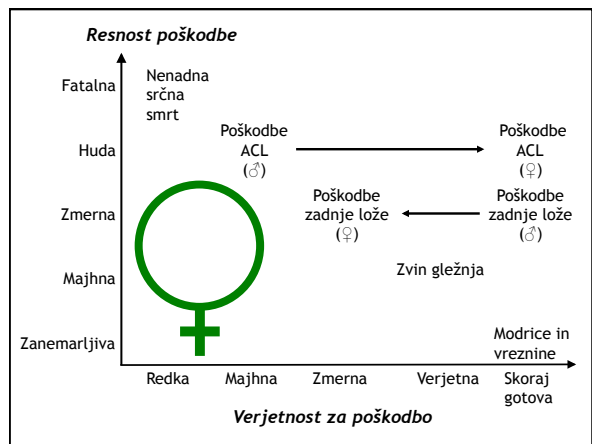
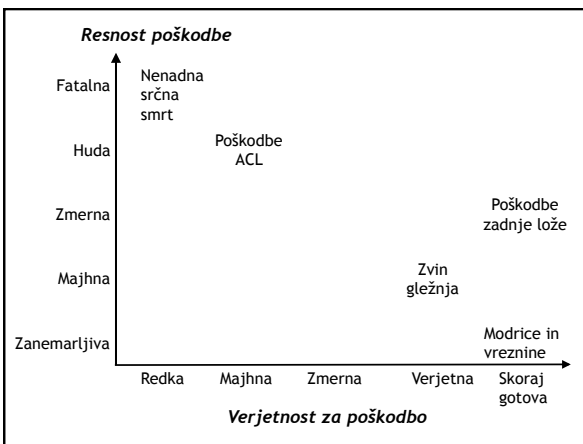
Background: This research study, comprising 1500 top level athletes, started in 2003 and will be resumed every year for the next 5 years. This paper reviews data from year 2003.

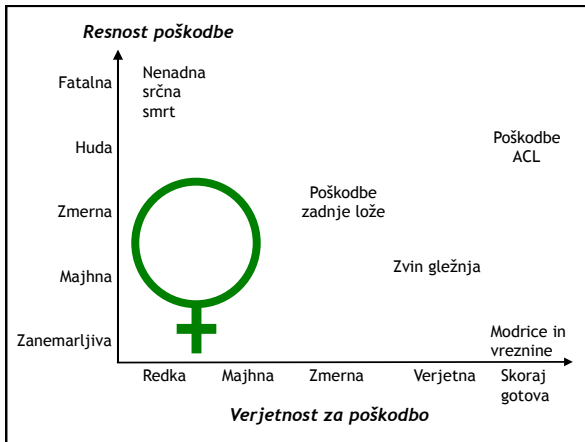
Purpose: To determine the incidence, anatomical distribution, and time onset of injury in relation to preseason versus season and training v competition, and to evaluate the influence of sex on incidence of injuries.

Methods: We posted 1200 questionnaires to top level Slovenian athletes, listed by the Slovenian Olympic Committee. In total, 1037 athletes from 54 different sports returned the questionnaire (79.8%). 699 men (67.4%) and 338 (32.6%) women. Mean (SD) age was 21.5 (6.4) years for men and 19.7 (5.7) years for women, weight was 76.6 (6.4) kg for men and 61.2 (8.8) kg for women, height was 181.9 (7.7) cm for men and 170.3 (6.9) cm for women.

Results: We followed injuries occurred in the past 12 months. Overall injury rate (irrespective of sex or sport) was 135 injuries per 1000 athletes during 12 months (year 2003). Distribution according to sex the injury rate was 136 injuries per 1000 women and 134 injuries per 1000 men. The χ^2 test for independent variables did not show significant differences between the sexes (p<0.05).

Conclusions: This study has given an extensive amount of information and cannot be presented in one slide. This part of the analysis showed us that sex is not a defining factor for the rate of sports injuries over a 12 month period. As we are longitudinally following the same group of people, it will be interesting to do the follow up and compare data year by year. These data will help us reorganise the medical care of top level athletes on the national level, as we are planning to introduce intervention measures regarding the predominant injuries (knee injuries 22%, ankle injuries 14%).





SPOL

• **Pojavnost zvinov gležnja je bila statistično značilno višja pri odbojkarjih kot pri odbojkaricah.**

♂
19

+

♀
6

→

25
zvinov
gležnja

Prediktor	Hi kvadrat/ relativno tveganje	p vrednost/ 95% interval zaupanja
Spol	5,31	p=0.021
moški	2.62	1.10 – 6.26
ženski	0.87	0.78 – 0.98

STAROST

STAROST

• **OTROCI**

- Neizkušenost
- Nepopolno razvit sitem gibalnega nadzora
- Slaba športna tehnika
- Psihološki dejavniki (presoja, preценjevanje zmogljivosti)
- Prezgodnja specializacija !!!

• **STAREJŠI**

- Spremembe visko-elastičnih lastnosti tkiv (vezi, kite, mišice)
- Spremembe reakcijskih časov.
- Sarkopenija in osteopenija.

Overuse Injuries and Burnout in Youth Sports: A Position Statement from the American Medical Society for Sports Medicine
National Athletic Trainers' Association Position Statement: Prevention of Pediatric Overuse Injuries

STAROST

Demise of the fittest are we destroying our biggest talents?

Road Block

Table 6. Recommendations for Pitching in Youth Sports

3. Avoid pitching too much. Future baseball players should be following the following guidelines:

Age, y	Guideline
6-10	1. Avoid pitching more than 30 minutes per game
11-12	2. Avoid pitching more than 50 minutes per game
13-14	3. Avoid pitching more than 60 minutes per game
15-16	4. Pitches with the following characteristics should be monitored closely
17-18	5. Pitches with the following characteristics should be monitored closely

From Andrews JR, et al. *Journal of Sports Medicine*. 2006;14(4):48-57.

MIŠIČNA JAKOST IN MOČ

Zabeležili smo **14 poškodb ramenskega sklepa**

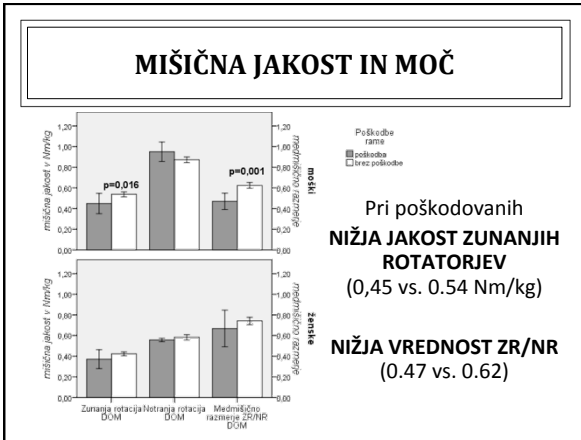
- 10 pri odbojkarjih (prevalenca 10,1%)
- 4 pri odbojkaricah (prevalenca 4,88%)

Ni razlik med spoloma (p=0,190)

Vse poškodbe so nastale na dominantni rami.

Strength Asymmetry of the Shoulders in Elite Volleyball Players

Vedran Hadzic, MD; Tine Sattler, PhD; Matjaž Veseiko, PhD, MD; Goran Markovic, PhD; Edvin Dervecic, PhD, MD*



MIŠIČNA JAKOST IN MOČ

Spremljani parameter	Stran	ODBOJKARJI		ODBOJKARICE	
		Poškodba rame	Brez poškodbe rame	Poškodba rame	Brez poškodbe rame
		Povprečje ± St.odk.	Povprečje ± St.odk.	Povprečje ± St.odk.	Povprečje ± St.odk.
Notranja rotacija	D	0.94 ± 0.13*	0.88 ± 0.12**	0.56 ± 0.01	0.59 ± 0.11**
	ND	0.82 ± 0.10	0.81 ± 0.12	0.45 ± 0.11	0.55 ± 0.09
Zunanja rotacija	D	0.44 ± 0.14	0.54 ± 0.11*	0.37 ± 0.06	0.42 ± 0.06**
	ND	0.49 ± 0.06	0.51 ± 0.09	0.36 ± 0.03	0.38 ± 0.07
Razmerje jakosti	D	0.46 ± 0.11*	0.62 ± 0.12	0.67 ± 0.11	0.74 ± 0.15
	ND	0.60 ± 0.09	0.64 ± 0.11	0.85 ± 0.35	0.71 ± 0.14

* - p < 0.05; razlike v mišični jakosti med D in ND ramo
 ** - p < 0.0001; razlike v mišični jakosti med D in ND ramo

MIŠIČNA JAKOST IN MOČ

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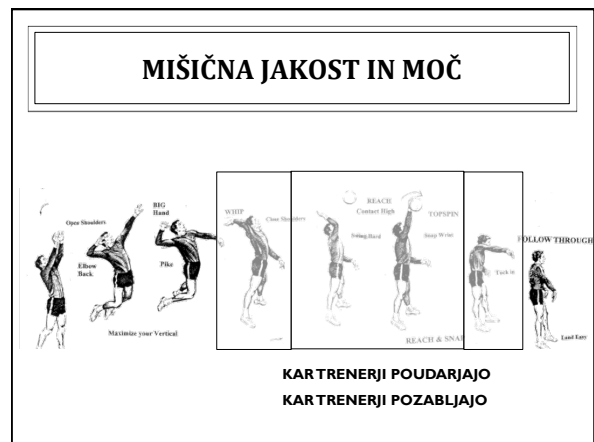
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MIŠIČNA JAKOST IN MOČ

Povezava med porušenim mišičnim razmerjem dominantne rame in poškodbami ramenskega sklepa (p=0,005) pri odbojkarjih ne pa tudi pri odbojkaricah (p=0,608).

∴

Porušeno ZR/NR pomeni 12,75-krat višje tveganje za poškodbo rame kot normalno medmišično razmerje.



ZUNANJI DEJAVNIKI TVEGANJA

MEHANIZMI POŠKODOVANJA

KONTAKTNI

NEKONTAKTNI

MEHANIZEM POŠKODOVANJA

- Igralna situacija
- Početje športnika tik pred poškodbo
- Udeležnost drugih igralcev
- Grob opis biomehanskega položaja telesa
- Podroben biomehanski opis poškodovanega sklepa

MEHANIZEM POŠKODOVANJA

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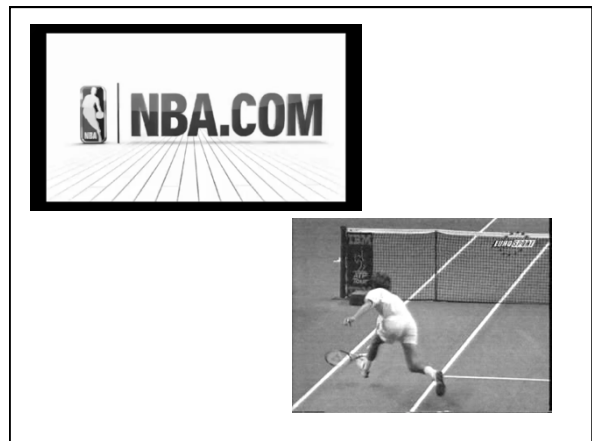
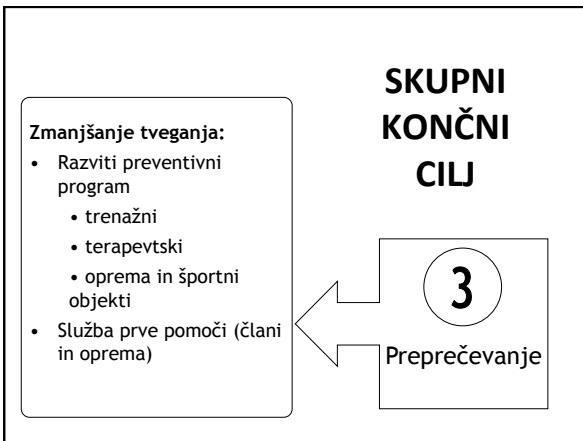
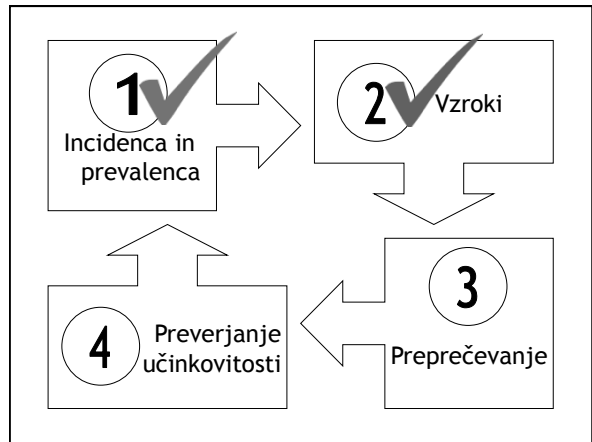
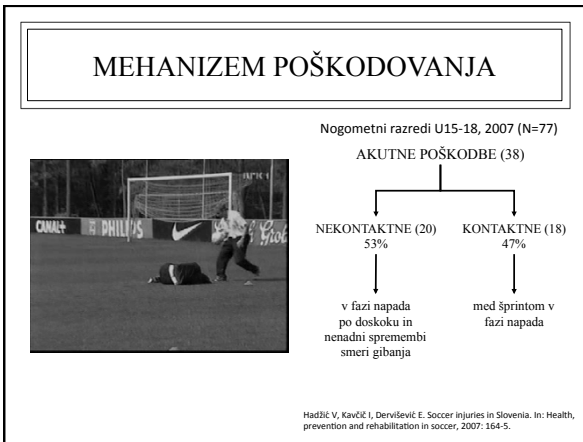
Mechanisms of Anterior Cruciate Ligament Injury in World Cup Alpine Skiing

A Systematic Video Analysis of 20 Cases

Tone Benk¹ PT, MSc, Torje Wilje Flørenes¹ MD, PhD, Tron Krosshaug¹ PhD, Indrøyli Krog¹ MD, PhD, Lars Nordsletten¹ MD, PhD, Christopher Wang¹ MD, Brian Muller¹ PhD, Robert Corcos Reid¹ PhD, Vibe Selmer¹ PhD, and Roald Bahr¹ MD, PhD (investigation performed at the Oslo Sports Trauma Research Center, Department of Sports Medicine, Norwegian School of Sport Sciences, Oslo, Norway)

Lindsey Vonn crash, Schladming 2013

Figure 5. Injury 11: Landing back-weighted after jumping



ZVIN GLEŽNJA

Table 4.1 Risk of ankle sprains in different sports. The numbers reported are average estimates based on the studies available.

Sport	Competition incidence ¹	Overall incidence ¹	Rank ²	Comments
Team sports				
Volleyball	1.8-5.5	0.6-2.0	1 (32-49%)	
Soccer	0.4-26.7	0.1-5.0	1 (15-41%)	
Team handball	1.32	0.4-1.6	2 (11-14%)	
Basketball	1.2-6.4	0.9-4.7	1 (13-27%)	
American Football	5.0-13.0	0.5-0.9	2 (12-21%)	
Australian Football	3.9-4.9	1.3-2.3	3 (9-14%)	
Indoor soccer	10.1-10.3	NA	1 (19-25%)	
Individual sports				
Orienteering	3.8	0.82	1 (27-32%)	
Badminton	NA	0.6	1 (19-24%)	
Gymnastics	NA	0.06-0.31	2 (11-21%)	

¹Incidence is reported for adult, competitive athletes as the number of injuries per 1000h of training and competition.
²Rank indicated the relative rank of ankle within each sport, as well as the proportion as a percentage of the total number of acute injuries within the sport.
NA: Data not available.

ZVIN GLEŽNJA - DEJAVNIKI TVEGANJA

Table 4.2 Internal and external risk factors for ankle sprains in different sports. The numbers reported are average estimates based on the studies available.

Risk factor	Relative risk ¹	Evidence ²	Comments
Internal risk factors			
Previous ankle sprain	2	++	Increased risk for recurrence during 12 months post-injury
Postural sway	NA	+	
Gender	1.25	+	Risk is higher for females
Range of motion of the ankle	NA	+	
Height and weight	NA	+	
Anatomic foot type	NA	+	
Foot width	NA	+	
Generalized joint laxity	0	0	No known association
Ankle joint laxity	NA	+	
Muscle strength	NA	+	
Limbs dominance	NA	+	
External risk factors			
Shoe type		++	No association
Play in game versus practice	2-44	++	Higher risk during games
Player position	1-5	++	Relative risk depends up-on sport

ZVIN GLEŽNJA

Table 4.3 Injury prevention matrix for ankle sprains: potential measures to prevent injuries.


	Pre-crash	Crash	Post-crash
Athlete	Skill Neuromuscular function		Neuromuscular function
Rules	Rule changes		
Material		External ankle support	

ZVIN GLEŽNJA - (10 - 5 - 10)

Risk 4.2 Basic proprioception program for the ankle (originally described by Trapp (1995))

Basic position
The athlete stands on one (straight) leg while the other leg is flexed in the air with the knee bent at 90°. The arms are crossed in front of the chest.

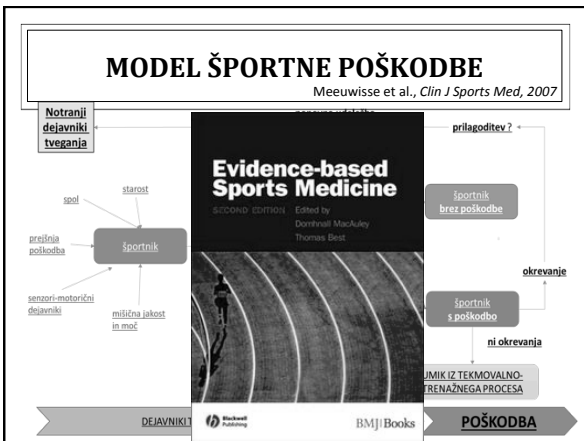
Exercise
The goal of the exercise is to attempt to make all balance correction using the ankle joint only, while using the arms, hips, and knees as little as possible.




Program
The program follows a "10-5-10" rule (i.e., 10min, 5 times a week, for 10 weeks).

Level of difficulty
At first balancing on the floor may represent an adequate challenge. Exercise difficulty can be gradually increased during the program in the following order: (1) perform exercises on a wobble board on a soft surface, (2) perform exercises on a wobble board on a hard surface, and (3) close the eyes.

Source: Originally described by Trapp (1995)



QUO VADIS ?



A peek into the future of sports medicine: the digital revolution has entered our pitch

Evert A Verhagen,¹ B. Clarsen,² R. Bah^{2,3}

Br J Sports Med 2013;0:1-2.

- Uporaba sodobnih tehnologij (pametni telefoni, GPS naprave)
- Neposreden vnos v podatkovne zbirke → prihrani čas in denar.
- Dostopnost podatkov v realnem času → pravočasnost ukrepanja.
- Možnost različnih modulov glede na specifikko športa.
- Uporaba SMS in e-poštnega obveščanja pri prospektivnih študijah → zmanjša nedoslednost podatkov.



