The effect of physiotherapy program on the performance of elite 15 years old lithuanian basketball players

Assoc. Prof. Laimonas Šiupšinskas PT, PhD









LITHUANIAN BASKETBALL FEDERATION

FIBA WORLD RANKING



Ranking Men after the 2015 Continental Championships

(last updated: 03 Oct 2015)

> See how it works

Share this 19 (f)

Θ

WORLD RANK	COUNTRY	ZONE RANK	IOC	CURRENT POINTS	+/- RANK *
1.	USA	1.	USA	1000.0	ο Ο
2.	Spain	1.	ESP	715.0	ο Ο
3.	Lithuania	2.	LTU	457.0	• +1
4.	- Argentina	2.	ARG	455.0	O -1
5.	France	3.	FRA	379.0	ο 😑
6.	Serbia	4.	SRB	353.0	• +1
7.	Russia	5.	RUS	305.0	-1
8.	C• Turkey	6.	TUR	281.0	ο Ο
9.	Srazil	3.	BRA	273.0	o
10.	Greece	7.	GRE	225.0	o
11.	Australia	1.	AUS	219.0	O 0

F	BA
EUI	ROPE

We Are Basketball

Subjects



LITHUANIAN BASKETBALL FEDERATION

	Girls (n=16)	Boys (n=15)	Total
Age (years) mean (SD)	15,42 (0,27)	15,36 (0,29)	15,39 (0,28)
Height (m) mean (SD)	1,76 (0,07)	1,84 (0,09)	1,70 (0,09)
Weight (kg) mean (SD)	64,88 (7,11)	67,20 (11,81)	65,65 (9,63)
BMI mean (SD)	20,65 (2,09)	19,78 (1,85)	20,23 (3,99)

Study design





Functional movement screen



Predicting Musculoskeletal Injury in National Collegiate Athletic Association Division II Athletes From Asymmetries and Individual-Test Versus Composite Functional Movement Screen Scores

Monique Mokha, PhD, ATC, CSCS; Peter A. Sprague, DPT, PT, OCS; Dustin R. Gatens, MS, LAT, ATC

Key Points

- Division II athletes with composite scores of ≤14 on the Functional Movement Screen were not at greater risk of musculoskeletal injury than those with higher scores.
- The athletes with an asymmetry or a score of 1 on any individual test of the Functional Movement Screen were at 2.73 times greater risk of a musculoskeletal injury than others.

Scoring of the FMS

- 3 -Perform pattern as directed
- 2 -Perform pattern with
- compensation/imperfection
- 1 -Unable to perform pattern
- 0 -Pain with pattern regardless of quality



Upper and lower quarter Y balance test



Drop vertical jump test





Landing error scoring system (LESS)



LESS Scoring

By University of Wisconsin-Madison Shared Apps

Open iTunes to buy and download apps.



View in iTunes

Free

Category: Health & Fitness Released: Aug 20, 2014 Version: 1.0 Size: 8.0 MB Language: English Seller: University of Wisconsin-Madison Shared Apps © University of Wisconsin System Board of Regents Rated 4+

Compatibility: Requires iOS 7.0 or later. Compatible with iPad.

Customer Ratings

We have not received enough ratings to display an average for the current version of this application.

More iPad Apps by University of Wisconsin-Madison Shared Apps

Ŵ

Description

The LESS (Landing Error Scoring System) has been developed through a consortium of researchers and medical professionals under the direction of Dr. Darin A. Padua at the University of North Carolina at Chapel Hill.

University of Wisconsin-Madison Shared Apps Web Site > LESS Scoring Support >

....More

iPad Screenshot



No SIM 🗟	00:58			∦ 31 % 💶	
Trials					
Sau	ule Salatkaite - 2016 m. sausio 17 d. 22:55:57 GM7	Г+2			
				Front View	
	Real Time LESS				
	Frontal-Plane Motion				
	L1. Stance width	Normal	Wide	Narrow	
	L2. Maximum foot-rotation position	Normal	Externally	Internally	
	L3. Initial foot contact	Symmetr	ic Non	Symmetric	
	L4. Maximum knee-valgus angle	Normal	Small	Large	
	L5. Amount of lateral trunk flexion	None	Small	to Moderate	
	Sagittal-Plane Motion				
	L6. Initial landing of feet	Toe to Heel	Heel to Toe	Flat	
	L7. Amount of knee-flexion displacement	Large	Average	Small	
	L8. Amount of trunk-flexion displacement	Large	Average	Small	
	L9. Total joint displacement in the sagittal plane	Soft	Average	Stiff	
	L10. Overal impression	Excellent	Average	Poor	
L2 LI	Send Sav	е			
Nev	v Trial		RealT	ïme (i	



Single leg hop tests



Biodex Medical System 4 PRO



Physiotherapy program based on test results

- Foam rolling
- Core stability
- Flexibility
- Strength

Foam rolling



Core stability



Flexibility







Strength













Drop vertical jump test



Drop vertical jump test











1. Physiotherapy program increased dynamic stability of upper and lower extremities for boys. Dynamic stability of lower extremities improved in girls.

2. Physiotherapy program improved overall quality of vertical jump landing biomechanics in boys as well as in starting position and in the phase of maximum squat. Vertical jump landing biomechanics in girls improved in phase of maximum squat before the jump and in the landing phase.

3. Physiotherapy program improved the quality of basic functional movements in girls. Distance of single leg hops increased, but symmetry remained in the limits in both groups.

4. Isokinetic muscle strength increased in boys in the left leg strength at a lower angular velocity and strength of both legs at a higher angular velocity. Left leg strength increased in girls.

Question and answer

 I would like to know how often football players should do injury prevention exercises. Load of exercises and how many times in week. Should it take 1h or is it enough to do 10-15 every day? <u>Injury Prevention for 6 Weeks = Better</u> <u>Landings for 6 Months</u>

Take Home Message: Six weeks of a dynamic injury prevention warm-up program results in biomechanical improvements that last up to 6 months after stopping the program. It may be important to perform these programs continually or reinforce these programs every 6 months.

The Effects of an Injury Prevention Program on Landing Biomechanics Over Time DiStefano LJ, Marshal SW, Padua DA, Peck KY, Beutler AI, de la Motte SJ, Frank BS, Martinez JC, & Cameron KL. *Am J Sports Med*. Published Online First: January 20, 2016; DOI: 10.1177/0363546515621270

Neuromuscular training

Take Home Message: Neuromuscular training programs have shown to significantly reduce the number of ACL injuries. Previous literature identified that a young starting age has the greatest protective benefit for ACL injuries. This study added to the existing evidence that high compliance with NMT programs is another key factor in reducing ACL injuries.

Superior compliance with a neuromuscular training programme is associated with fewer ACL injuries and fewer acute knee injuries in female adolescent football players: secondary analysis of an RCT

Martin Hagglund, Isam Atroshi, Philippe Wagner, Markus Walden. Published Br J Sport Medicine: 2013 Oct; 47(15):974-9. doi: 10.1136/bjsports-2013-092644. Epub 2013 Aug 20 Warm-up Programs with evidence in reducing ACL injuries (females)

• WIPP (Sportsmetrics Warm up for Injury prevention and performance)

Download for free at <u>www.sportsmetrics.net</u>

 PEP Program (Prevent Injury and Enhance Performance) Santa Monica Orthopedic Group.

Download at <u>www.aclprevent.com</u>

• FIFA 11+ (FiFA 10 + PEP)

Download at <u>www.FIFA.com</u>

SportsMetrics

Content:

- A 3x/week jump training program (lasting 6 weeks)
- Progressed through 3 phases: the technique phase, fundamental phase, and the performance phase
- Training sessions are 60-90 minutes

SportsMetrics

Is Knee Separation During a Drop Jump Associated With Lower Extremity Injury in Adolescent Female Soccer Players?

John W. O'Kane,*[†] MD, Allan Tencer,[‡] PhD, Moni Neradilek,[§] MS, Nayak Polissar,[§] PhD, Lori Sabado,[‡] PT, and Melissa A. Schiff,^{II} MD, MPH Investigation performed at the University of Washington, Seattle, Washington, USA

Background: Knee injuries are common in older adolescent and adult female soccer players, and abnormal valgus knee appearance characterized by low normalized knee separation (NKS) is a proposed injury risk factor. What constitutes normal NKS in younger adolescents and whether low NKS is an injury risk factor are unknown.

Purpose: To determine the normal range of NKS using a drop-jump test in female perimenarchal youth soccer players and whether low NKS contributes to lower extremity injuries or knee injuries.

Study Design: Cohort study; Level of evidence, 2.

Methods: From 2008 to 2012, a total of 351 female elite youth soccer players (age range, 11-14 years) were followed for 1 season, with complete follow-up on 92.3% of players. Baseline drop-jump testing was performed preseason. Lower extremity injuries during the season were identified using a validated, Internet-based injury surveillance system with weekly email reporting. Normalized knee separation at prelanding, landing, and takeoff was categorized 2 ways: as ≤10th percentile (most extreme valgus appearance) compared with >10th percentile and as a continuous measure of 1 SD. Poisson regression modeling with adjustment for clustering by team estimated the relative risk (RR) and 95% confidence interval (CI) of the association between the NKS and the risk of lower extremity and knee injury, stratified by menarche.

Results: Of the study participants, 134 players experienced 173 lower extremity injuries, with 43 (24.9%) knee injuries. For postmenarchal players (n = 210), those with NKS \leq 10th percentile were at 92% increased risk of lower extremity injury (RR, 1.92; 95% Cl, 1.17-3.15) and a 3.62-fold increased risk of knee injury (RR, 3.62; 95% Cl, 1.18-11.09) compared with NKS >10th percentile at prelanding and landing, respectively. Among postmenarchal players, there was an 80% increased risk of knee injury (RR, 1.80; 95% Cl, 1.01-3.23) with a decrease of 1 SD in landing NKS and a 66% increased risk of knee injury (RR, 1.66; 95% Cl, 1.04-2.64)

PEP Program (Prevent Injury and Enhance Performance)

Santa Monica Sports Medicine Foundation and the PEP (Prevent Injury and Enhance Performance) http://smsmf.org/smsf-programs/pep-program (FREE download!)

Content:

- Warm-up, stretching, strengthening, plyometrics, and sport specific agility exercises for soccer
- Performed on the field before practice; no extra specialized equipment
- 19 components, ~20 minutes, 3x/week

FIFA 11+

- http://f-marc.com/11plus/home/
- http://f-marc.com/11plus/manual/

(76 page manual in 7 languages; videos on the website as well!)

Content:

 Comprehensive warm-up program to improve strength, awareness, and neuromuscular control during static and dynamic movements

- Especially adolescent female soccer players
- Mostly done as warm-up
- Little to no equipment
- Some strength training, some plyometric activity and some balance

Frequency:

 Agreement that an ACL prevention program should include at least 10 minutes of exercises 3x/ week, as a bare minimum

****Most studies report performing 15-20 minutes of activity. Sadoghi, JBJS, 2012

Duration:

 Programs should begin prior to season, at least 6 weeks pre-season

***Most studies recommend 8 or more weeks in duration to allow sufficient neuromuscular changes and performance training effects Ideally, the program can be continued throughout the season, at a lower frequency or duration (i.e.-cut the warm-up to 10-15 minutes if necessary)

- Sadoghi, JBJS, 2012
- Voskanian, Curr Rev Musculoskeletal Med, 2013

Components of an Injury Prevention Program:

- Muscle strengthening
- Plyometrics
- Neuromuscular training / control / balance
- Education and feedback regarding body mechanics and proper landing patterns in a dynamic atmosphere (HOW)

*Voskanian, Curr Rev Musculoskeletal Med, 2013



Institute of Sports of Lithuanian University of Health Sciences



Lithuanian Federation of Sports Medicine

International Conference EXERCISE FOR HEALTH AND REHABILITATION 11 of November, 2016

Kaunas, Lithuania