

ES.010- Chemistry of sports week 2

Topics for today:

- On-line reading - review of Anatomy and chemistry of the body
- Mini biochemistry course
- Injury prevention
- Getting the workouts organized
- PE points

Review of Last week

Fitness tests:

For those who did them this past week:

- Please fill in the survey - we will talk about it next week

Injury prevention

Want to participate in an exercise program that will not leave you unable to function in your daily life

How can we do this?

Injury prevention

Common sense – don't go out and run a marathon when you have not been running regularly

Gradually build up your level of exercise

Better to be consistent through out the week as opposed to doing it all on the weekend

Injury Prevention

- Who has been injured?
- What happened?
- How long did it take to recover?
- Any suggestions on how to prevent it from happening again?

Two main ways to prevent injury

- Warm-ups
- Stretching

Injury prevention at the beginning of workouts - Warm-up

Definitions from Woods et al: (one of the
required readings!)

Warm-up is intended to improve a muscle's
dynamics and prepare the athlete for
demands of exercise

Why do you think it is important to warm-up?

Injury prevention at the beginning of workouts - Warm-up

When should you warm-up in your workout?

How can tell when you are sufficiently warmed
up?

Types of warm-ups

- Passive
- Active

Is there a specific warm-up you do for your sport?

How long do you warm-up for?

Injury prevention at the beginning of workouts - Stretching

Definitions from Woods et al:

Variations of stretching –
dynamic –motion

<http://www.livestrong.com/video/1226-feet-stretching-exercises-anybody/>

Static – Quadriceps stretch

PNF

Injury prevention at the beginning of workouts - Stretching

Definitions from Woods et al:

Variations of stretching - dynamic, static and proprioceptive neuromuscular facilitation (PNF)

PNF - requires static stretch, isometric contraction and relaxation and then another static stretch

Summary of literature

Survey of stretching protocols and results

Study	Protocol	Type	Results
Amako et al.	4 upper body, 7 lower body, 7 trunk; 30 sec each 1 x 20 min session/day for 12 weeks	Static	Protocol limited the amount of muscle related injury
Bixler and Jones	Trunk twist: 15 sec Hamstring, groin, quad stretches: 25 sec each	Static	Protocol reduced injury
de Weijer et al.	Hamstring only 1 x 30 sec for each leg 3 reps with 10 sec rest between reps	Static	N/A: measured changes in hamstring length over time
Hartig and Henderson	Hamstring only 5 x 30 sec stretches 3 sessions/day for 13 weeks	Static	Protocol reduced lower extremity overuse injury
Pope et al.	1 x 20 sec stretch for each of 6 major lower-limb muscle groups 1 session/day for 12 weeks	Static	Protocol did not significantly reduce total injuries
Rosenbaum and Hennig	2 lower-leg stretches 30 sec each, 3 reps	Static	N/A: measured changes in force output and muscle compliance
Sullivan et al.	Hamstring only 30 sec total (5 sec for each phase) 1 x 5 min session/day, 4 days/week, for 2 week period	Static and PNF CRC	N/A: measured changes in flexibility
Verrall et al.	Hamstring stretches 15 sec each with knee in 0, 10, and 90° of flexion, utilizing trunk flexion to enhance stretch	Passive	Protocol resulted in significant reduction in injury

CRC = contract - relax - contract; N/A = not applicable (did not specifically examine injury effects); PNF = proprioceptive neuromuscular facilitation; reps = repetitions.

Source: Woods, K., P. Bishop, and E. Jones. "Warm-up and Stretching in the Prevention of Muscular Injury." *Sports Medicine* 37, no. 12 (2007): 1089-1099.

Image by MIT OpenCourseWare.

Injury

Classified into groups:

1. Bone injuries
2. Muscle/tendon injuries
3. Ligament injuries
4. Spinal injuries

How long does it take to recover from injuries?

Which ones are the hardest to recover from?

Prevention of Injuries

- How can we prevent injuries?
- Does warm-up help?
- When do you stretch - before or after workout?
- What happens when you don't stretch?
- Is it sport specific?

Flexibility

- According to David Geier, director of sports medicine at the Medical University of South Carolina –Flexibility is the third pillar of fitness, next to cardiovascular conditions and strength training
- Flexibility can help your body reach its optimum fitness level and may play a role in injury prevention.

Flexibility

- When you stretch a muscle, you lengthen the tendons or muscle fibers that attach it to the bone. The longer these fibers are the more you can increase the muscle in size when you do your strength training
- Flexible muscles make everyday activities easier on your body and may decrease your risk of certain injuries

Flexibility exercise

<http://www.sport-fitness-advisor.com/flexibility-exercises.html>

Protecting yourself when you workout

- Equipment for Triathlons
 - Swimming
 - Bike
 - Running
- Sport specific equipment?
- What equipment do you use for your sport?

Steve's show and tell

- Crash - Memorial day 2008!
- Riding home from class last year

The laboratory component of class

How are the workouts going?

Who wants PE points for tri training?

Our first workout is on this Thursday at 4 pm

Thursday February 14 –MAC court – our first spin workout introduction to spinning

Thursday February 21 - swim at the Z center 50 m pool

Thursday February 28- Mac Court -bike - intervals to get heart rate up

Thursday March 7-Mac Court 4 pm bike – bike - longer distance sets - then try and run

Fitness assessment sign up

- If you have not done so already - please sign up for fitness assessment time slot.

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