

# Microtraumata in swimmers



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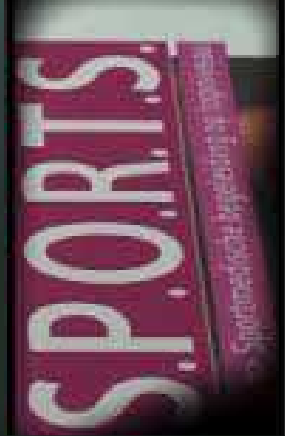
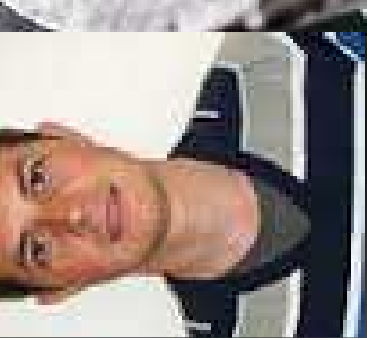
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# Objectives

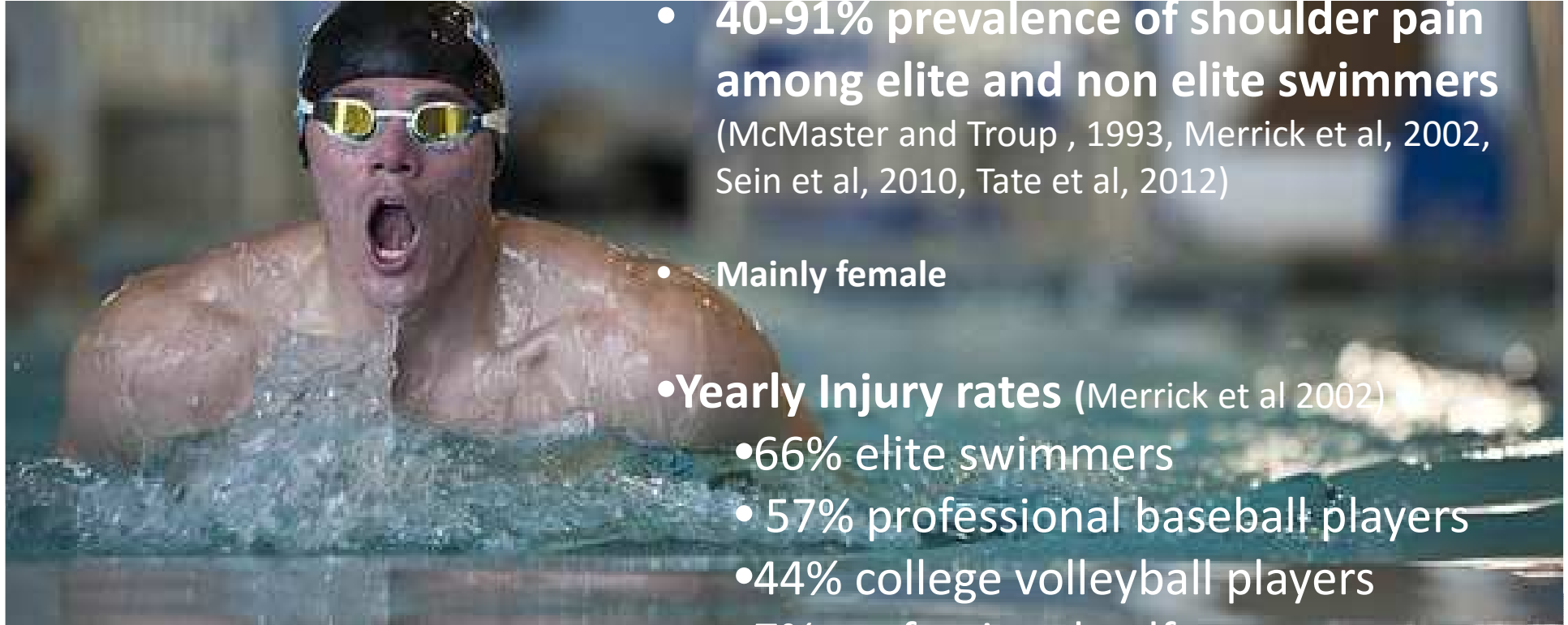
1. Swimmers' shoulder?
2. Prevalence?
3. Associated dysfunctions?
4. Risk factors?

# What is a swimmers' shoulder?

- “syndrome with anterior shoulder pain elicited by repetitive impingement of the rotator cuff under the coraco-acromial arch”



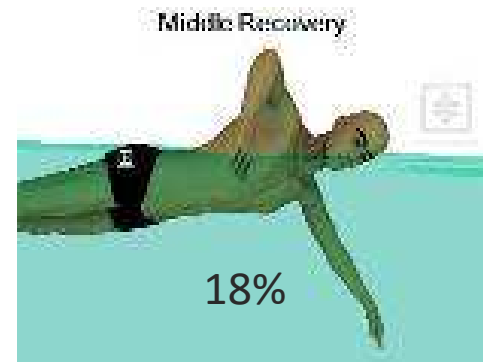
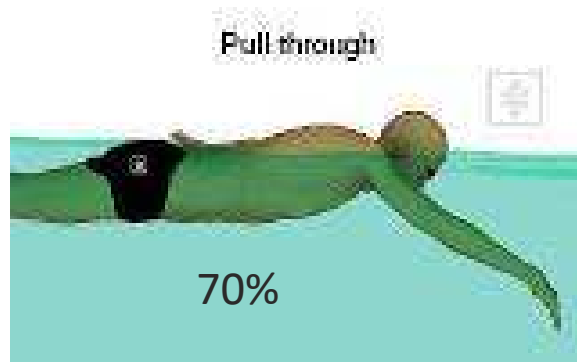
# Background



- **40-91% prevalence of shoulder pain among elite and non elite swimmers** (McMaster and Troup , 1993, Merrick et al, 2002, Sein et al, 2010, Tate et al, 2012)
- **Mainly female**
- **Yearly Injury rates** (Merrick et al 2002)
  - 66% elite swimmers
  - 57% professional baseball players
  - 44% college volleyball players

# Background

- Distance: 10 à 12 km /day, 6 à 7 days/week
- Combined with laxity/instability & a strong propulsion => high injury prevalence



# Percentage of Pain in Each Age Group

(Tate et al. 2012)

	Age 8-11	Age 12-14	Age 15-19	Masters
Pain: Rest	7%	14%	29%	19%
Pain: Normal	5%	12%	43%	19%
Pain: Strenuous Activity	31%	56%	81%	64%



**Dysfunctions associated with swimmers' shoulder: a systematic review (in progress)**

Filip Struyf, Angela Tate, Kevin Kuppens, Masha Hoogeland, Saskia Volders, Lori Michener

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- typical dysfunctions associated with swimming





## Dysfunctions associated with swimmers' shoulder: a systematic review (in progress)

Filip Struyf, Angela Tate, Kevin Kuppens, Masha Hoogeland, Saskia Volders, Lori Michener

- Muscle function (activity, ratio, muscle length...)
- Core (stability) endurance
- Joint laxity & flexibility
- Scapular dyskinesis
- ...



# Muscle function (activity, ratio, muscle length,...)(n=10)

	Rhomboid	Upper trapezius	anterior deltoid	middle deltoid	Serratus Anterior	subscapularis	Infraspinatus	teres minor	Supraspinatus
hand entry	PS<PFS (1)	PS<PFS (1)	PS<PFS (1)	PS<PFS (1)					
pulling phase	PS>PFS (1)				PS<PFS (1)	PS>PFS (2)		PS<PFS (2)	
hand exit			PS<PFS (1)	PS<PFS (1)			PS>PFS (1)		
mid-recovery		PS<PFS (2)		PS<PFS (2)		PS<PFS (1)	PS>PFS (2)		PS<PFS (2)

PS= painful shoulder

PFS= painfree shoulder

Scovazzo et al. 1991 (1); Ruwe et al. 1994 (2); Tate et al. 2012

# Muscle imbalance?

STRONG MUSCLES: M. Lat. Dorsi, M. Triceps, M. Teres major, M. Pec Major

WEAKER<sup>1</sup> MUSCLES: Rotator cuff

E.g. Swimmers' ER:IR ratio 78%; controls' ratio: 93%

<sup>1</sup>still stronger than a non-swimmer

Muscle function (activity, ratio, muscle length,...)(n=10)

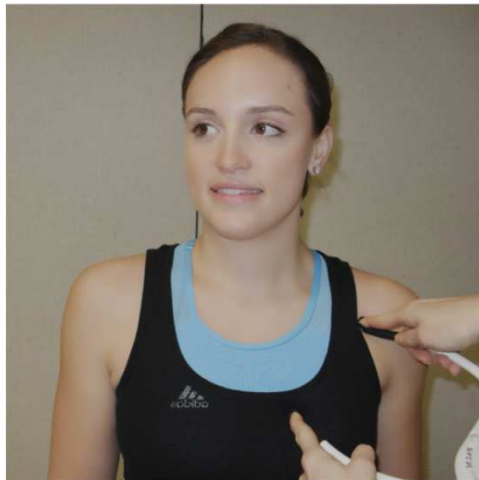
- Harrington: no sign difference in muscle strength between healthy swimmers & swimmers with pain

...(all in competition swimmers...)

ER:IR ratio of 78% : normal in swimmers?

## Muscle function (activity, ratio, muscle length,...)(n=10)

- decrease in the pectoralis minor (PM) muscle length ( $p < 0.05$  on the dominant arm; in swimmers with shoulder pain)



# Core endurance (n=2)

- Harrington et al. 2013 => no sign. difference
- Tate et al. 2012 => reduced core endurance for the 12-14 years group with shoulder pain



Harrington et al. 2013; Tate et al. 2012; McGill et al,1999, Schellenberg et al, 2007



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Antwerpen

# Joint laxity & flexibility

Study	RESULT
Walker 2012	Positive correlation between IR > 100° & pain and ER < 93° & pain
Bak 1997	Positive sulcus sign & anterior drawer test
Tate 2012	Positive correlation between <b>reduced</b> shoulder flexibility (both IR & ER) & pain
Beach 2013	No correlation between shoulder flexibility & pain
Harrington 2013	No correlation between shoulder flexibility & pain
McMaster 1998	Significant correlation between <u>increased</u> shoulder flexibility & pain (positive apprehension sign)

GIRD?



# Scapular dyskinesis

Study	RESULT
McKenna 2012	Reduced distance inferior border scapula & T7 more likely to develop shoulder pain
Tate 2012	No sign. Results
Su 2004	Sign. decrease in scapular upward rotation (at 45°, 90°, & 135° gh elevation) in shoulder pain swimmers

# Tate et al. 2012: prevalence of Scapular Dyskinesia (Winging)

- .65% 8-11 year olds
- .55% 12-14 year olds
- .36% high school swimmers
- .46% masters swimmers



## + Pain/Disability

- Exposure
- Water Polo
- History of trauma
- Feeling of instability
- Reduced core-stability
- Reduced pec minor length



## - Pain/Disability

- Lower extremity sport



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# Conclusion

- High pain prevalence warrants development of prevention programs and further investigation of training programs



Cross Training



Pec Minor Stretching



# Objectives

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# Microtraumata in swimmers: not always the shoulder!.. A case

- 35 yrs, 2 children
- Extremely athletic
- No history of Sh-pain
- Demonstration: “how to dive” to his daughter



Nose #



# Thanks!

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