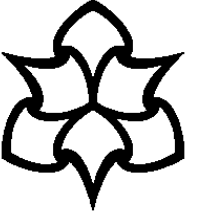


# Our research with Masters Athletes

*Birmingham  
4 November 2018*

Jamie McPhee & Hans Degens



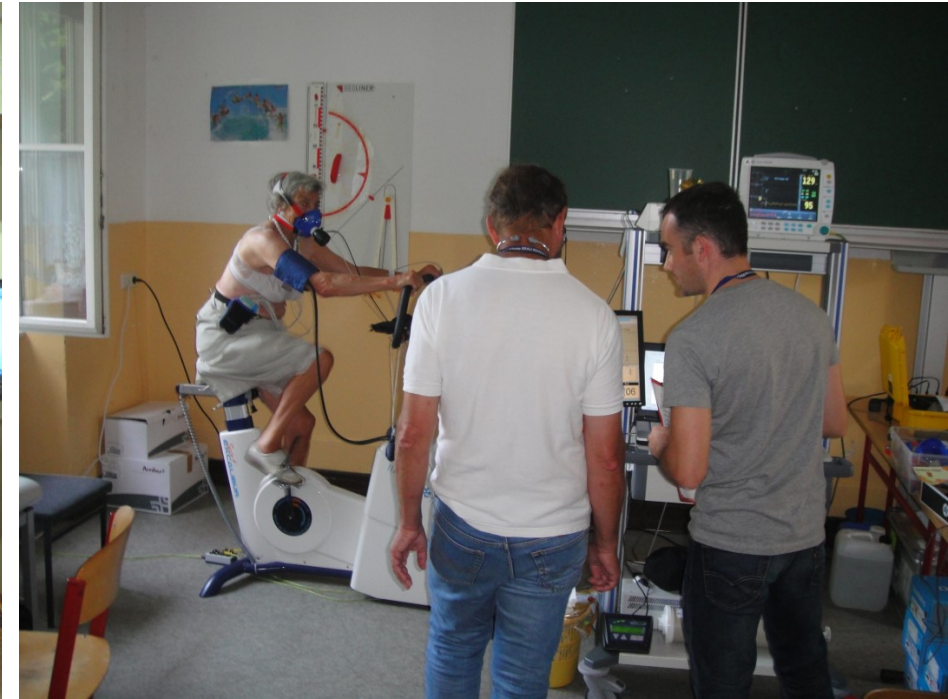
# Overview

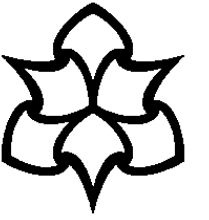


- I. Key research questions (and answers!)
- II. Key messages

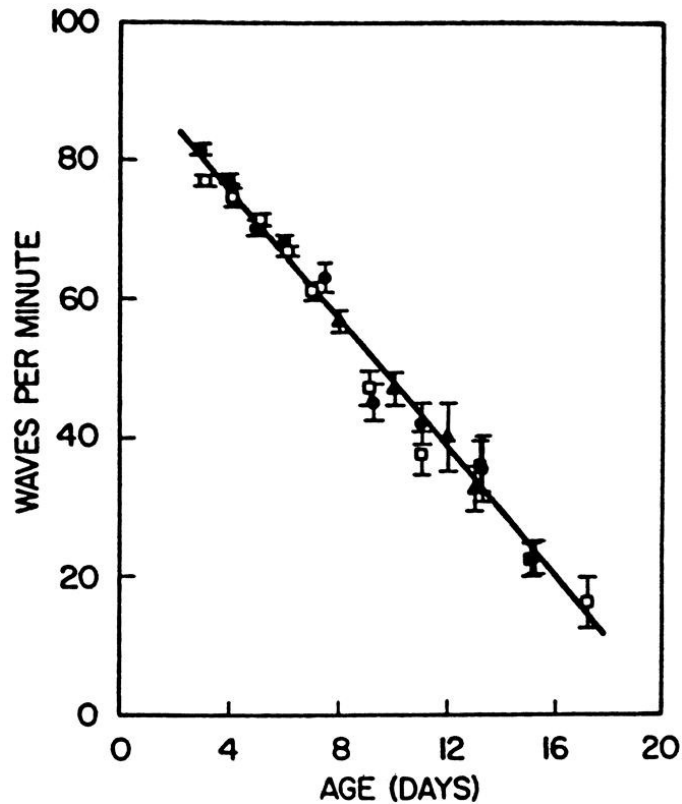






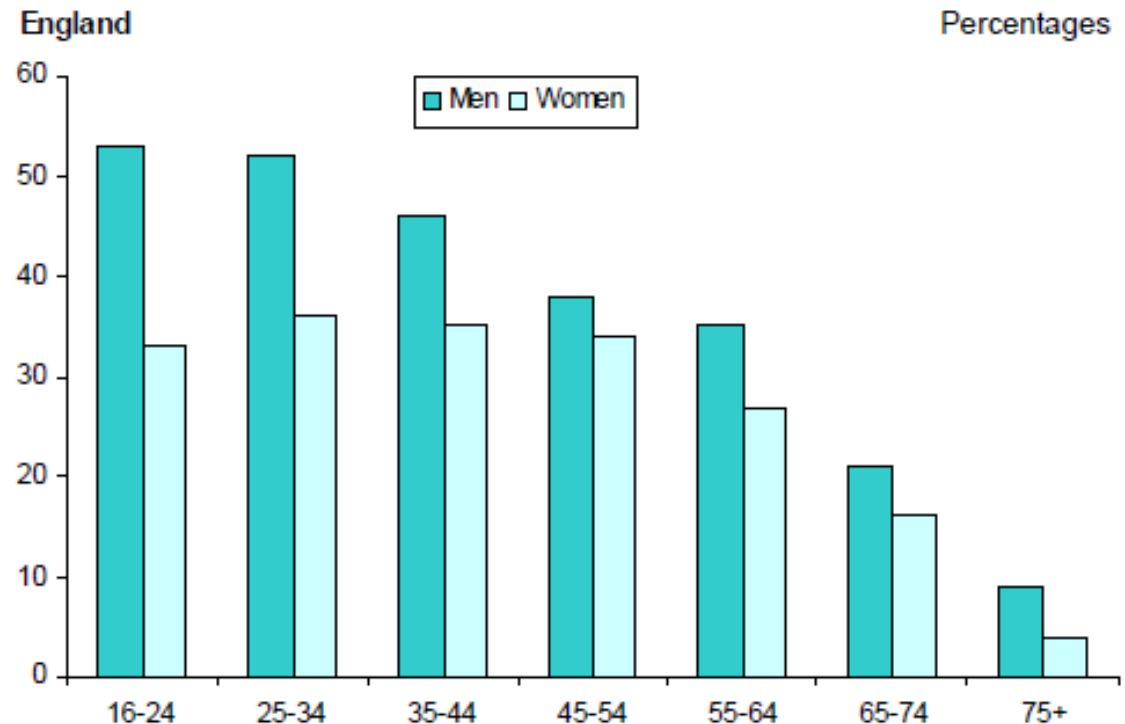


# People move less in older age



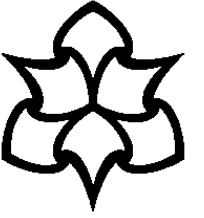
C. Elegans

Figure 4.1 Proportion of adults achieving the physical activity guidelines, by age and gender, 2006

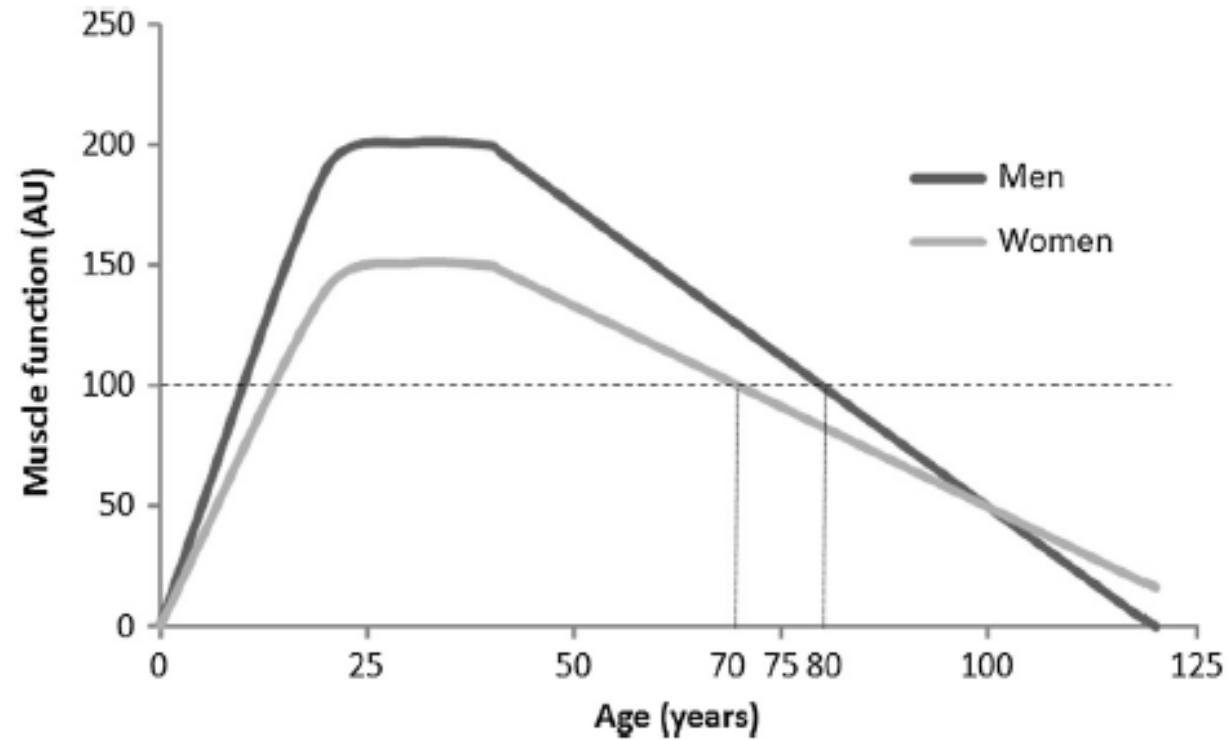


Source: Health Survey for England 2006: Latest trends. The NHS Information Centre

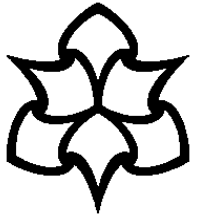
(Ingram, MSSE 32:1623, 2000; McPhee et al., BGEN, 17:567, 2016)



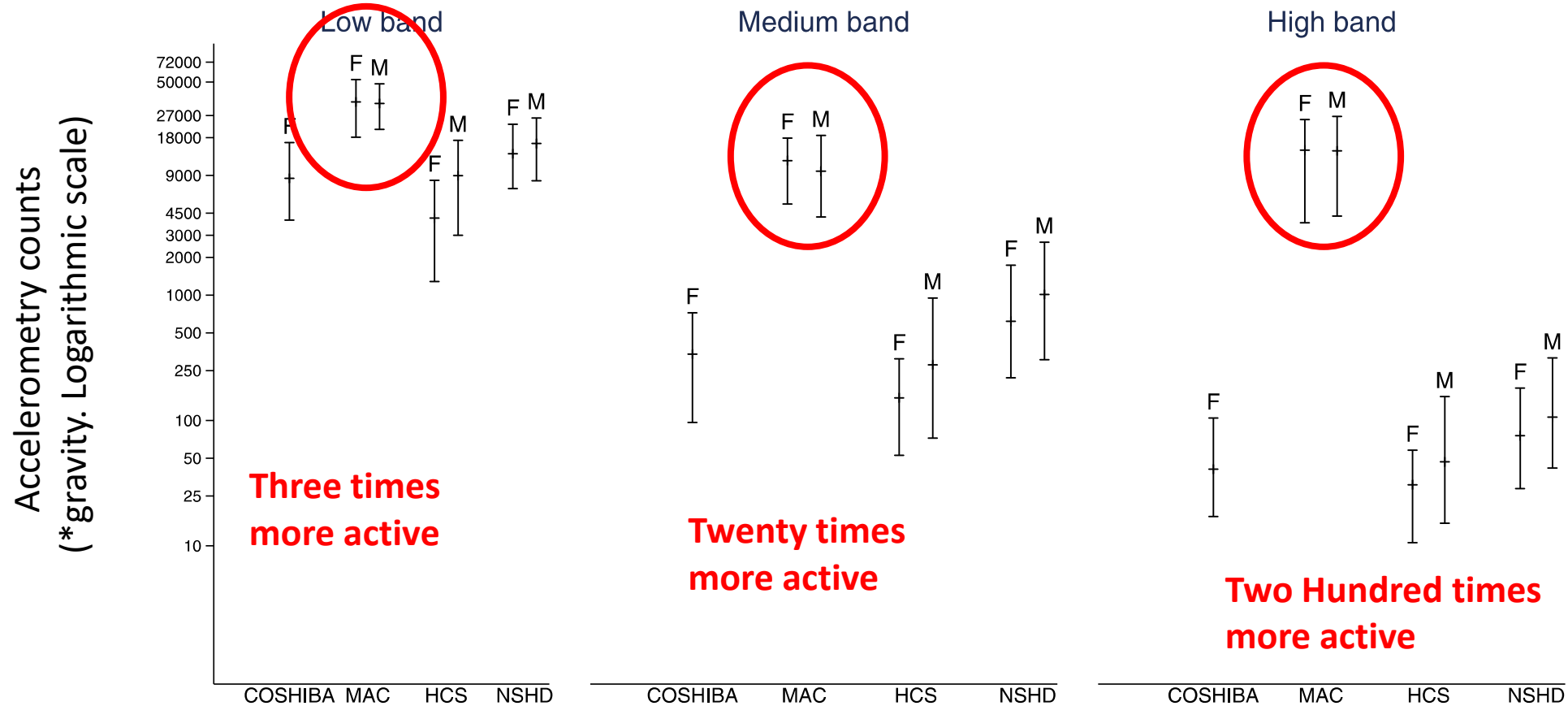
# Physical fitness declines with age



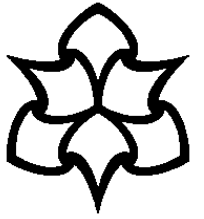
(Degens & McPhee, Chapter 20 in: Inflammation, Advancing Age and Nutrition, 2013)



# Masters athletes are more active than age-matched non-athletes



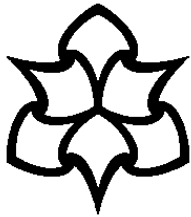




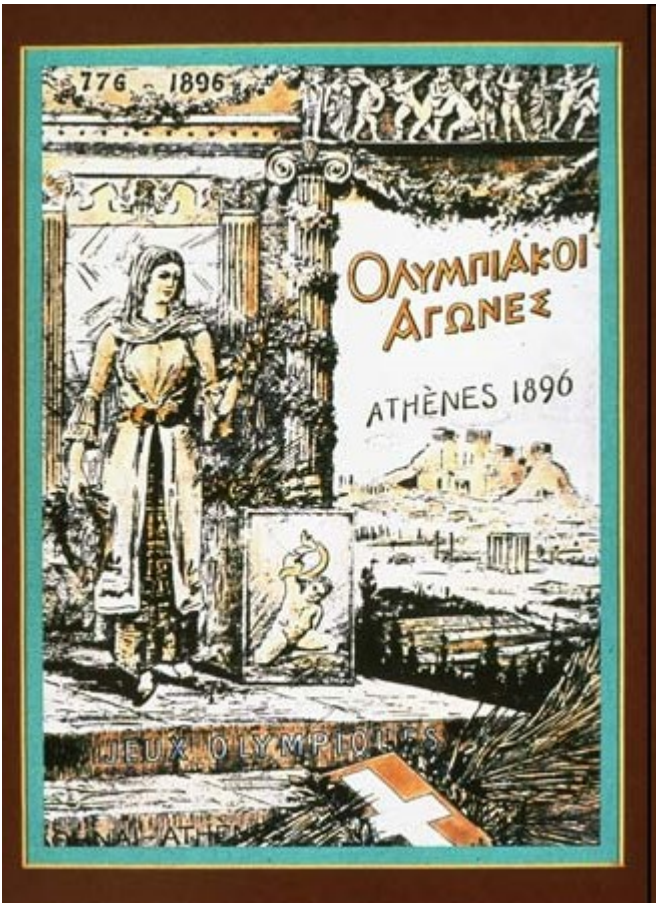
# Masters Athletes are *fit and healthy*

“Fitness” is best measured as the amount of oxygen the body can use per minute (to make energy for moving).





# Masters Athletes perform well



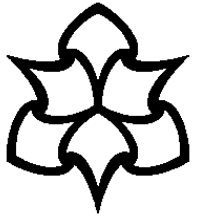
1896: First modern  
Olympic games (Athens)

400 m Hans Degens 2008 EVACS Ljubljana same as that of the winning 85-year old man in 2007!!!

Running events	(from the first Olympic games in Athens)	and age at which these records were achieved
100 m (s)	12.0	11.7 (61 years)
200 m (s)	22.2	22.1 (46 years)
400 m (s)	54.2	53.9 (63 years)
800 m (min:s)	2:11.0	2:10.4 (60 years)
1500 m (min:s)	4:33:2	4:27:7 (60 years)
Marathon (h:min:s)	2:58:50	2:54:5 (73 years)

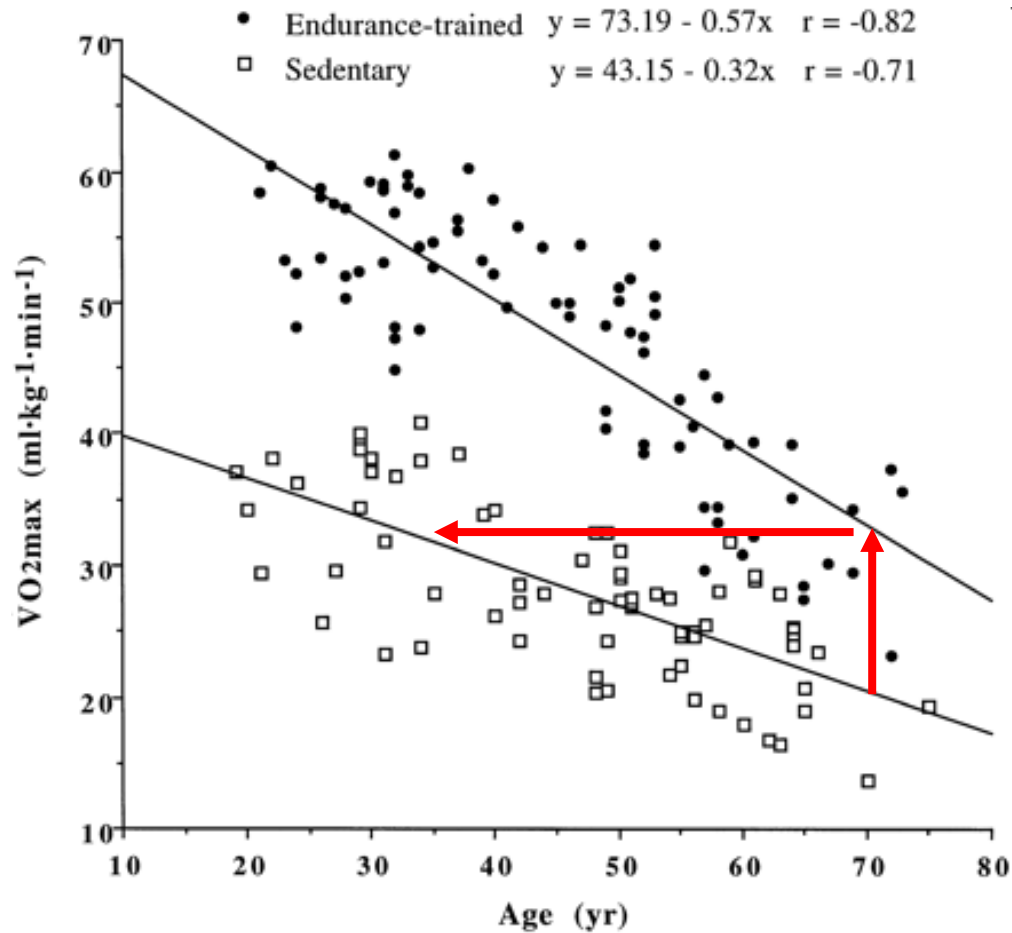
(Tanaka & Seals, J Physiol 586:55, 2008)





# Masters Athletes are *fit and healthy*

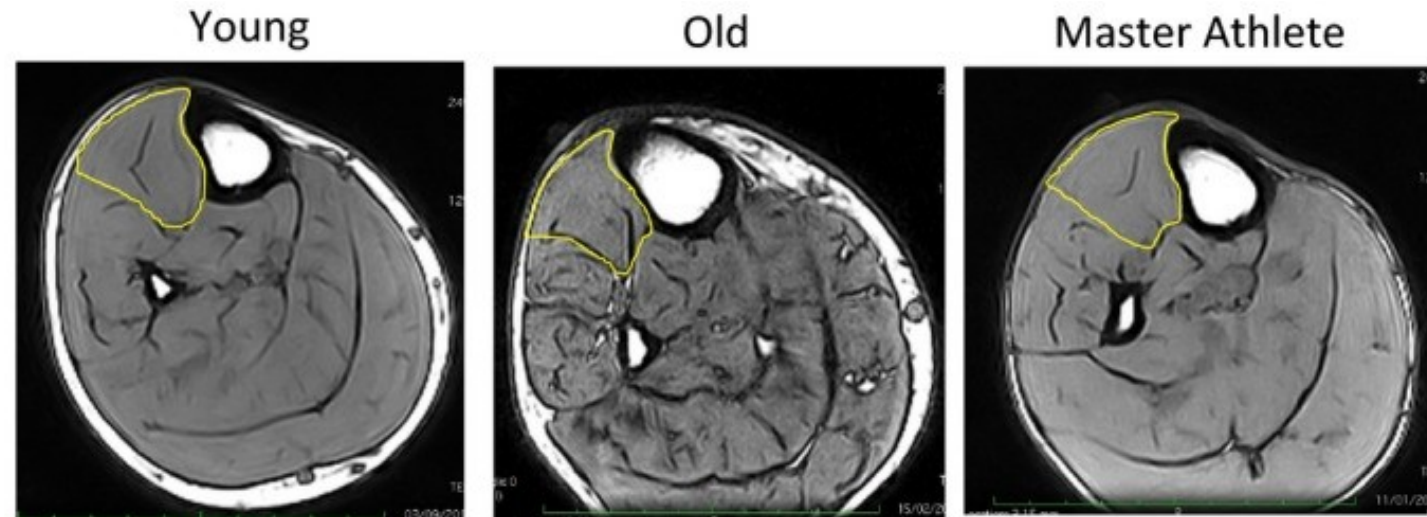
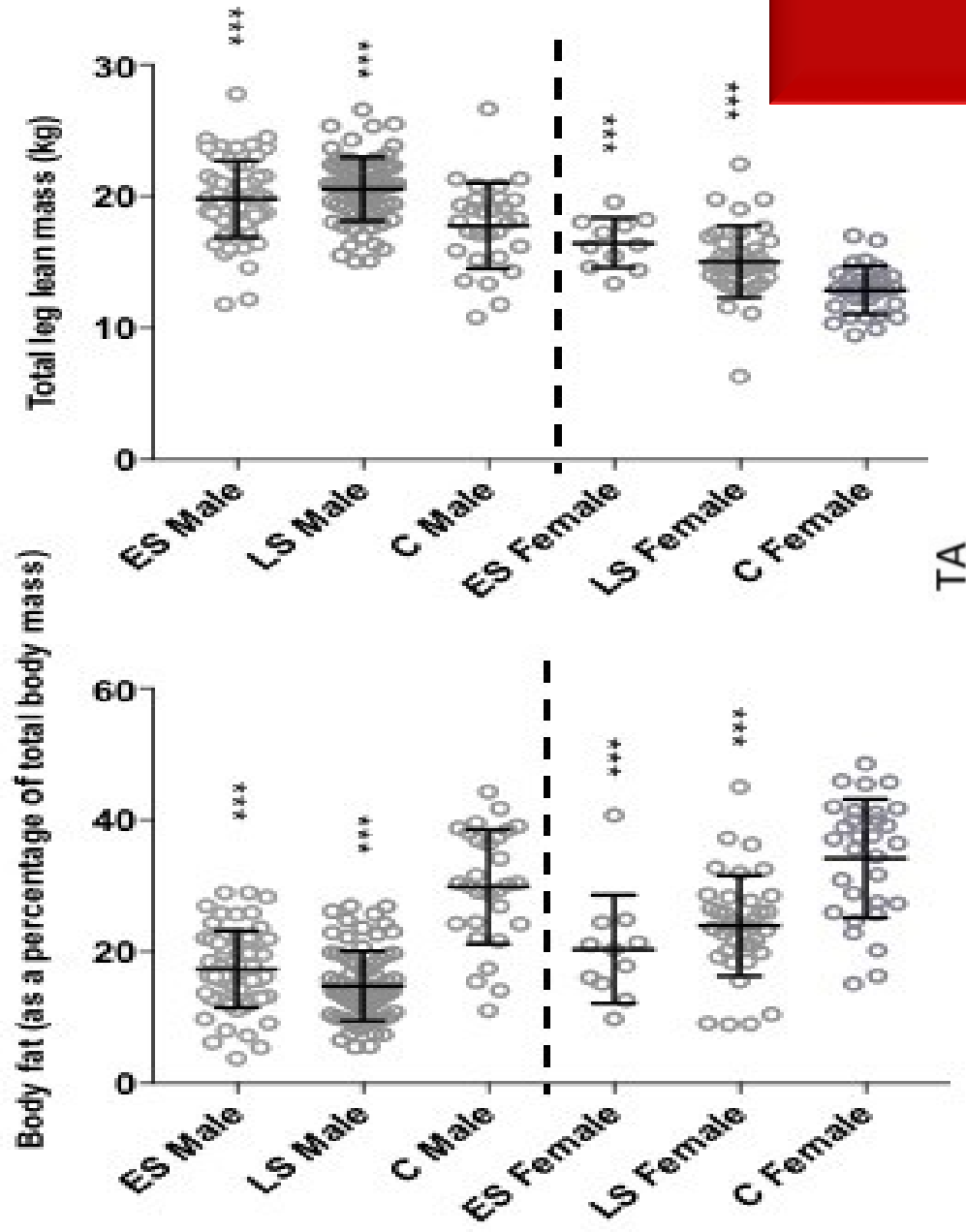
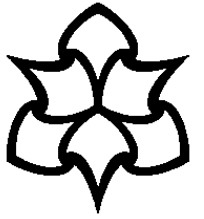
## 'Rejuvenation' of $\text{VO}_2\text{max}$ in master athletes



(Tanaka et al., JAP 83:1947, 1997)

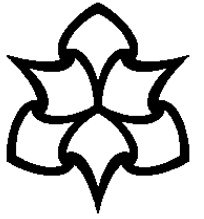


# Masters Athletes have larger muscles and lower body fat

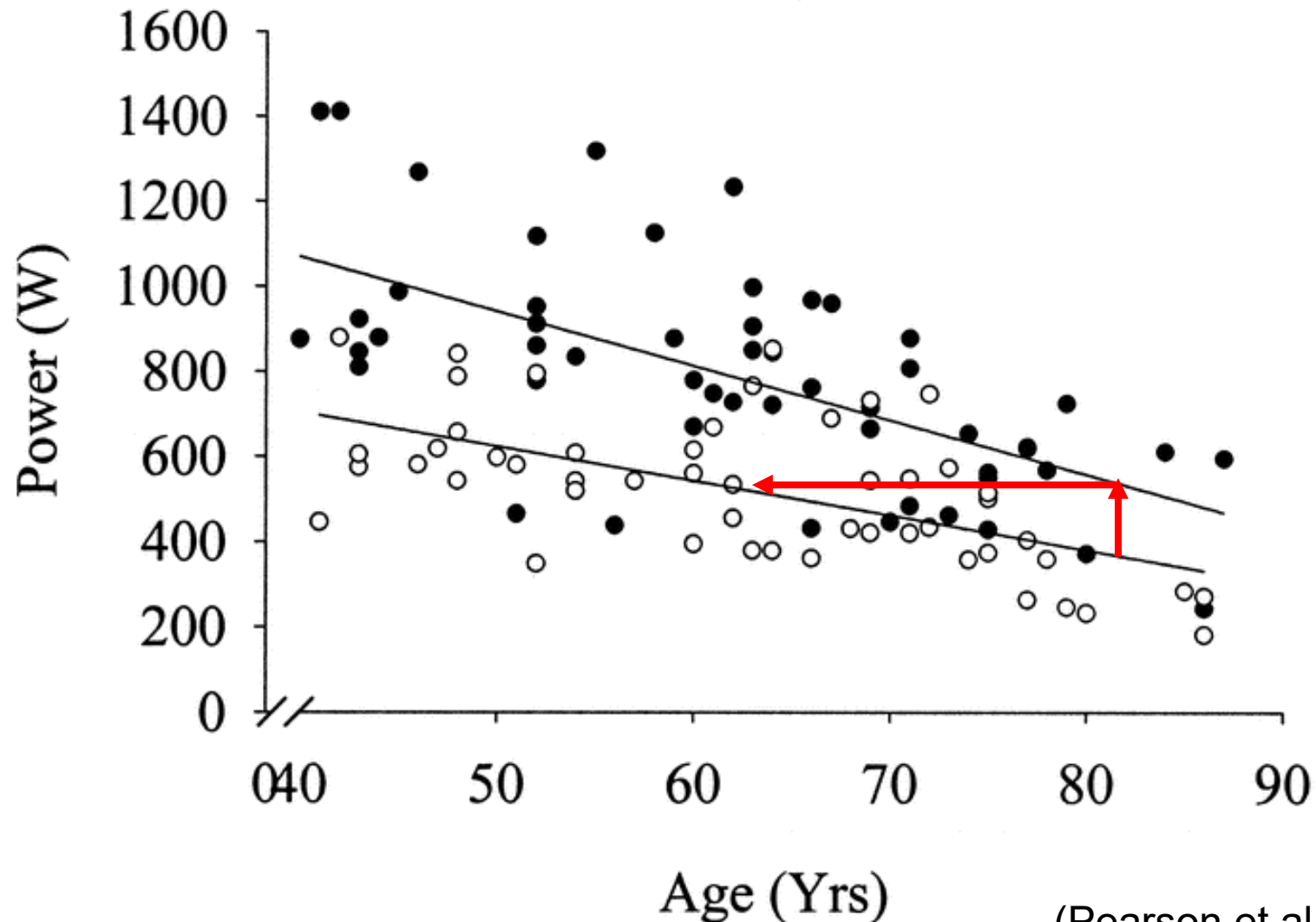


ES: Early starter master athletes (trained all adult life)  
LS: Late starter master athletes (trained since age 50)  
C: Non athlete

(Piasecki et al., Physiol Rep 4:E12987, 2016)

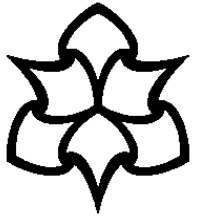


## 'Rejuvenation' of power in master athletes



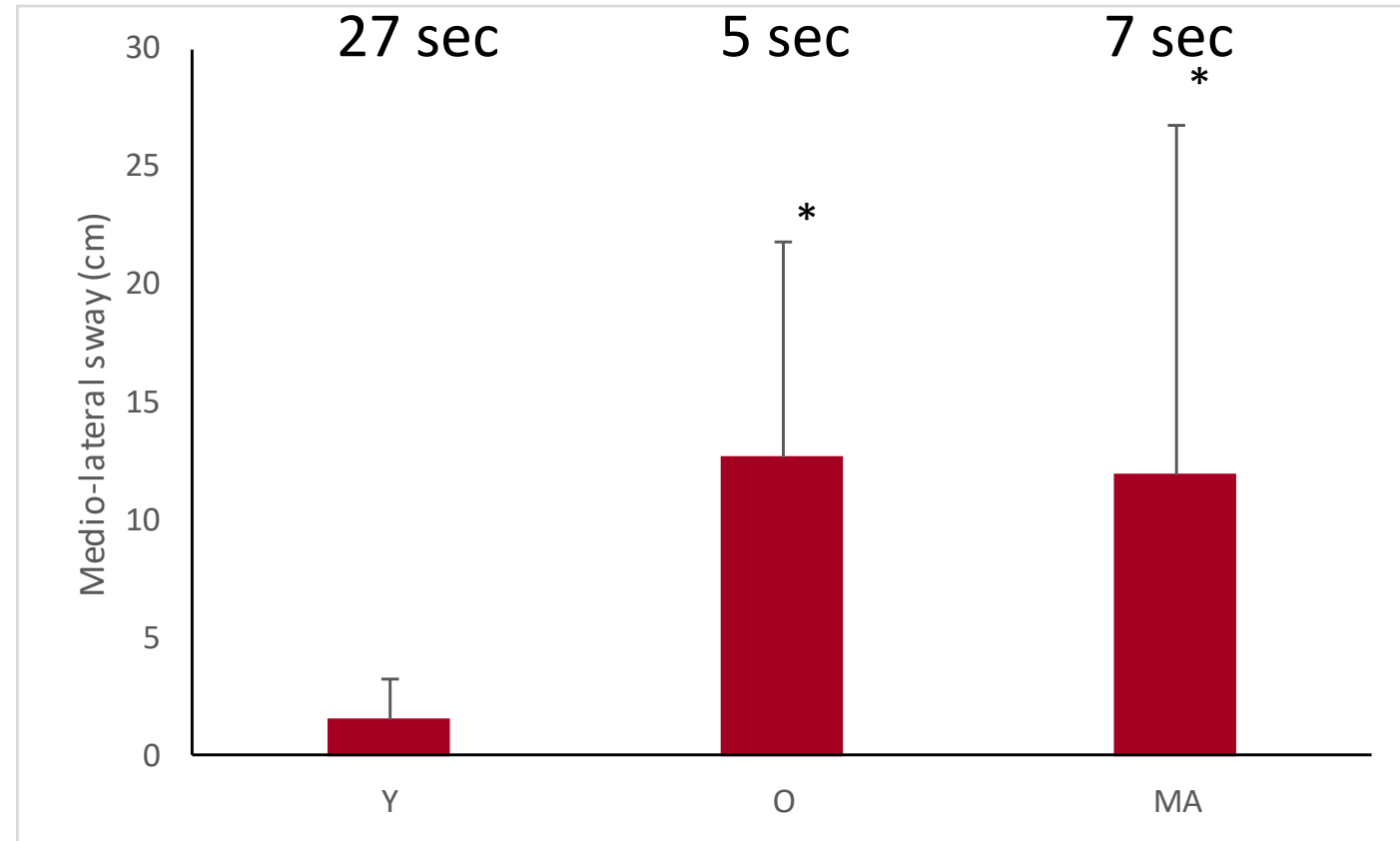
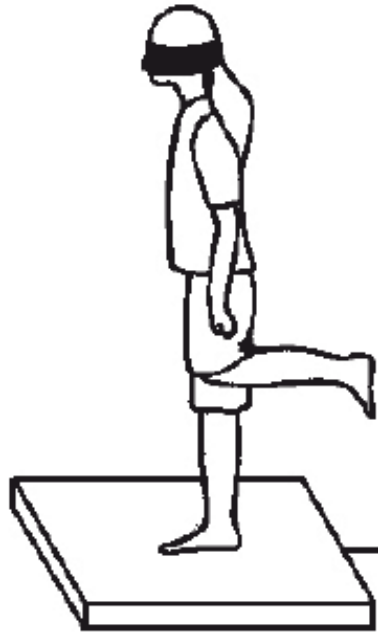
(Pearson et al., MSSE 34:1199, 2002)





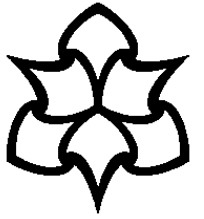
# Masters Athletes do not have better balance than age-matched non-athletes?

Stand on one leg with eyes closed:



(Leightley et al JAPA 25:345, 2017)

# Masters Athletes have good bones



Tennis arm vs non-tennis arm

4% Radius

vBMC.tot

Ar.tot

vBMD.tb

■ Men

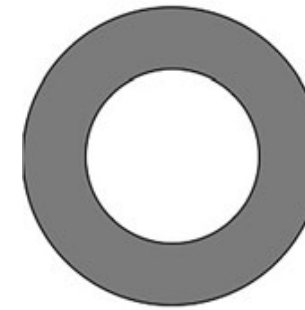
-20

0

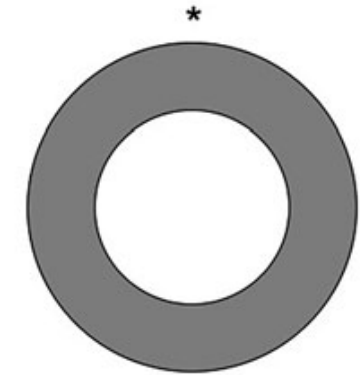
20

40

Side Difference (%)



C

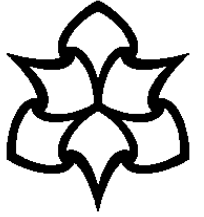


EA

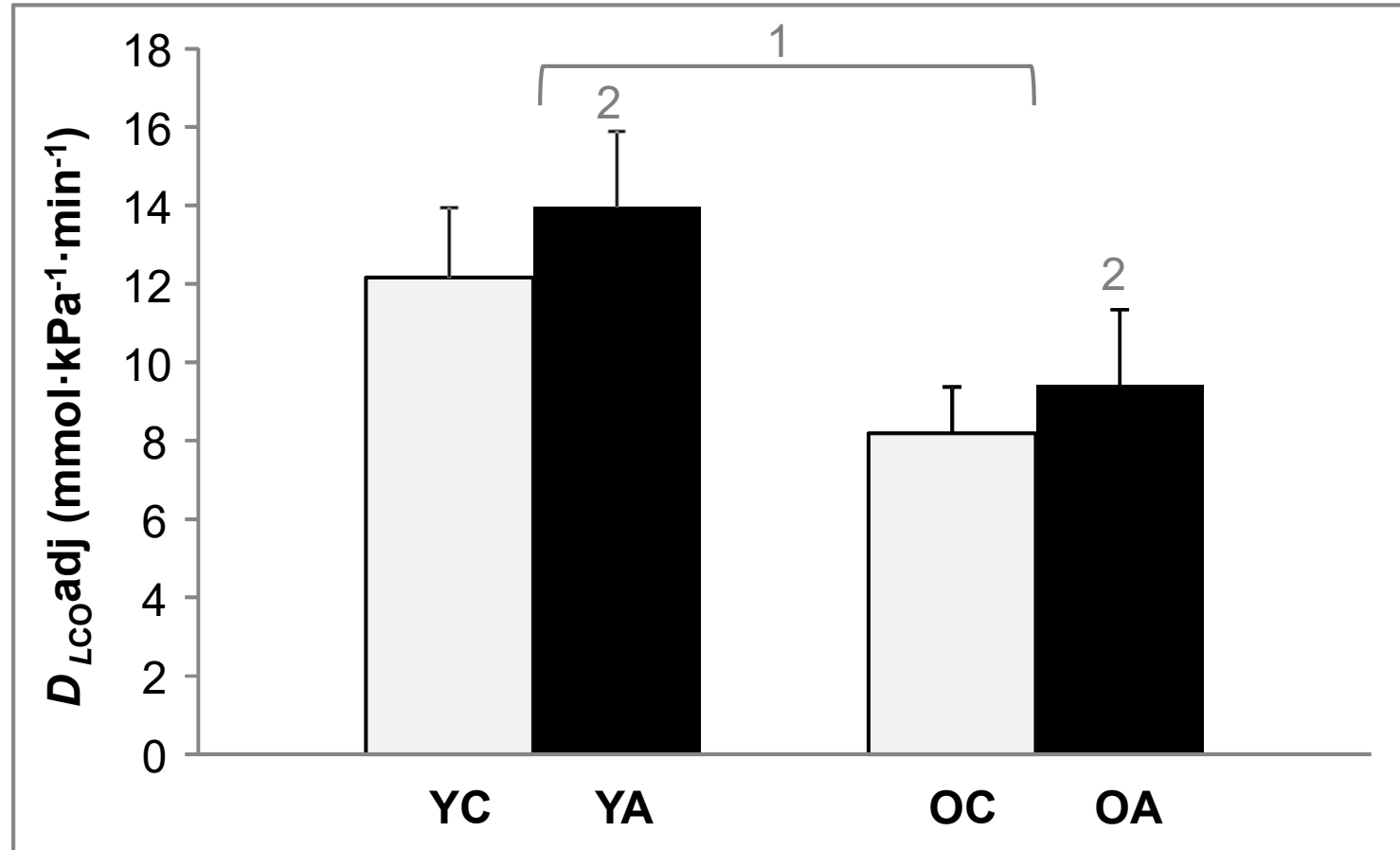
EC: 10%↑NS

PeriC: 5.8%↑

CrtA: 12.5%↑

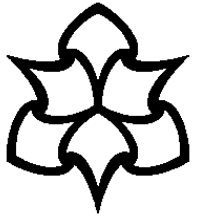


# Do Masters Athletes may have slightly better lung function

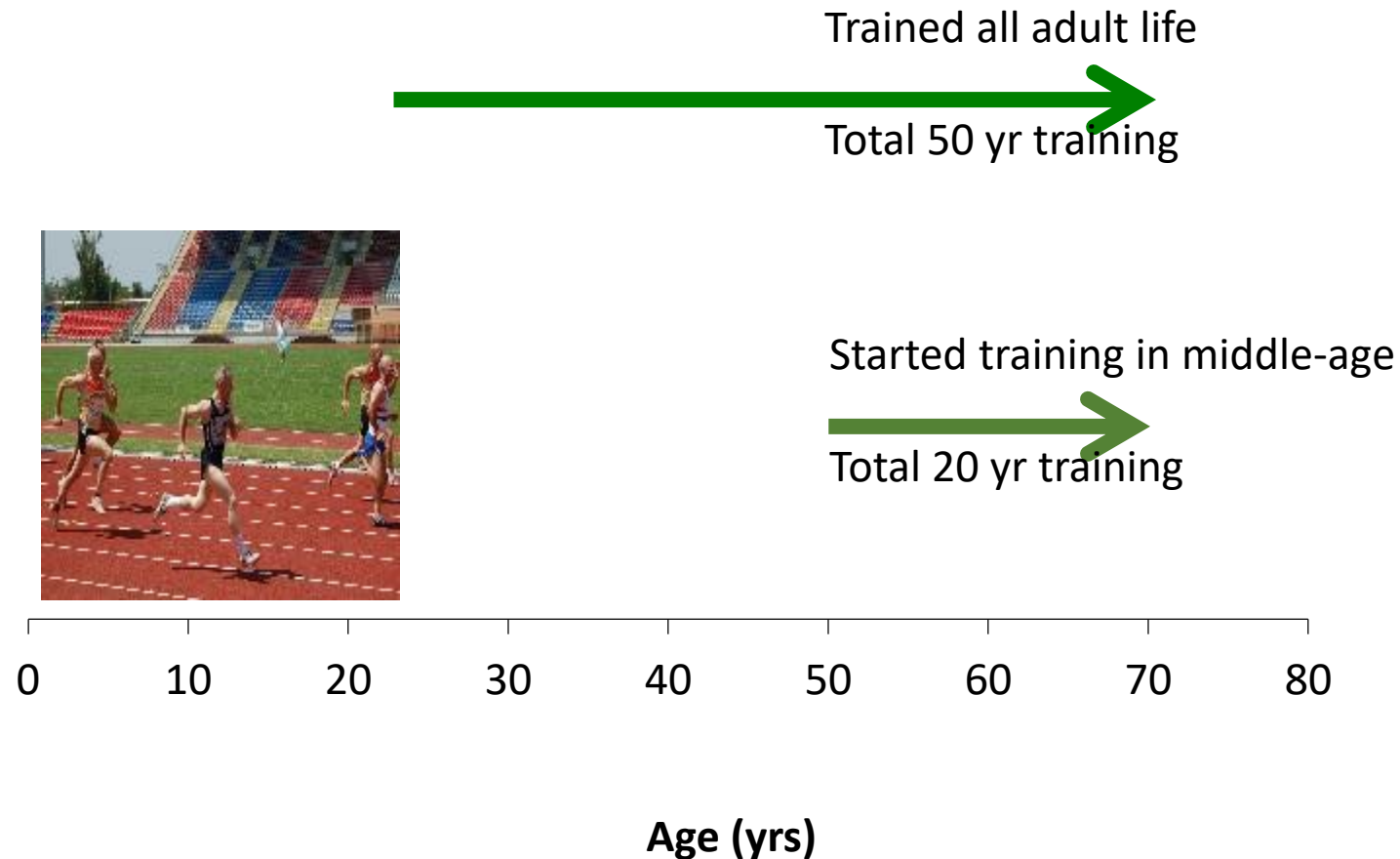


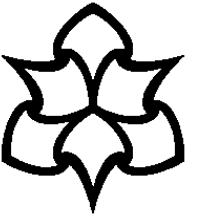
(Degens et al., Int J Sport Med, 2013)



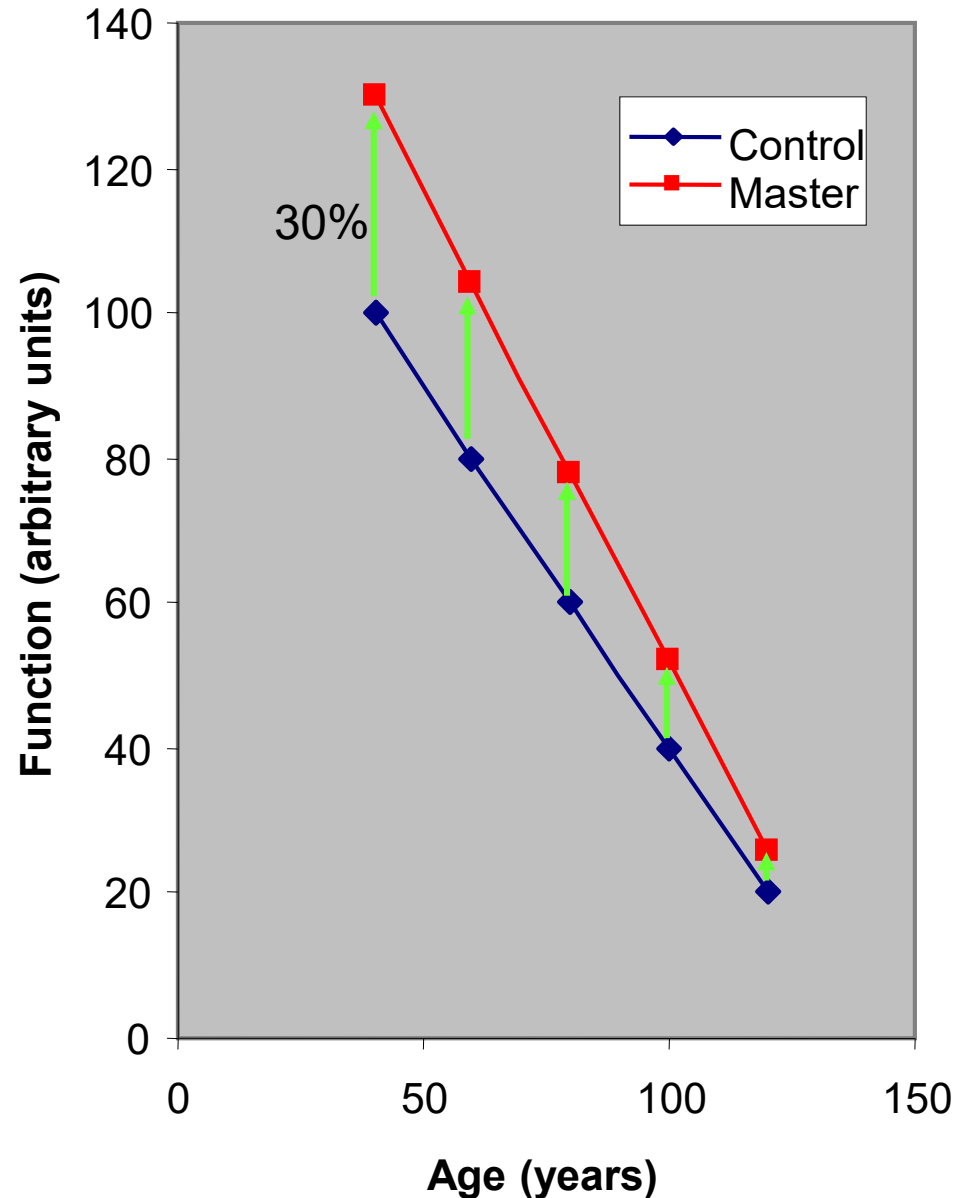


# Does it matter at what age a Master Athlete started competing?



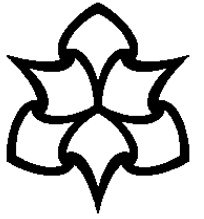


It does not matter at what  
age a Master Athlete  
started competing

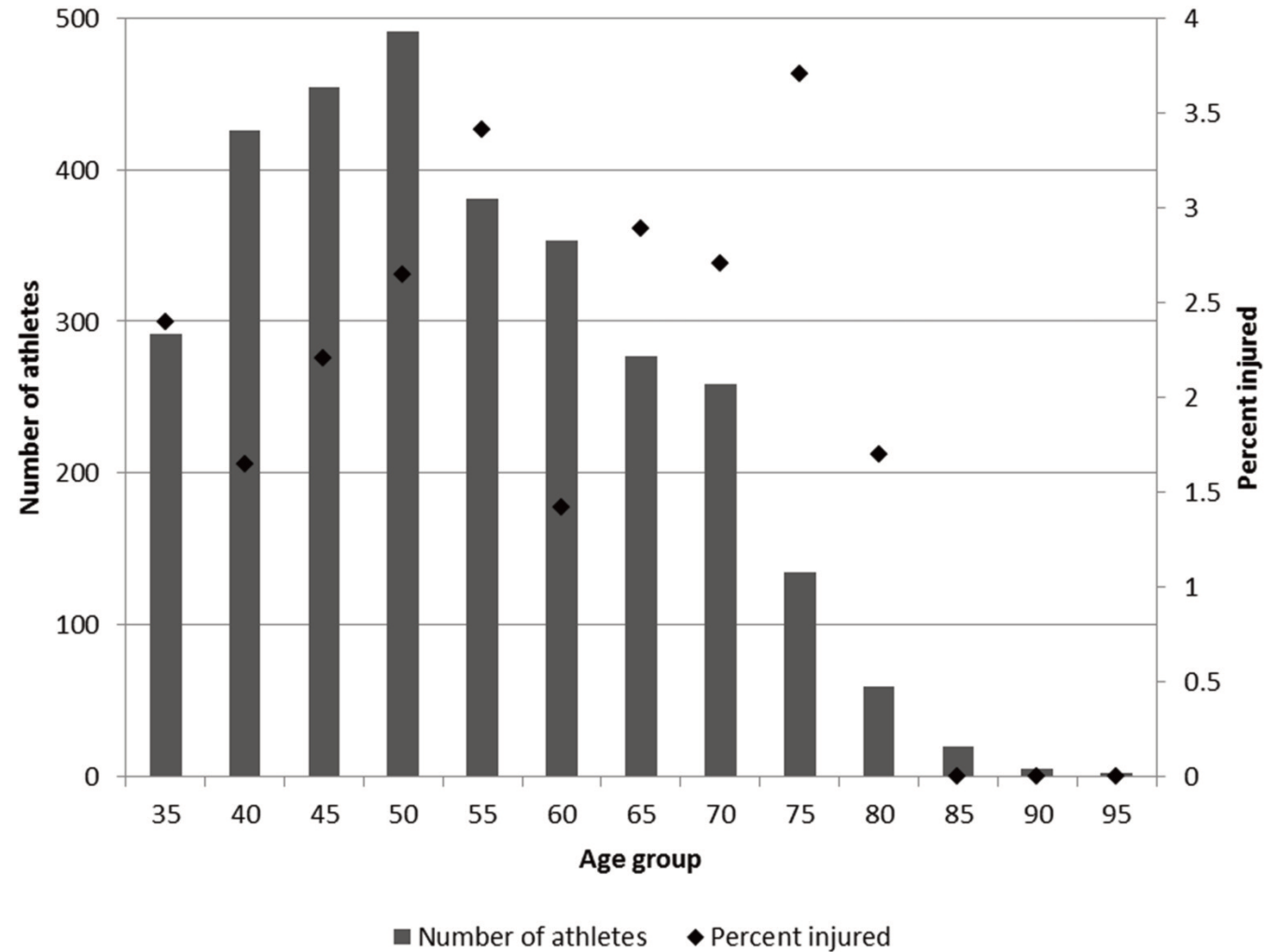


At any age masters athletes have better function than  
non-athletes

(Degens, Sport Med Doping Studies, 2012)

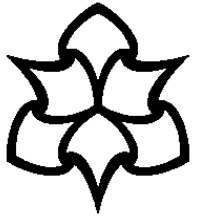


# The risk of injury during competition is low



(Ganse et al., JMNI, 2014)





## Key messages

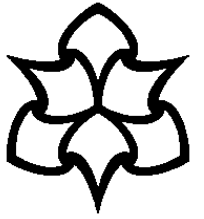


- Muscle and strength small gain
- Bone strength small gain
- Metabolism and fatness big gains
- Cardiovascular gains ( $\text{VO}_2\text{max}$ )
- Performance gains discipline-specific



- Muscle and strength large gain
- Bone strength large gain
- Metabolism and fatness moderate gains
- Cardiovascular gains ( $\text{VO}_2\text{max}$ )
- Performance gains discipline-specific

Balance can be improved!



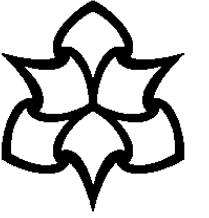
## Acknowledgements

### International Collaborators:

- Prof J Rittweger: German Aerospace Institute, Cologne
- Dr MT Korhonen: University of Jyvaskyla, Finland
- Dr B Ganse: University Hospital Aachen, Germany

### Colleagues:

- Dr A Ireland: Manchester Metropolitan University
- Dr J Coulson: Manchester Metropolitan University
- Dr M Piasecki: Manchester Metropolitan University



**Thank you for your attention**