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# Physical fitness, physical training, physical demands and injuries in Swiss Soldiers

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# Introduction



Daily military routine is physically more demanding than civilian life:

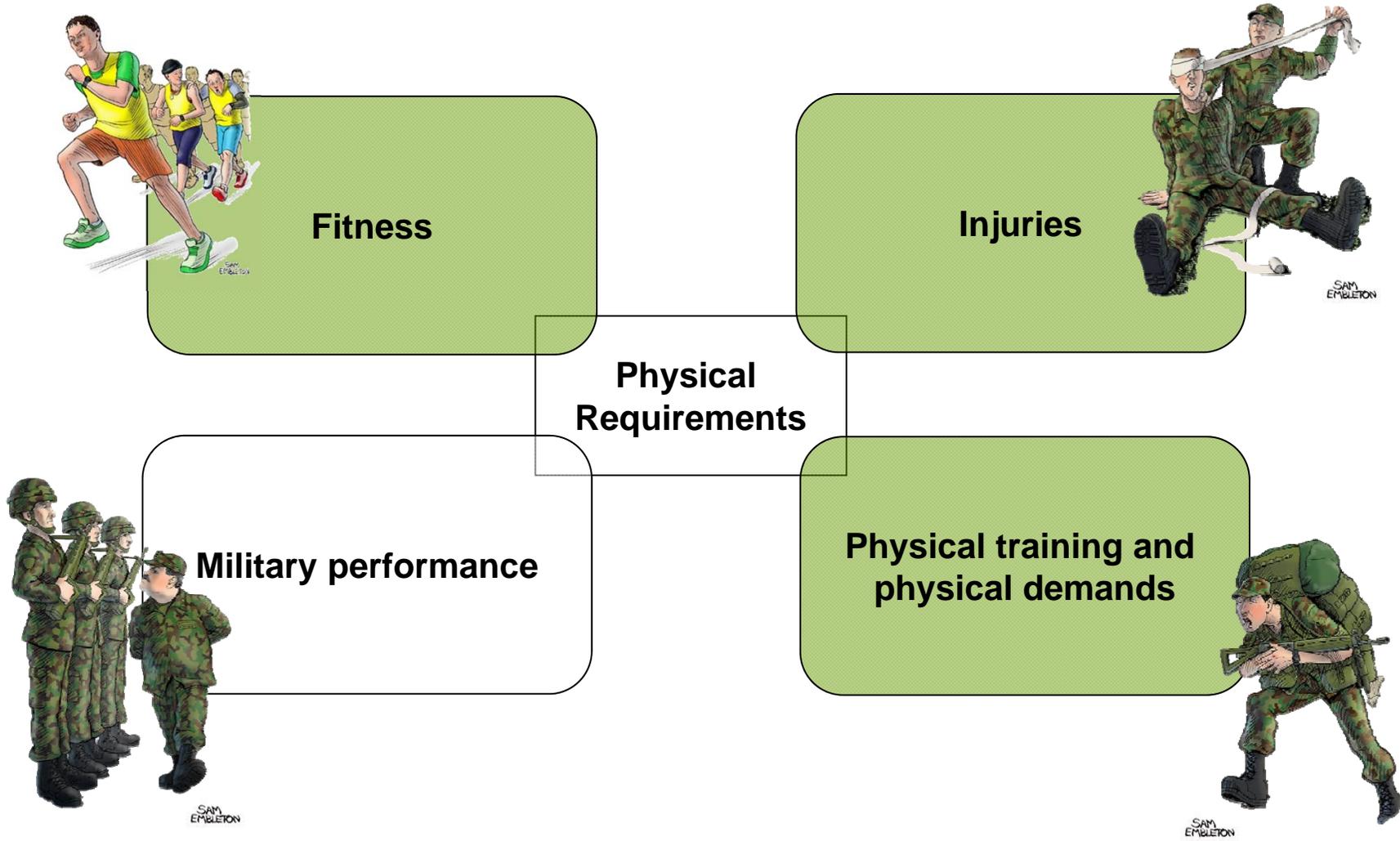
- 14 vs. 8 km/day on foot
- 18 vs. 12 MJ/day energy expenditure

*Wyss et al., Int J Sports Med, 2012*



Optimal selection and training are necessary to meet the increased requirements and to avoid injuries.

- **Selection:** Fitness Test Battery for the Recruitment of the Swiss Army
- **Training:** Physical training during military service





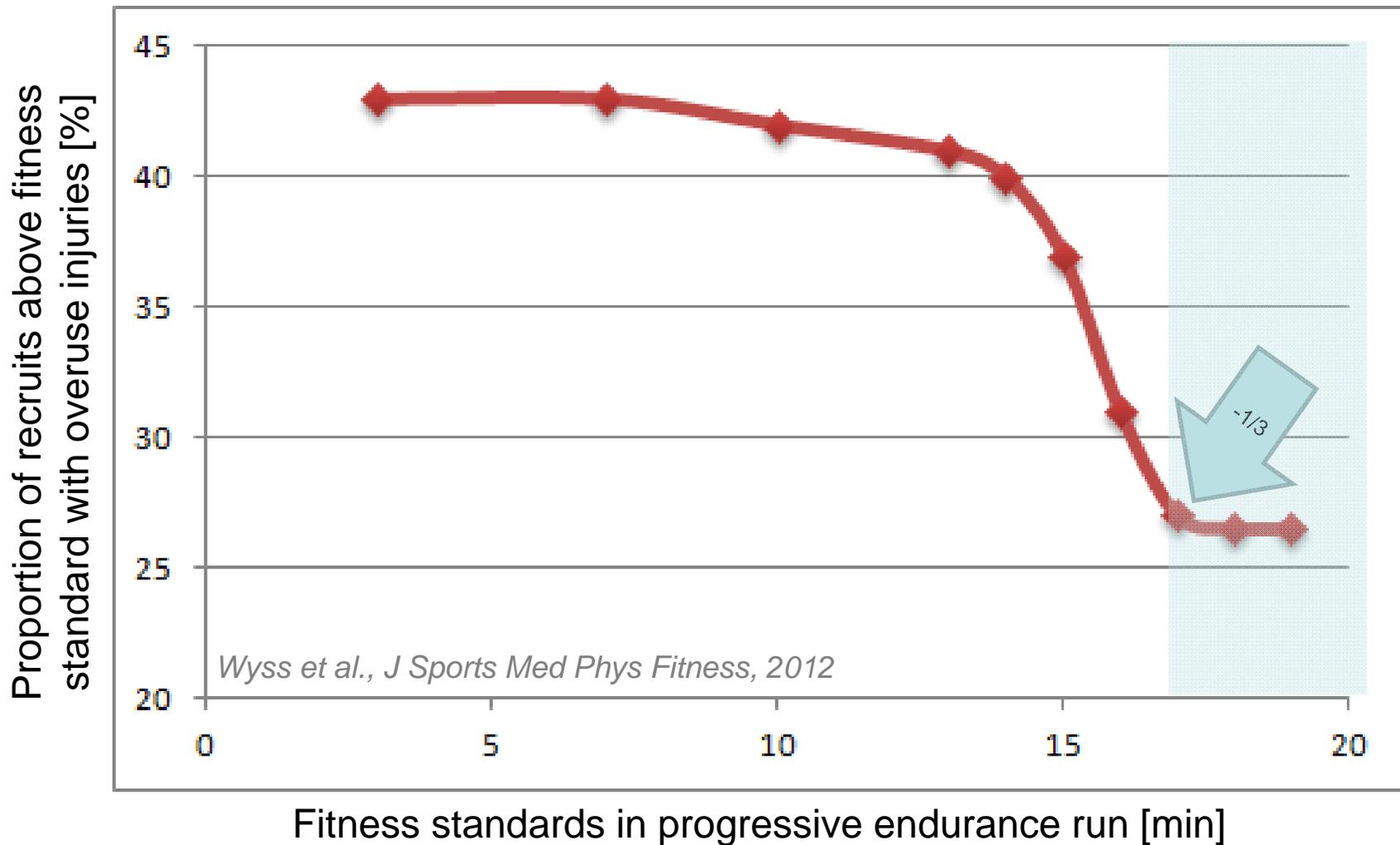
# Physical Fitness Test





# Job specific physical fitness standards

*Training school: Reconnaissance*





# Prediction of injuries compared to other tests



- Sit-up test



- Trunk muscle strength test

*Wunderlin et al., J Sports Med Phys Fitness, 2015*

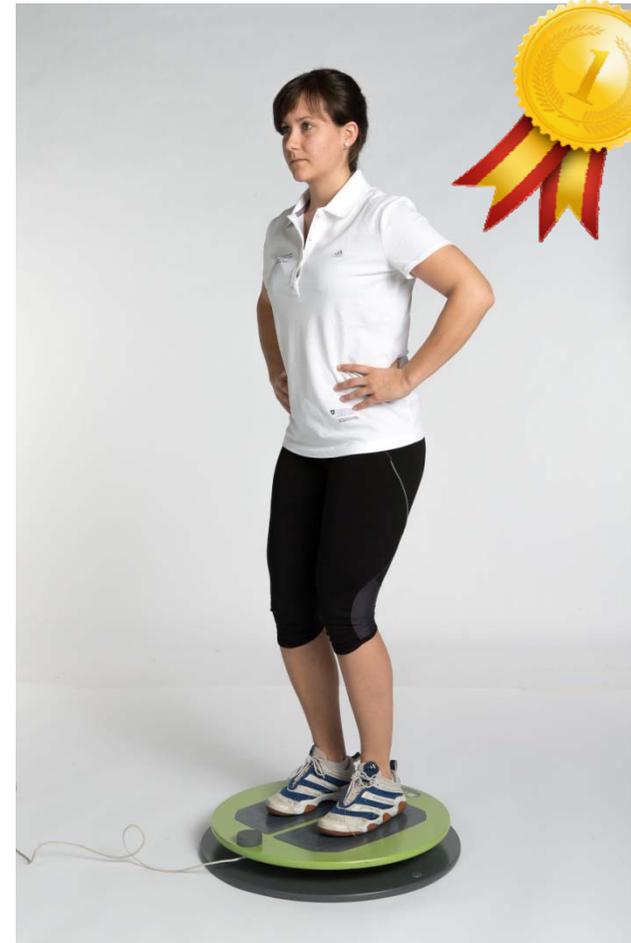


# Prediction of injuries compared to other tests

- 1-leg standing test



- MFT S3 Check





# Physical Fitness Test



Seated shot put



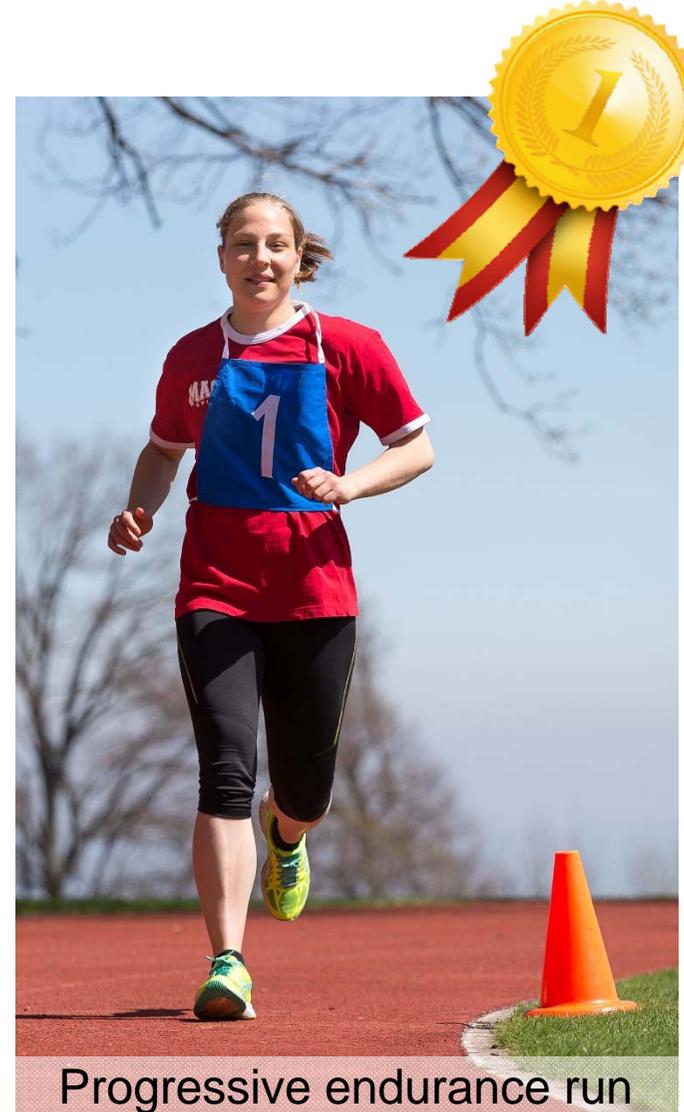
Standing long jump



1-leg stand



Trunk muscle strength test



Progressive endurance run

Wyss et al., *Swiss J Sports Med and Sports Traumat*, 2007 & Wyss et al., *J Sports Med Phys Fitness*, 2012



**Fitness**



**Injuries**

**Physical Requirements**



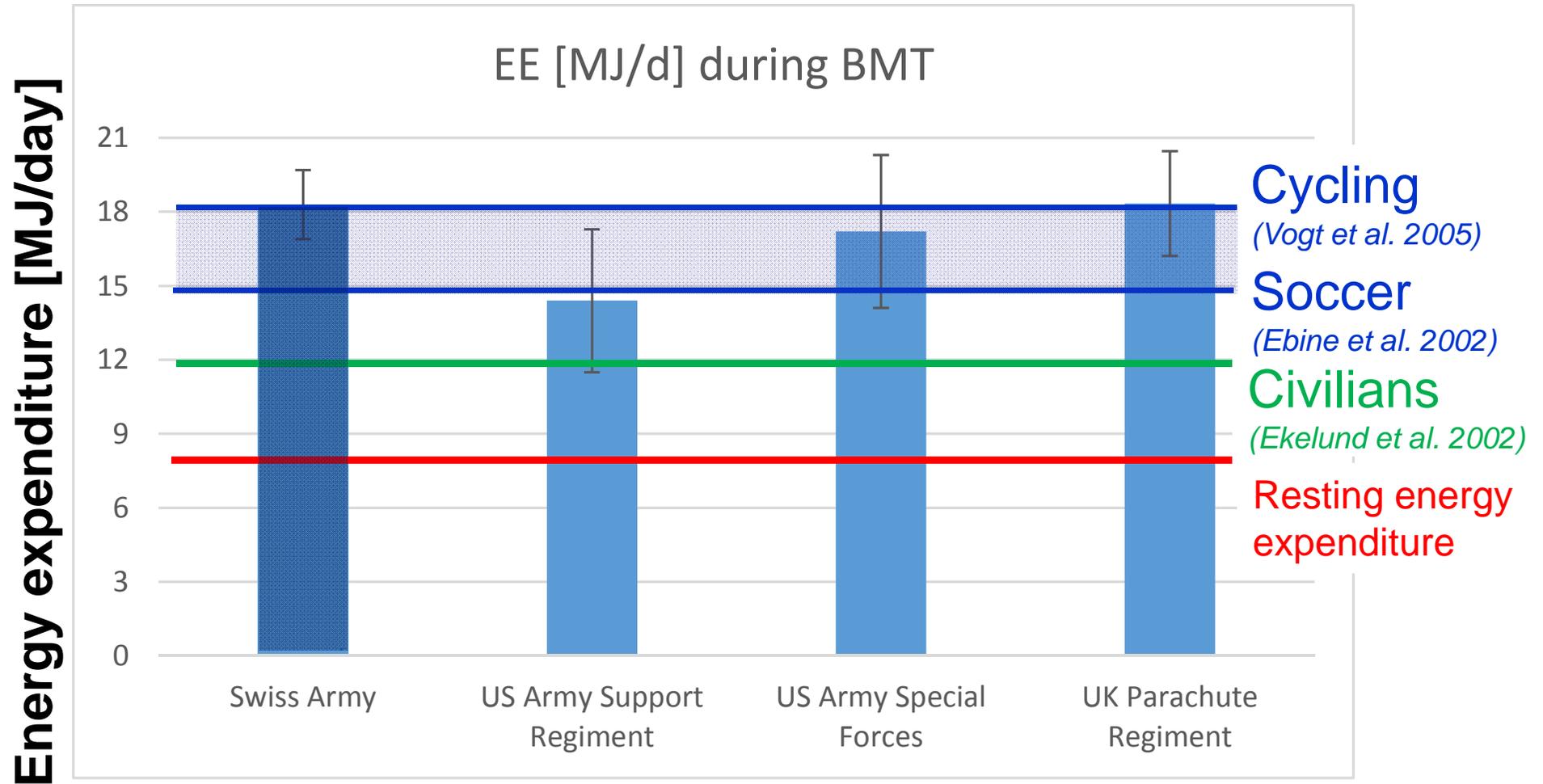
**Military performance**

**Physical training and physical demands**





# Physical demands



Wyss et al. 2014; Tharion et al. 2005; Wilkinson et al. 2008



# Physical training

Swiss Army:

- **180** minutes physical training per week according to the regulations.
- **85** minutes physical training per week according to the responsible staff.
- **36** minutes activated during physical training per week according to objective sensor data.

*Hofstetter et al., J Strength Cond Res, 2012; Wyss & Mäder, Mil Med, 2010*



# Physical demands and physical training related to injury incidences

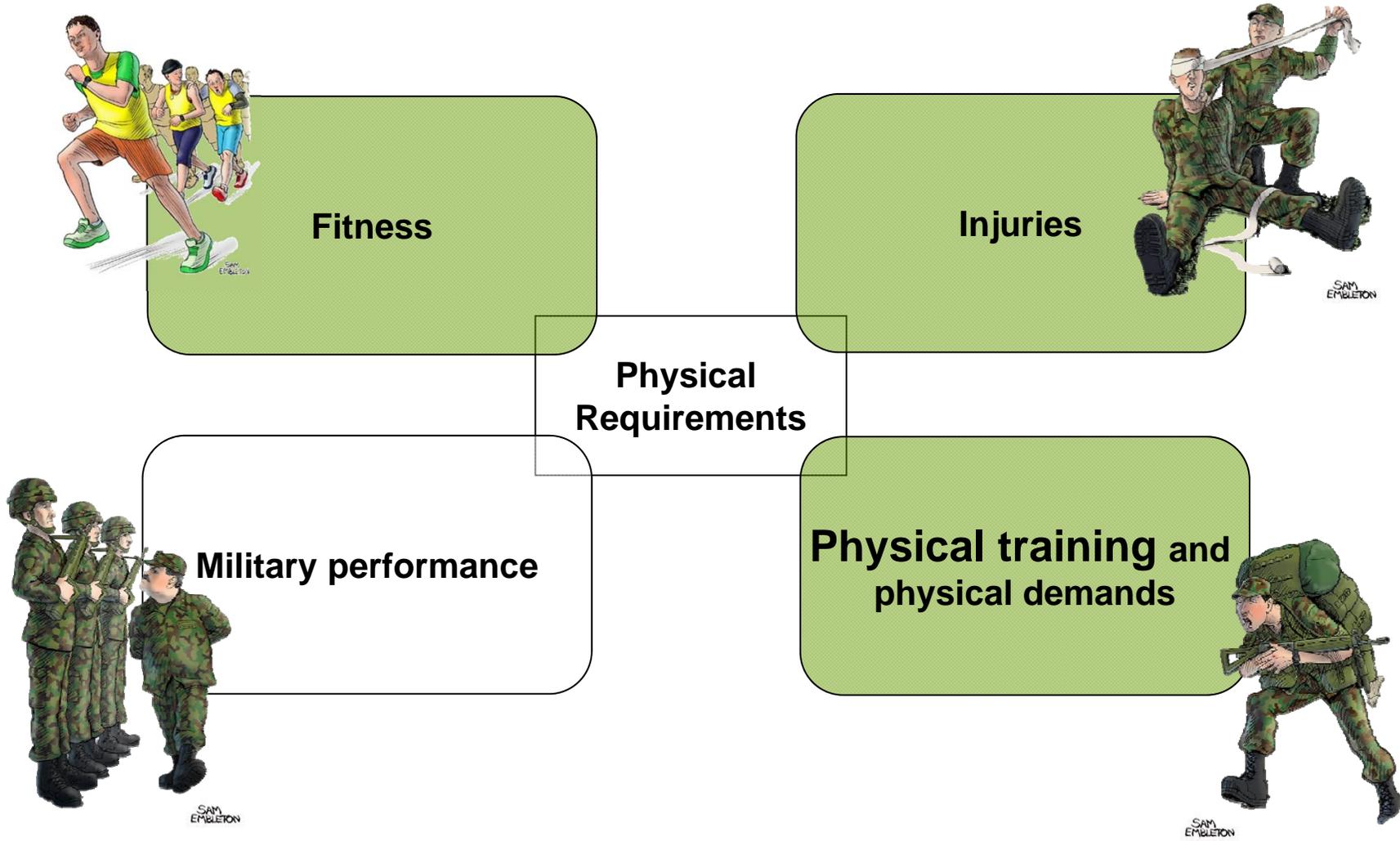
*Six risk factors explain 99% of the differences in injury incidence rates between 12 training schools:*

*(Wyss et al., Mil Med, 2014)*



- High energy expenditure (demands)
- Decreasing distances on foot per week with increasing time of BMT
- Large differences in daily physical demands within training week
- Little time spent on sports related PT
- Many activities with heavy equipment
- Little time for night rest







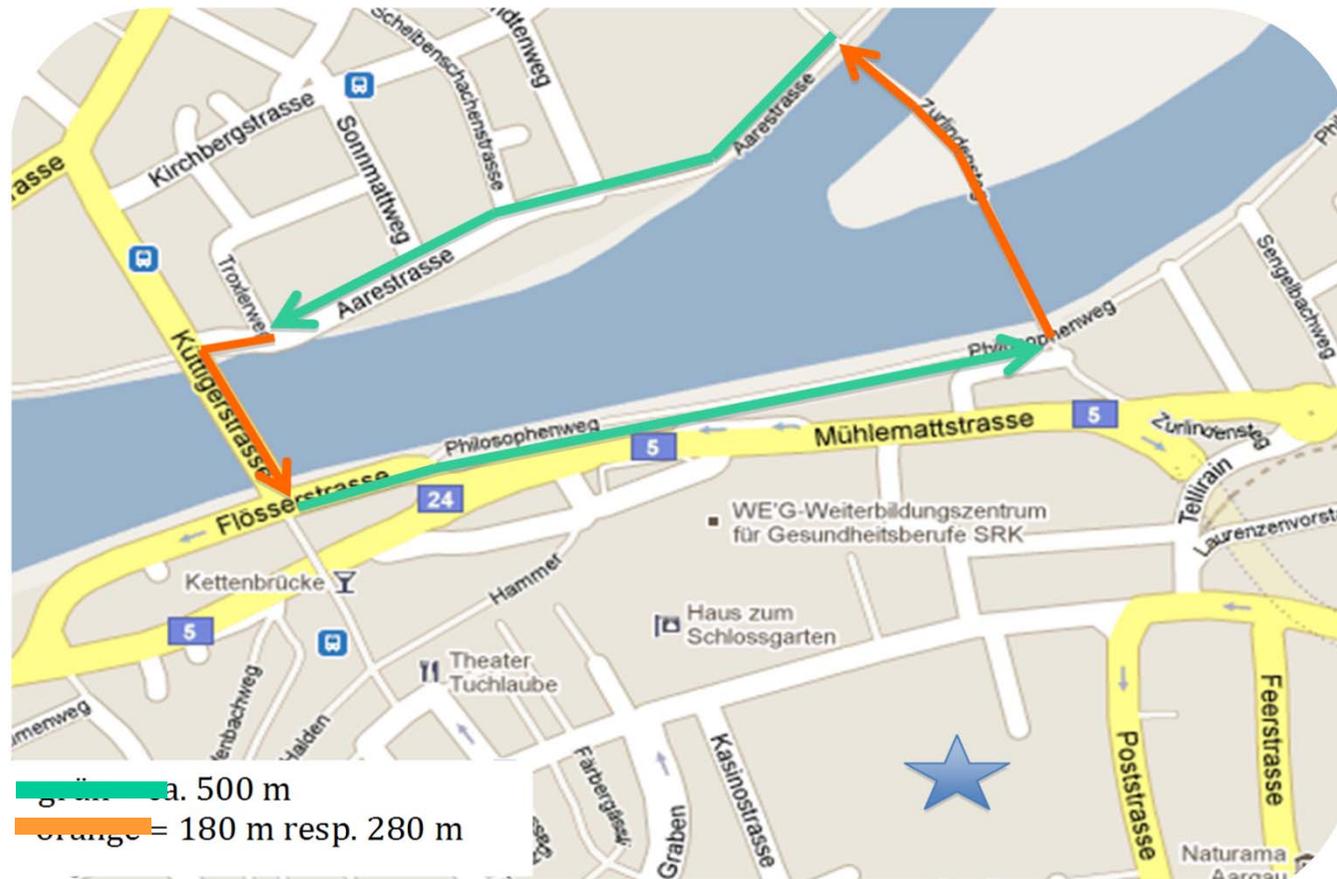
# Physical training intervention study

3 study groups	Control	PT+	PT++
Quantity	as usual	180'/week	180'/week
Quality	as usual	as usual	different content, instructed by physical education teachers



# Physical training intervention study

45'/week: Interval endurance run – instead of long jog





# Physical training intervention study

30'/week circuit strength training





# Physical training intervention study

30'/week  
team sports



30'/week  
balance training





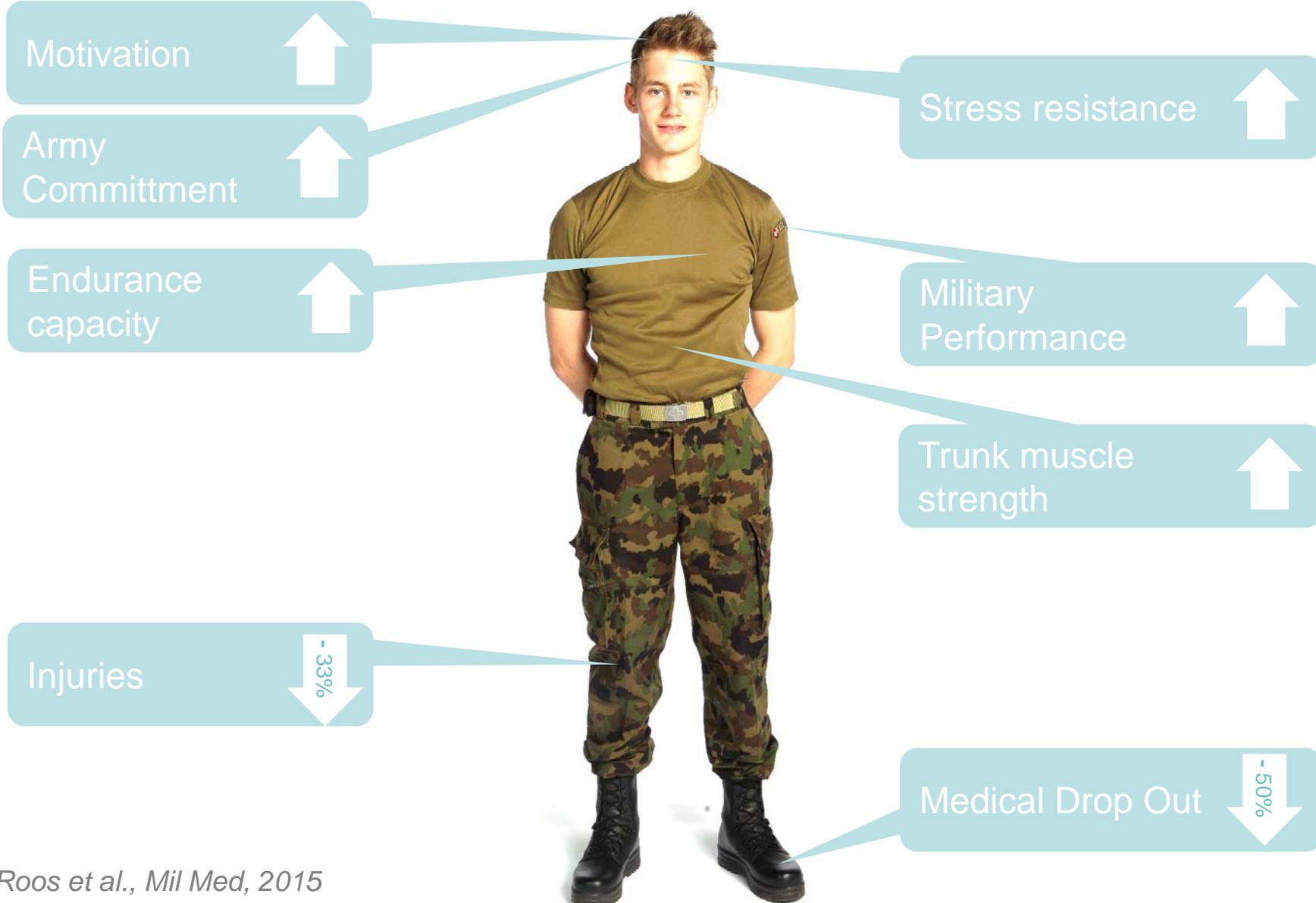
# Physical training intervention study

	Control	PT+	PT++
Duration per week [min]	70	140	145
Fitness score	+ 8 %	+ 16 %	+ 26 %
Aerobic fitness	+ 8 %	+ 17 %	+ 40 %

*Roos et al., J Strength Cond Res, 2015*



# Physical training intervention study

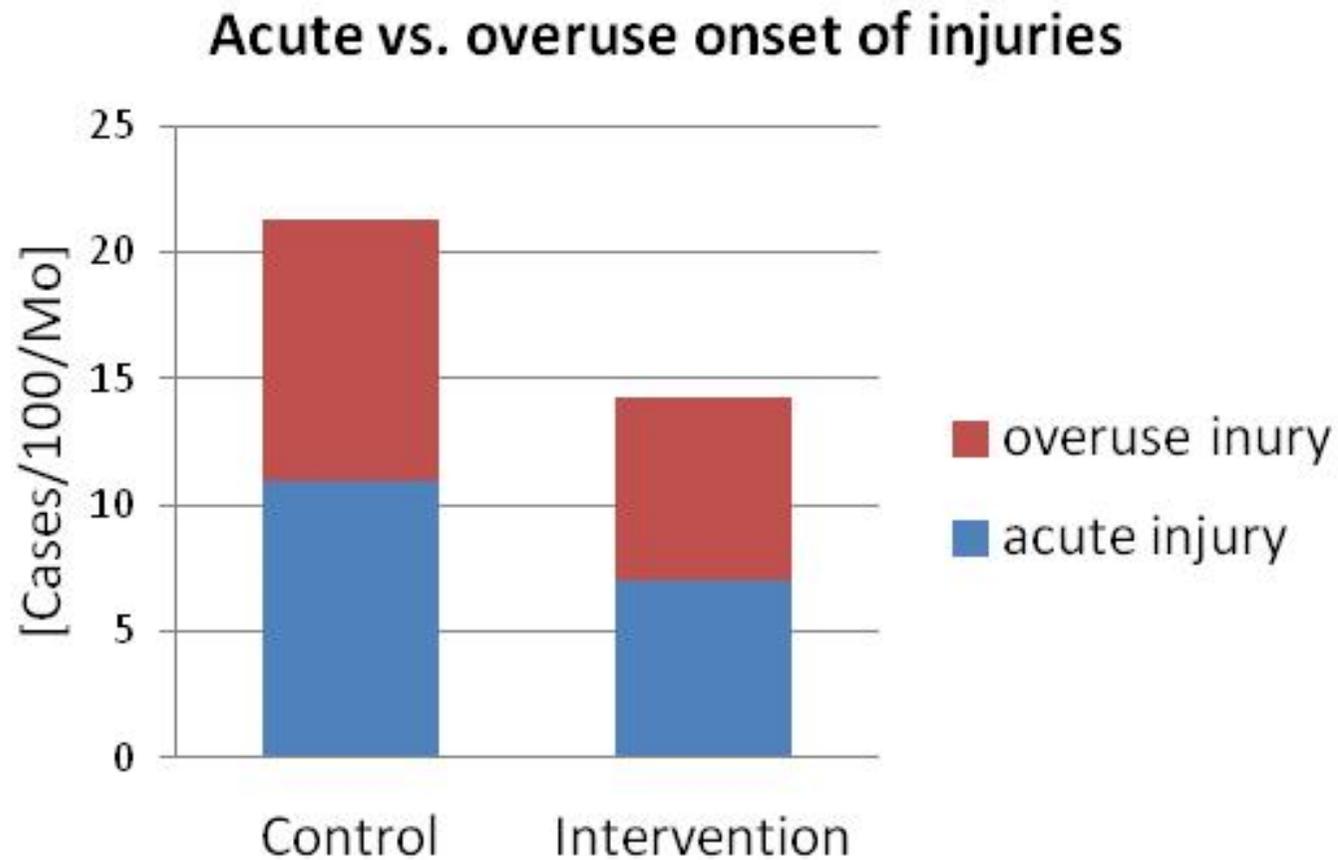


Roos et al., Mil Med, 2015



# Physical training intervention study

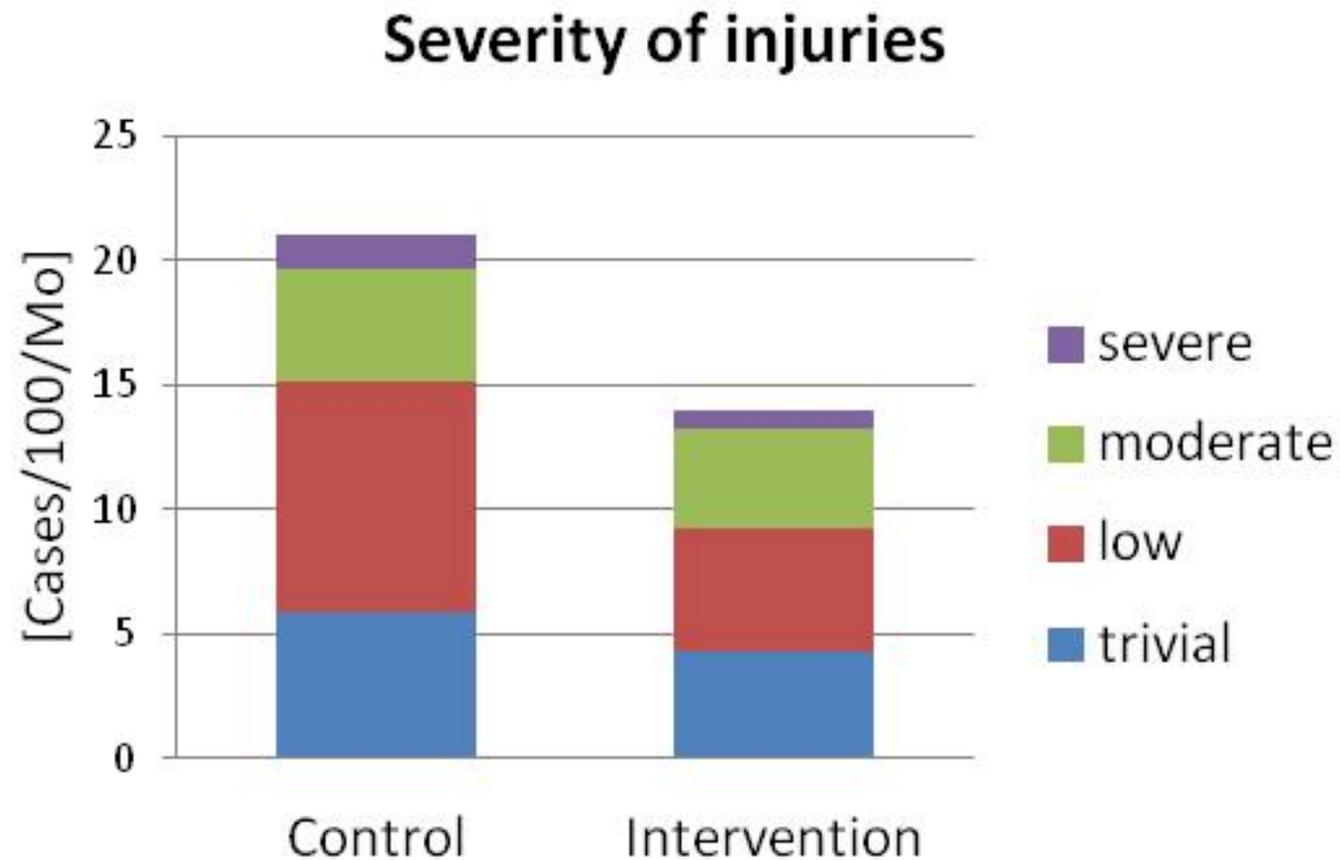
What kind of injuries were prevented by the implemented interventions?





# Physical training intervention study

What kind of injuries were prevented by the implemented interventions?





# Thank you for your attention

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