

2010 FISA WORLD ROWING COACHES CONFERENCE Copenhagen

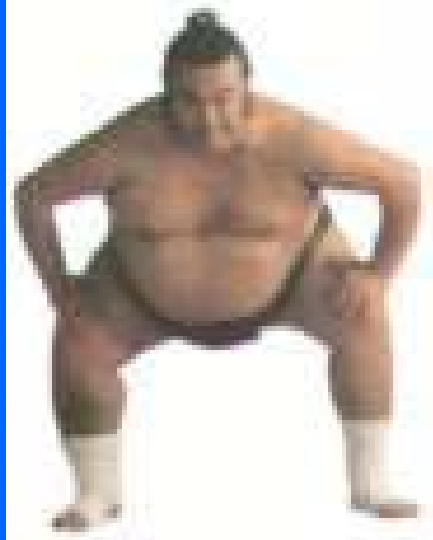
Saturday, 23rd January 2010
09.00 – 10.00

"Rowing Performance –
Optimization & Training"

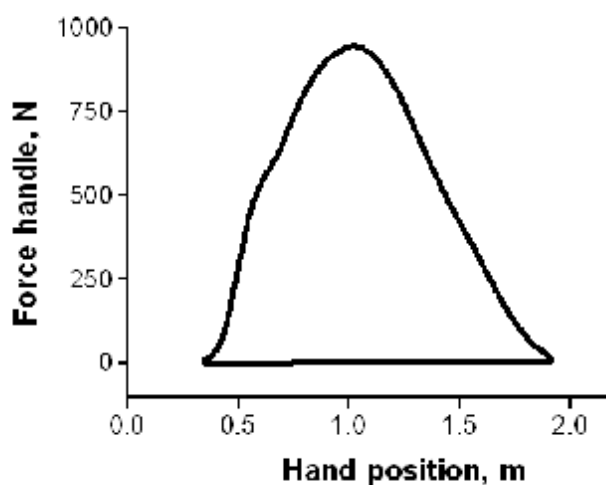


Kurt Jensen

Institute of Sports Science and Clinical Biomechanics
University of Southern Denmark



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B

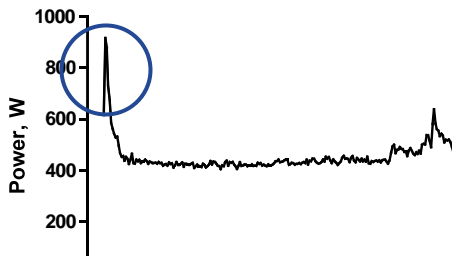
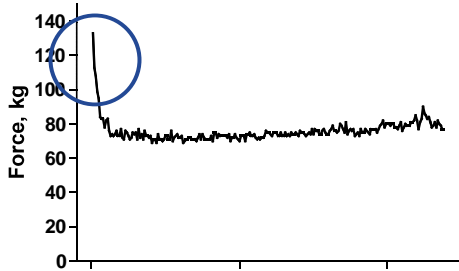


VO2max

Force - RFD

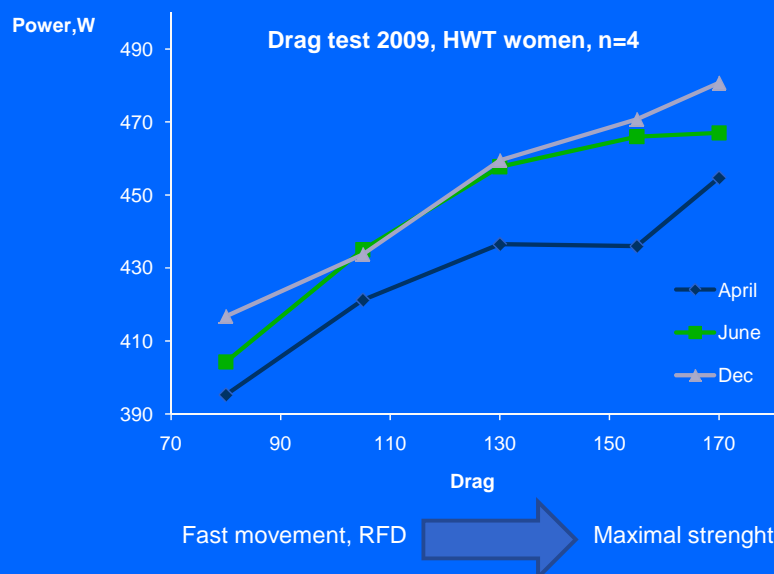
| | | |
|--------------|-----|--|
| Cycling | 157 | |
| Running | 20 | |
| Orienteering | 19 | |
| Triathlon | 16 | |
| Walking | 6 | |
| Rowing | 117 | |
| Pentathlon | 13 | |
| Badminton | 15 | |
| Swimming | 11 | |
| Kayaking | 26 | |
| Squash | 28 | |
| Handball | 142 | |
| Dancing | 4 | |
| Moto-cross | 17 | |
| BMX | 13 | |
| Speedway | 11 | |
| Karate | 6 | |
| Motorcycling | 11 | |
| Yachting | 4 | |
| Archery | 5 | |
| Riding | 5 | |
| Rally | 9 | |

Specific strength test



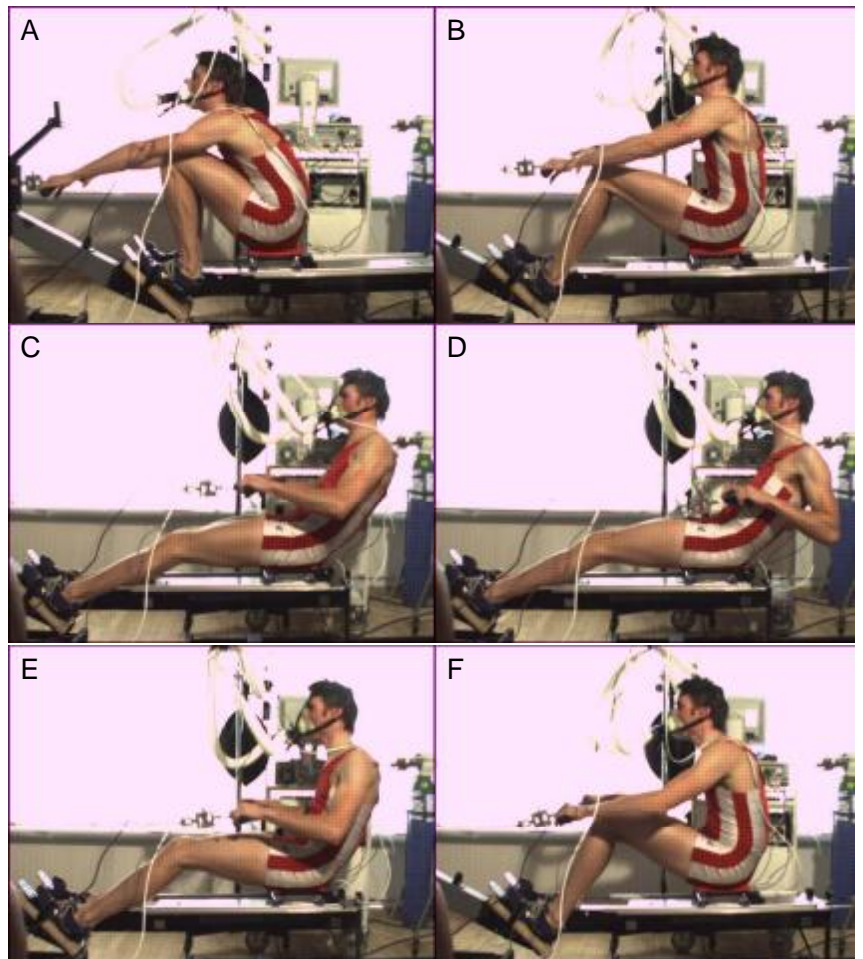
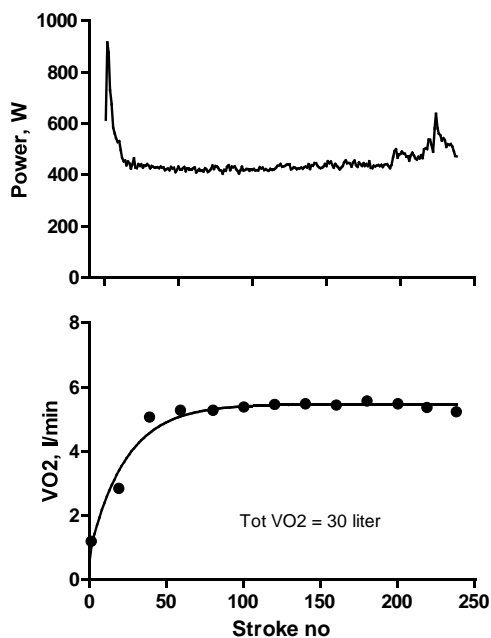
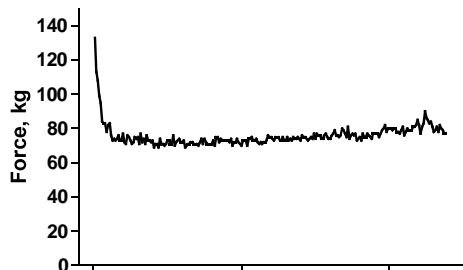
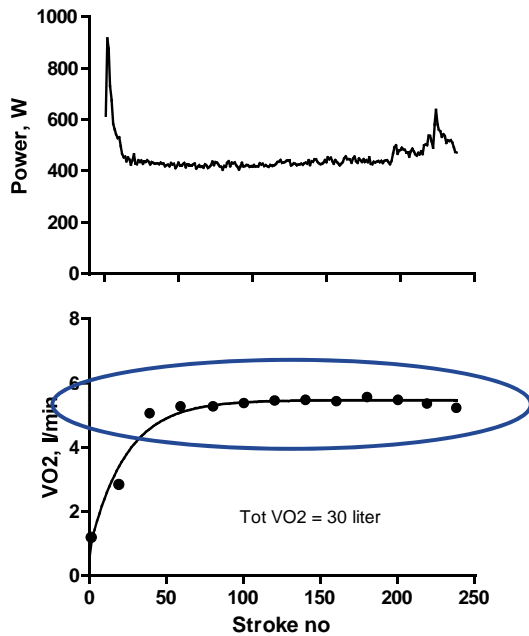
Strength training increases rowing specific peak power

- "Drag Test" in a Concept II rowing ergometer
- 5 times 100m all-out, rest 3-5min
- Drag factor: 80, 105, 130, 155, 170/180



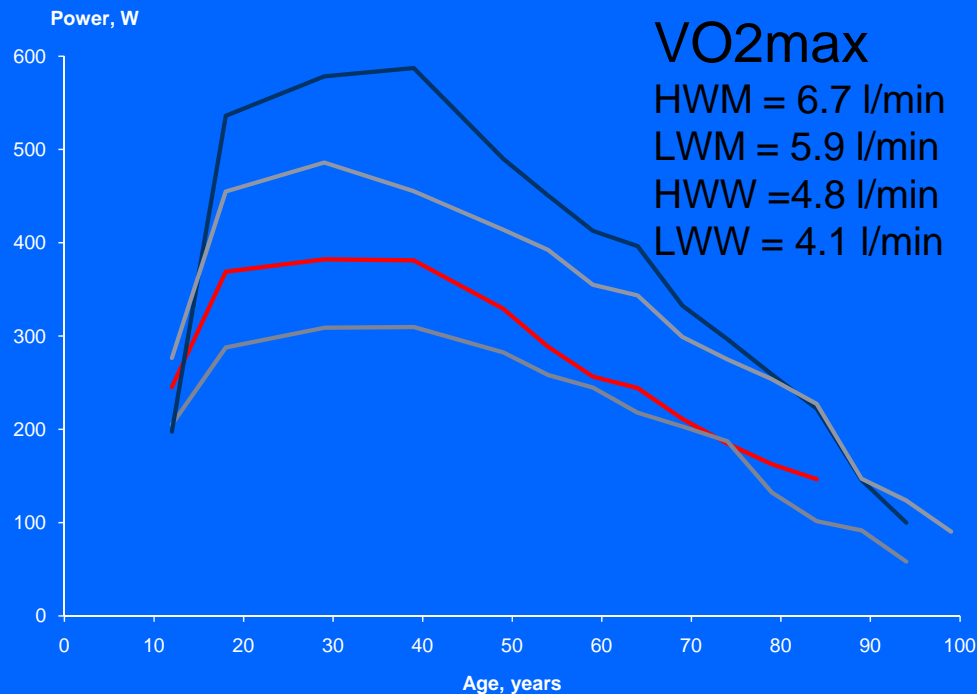
Maximal oxygen uptake

Oxygen kinetics



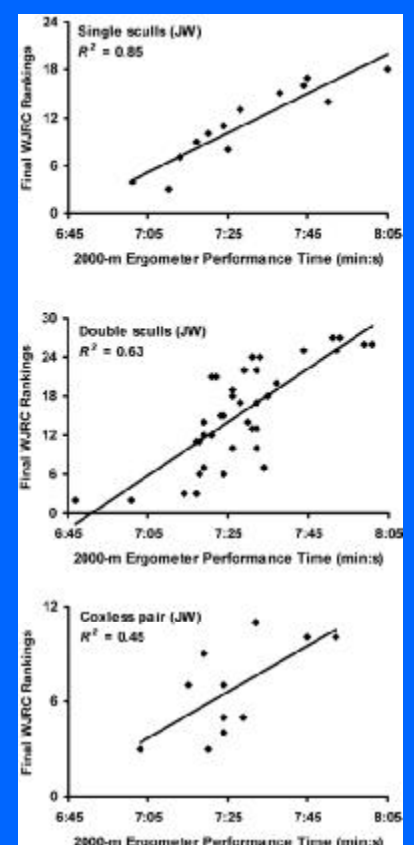
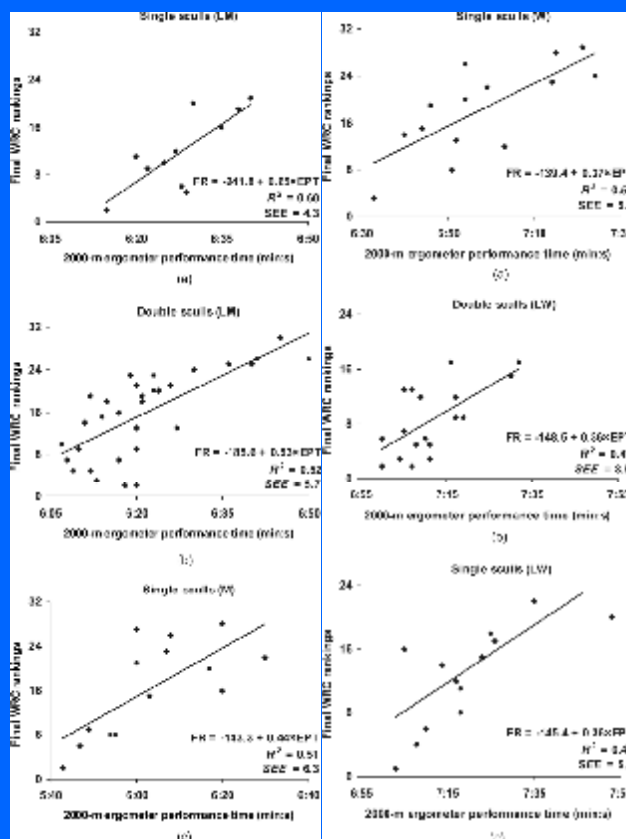
2K Ergometer Records

Aerobic fraction ~70-80%
Work efficiency ~16-20%

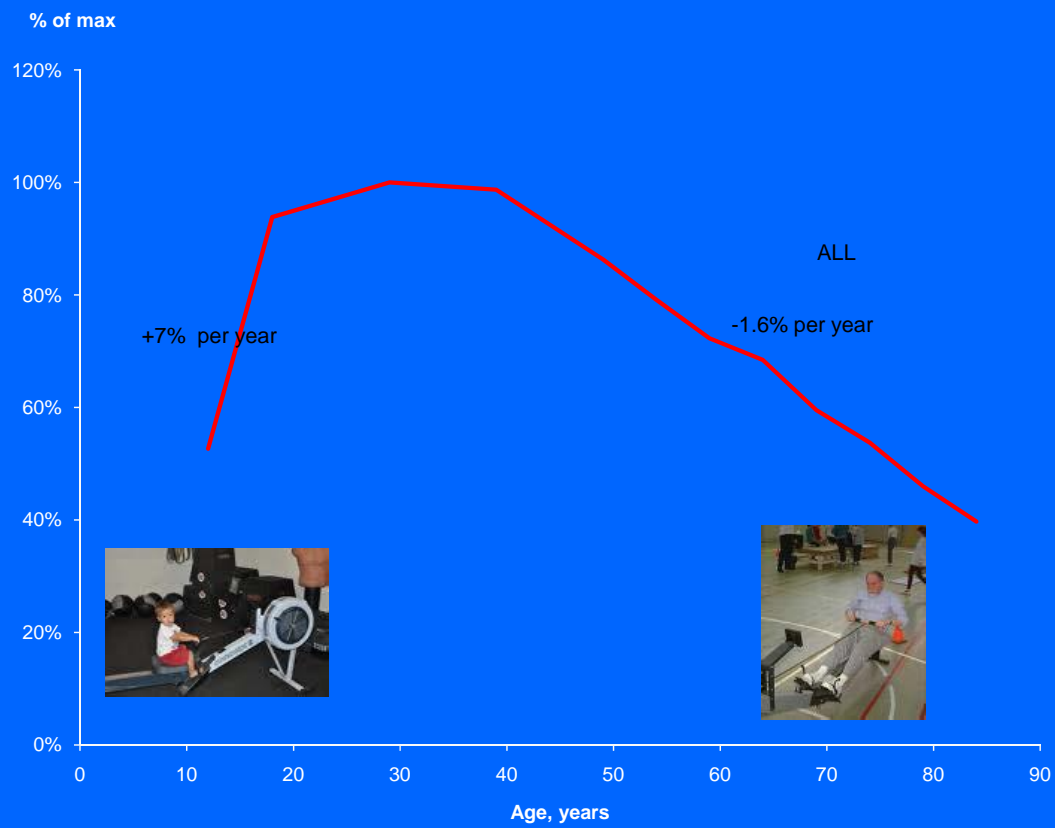


Relationship between 2000-m rowing ergometer performance times and World Rowing Championships rankings in elite-standard rowers

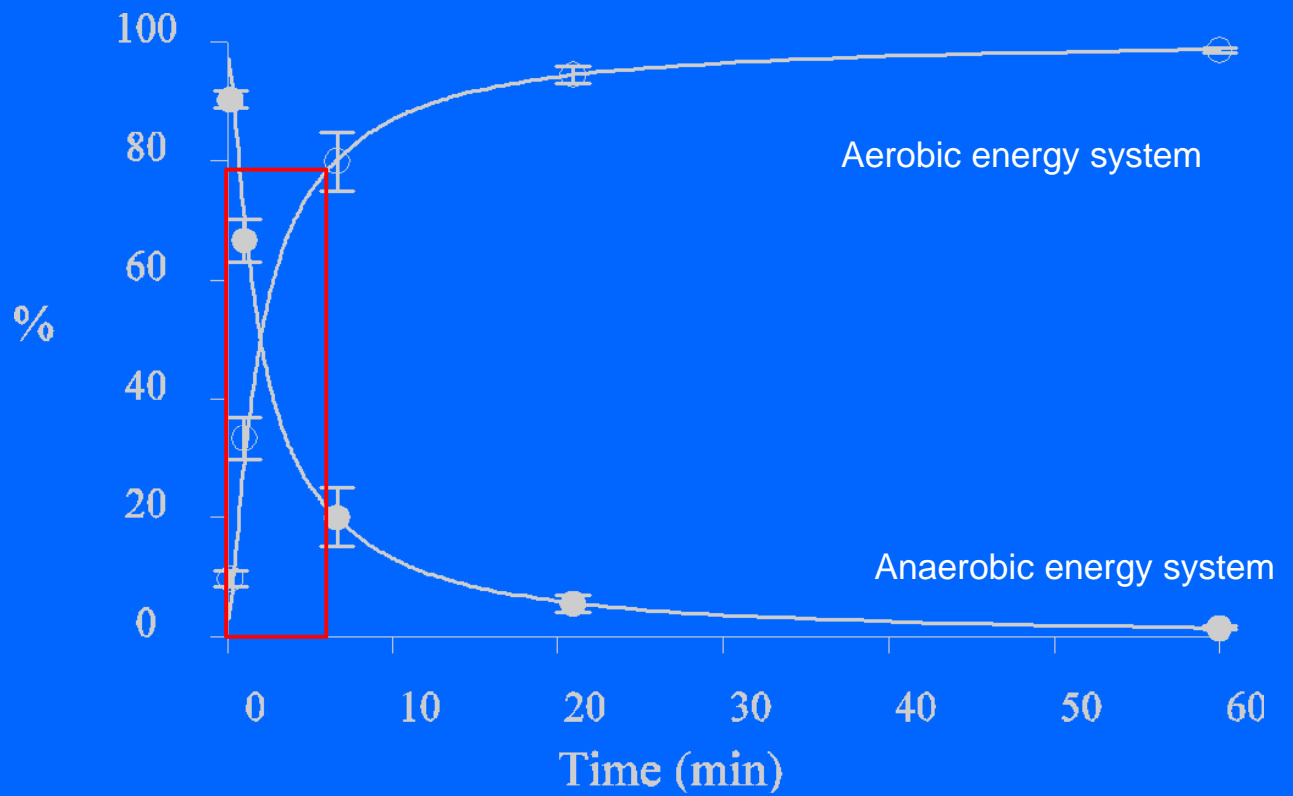
PAVLE MIKULI, DEPARTMENT OF SPORT, FACULTY OF KINESIOLOGY, UNIVERSITY OF ZAGREB, ZAGREB, CROATIA



Aging



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The Performance Profile

Individual needs to improve training?

“Week of testing”

Intensity

Week test

Level

| | | |
|-----|---|---------------------------|
| Mon | C | 6 km timing |
| Tue | B | 2 km timing |
| Wed | A | 3*100m (best result) |
| | A | 1 min as far as possible |
| Thu | D | 1 hour as far as possible |

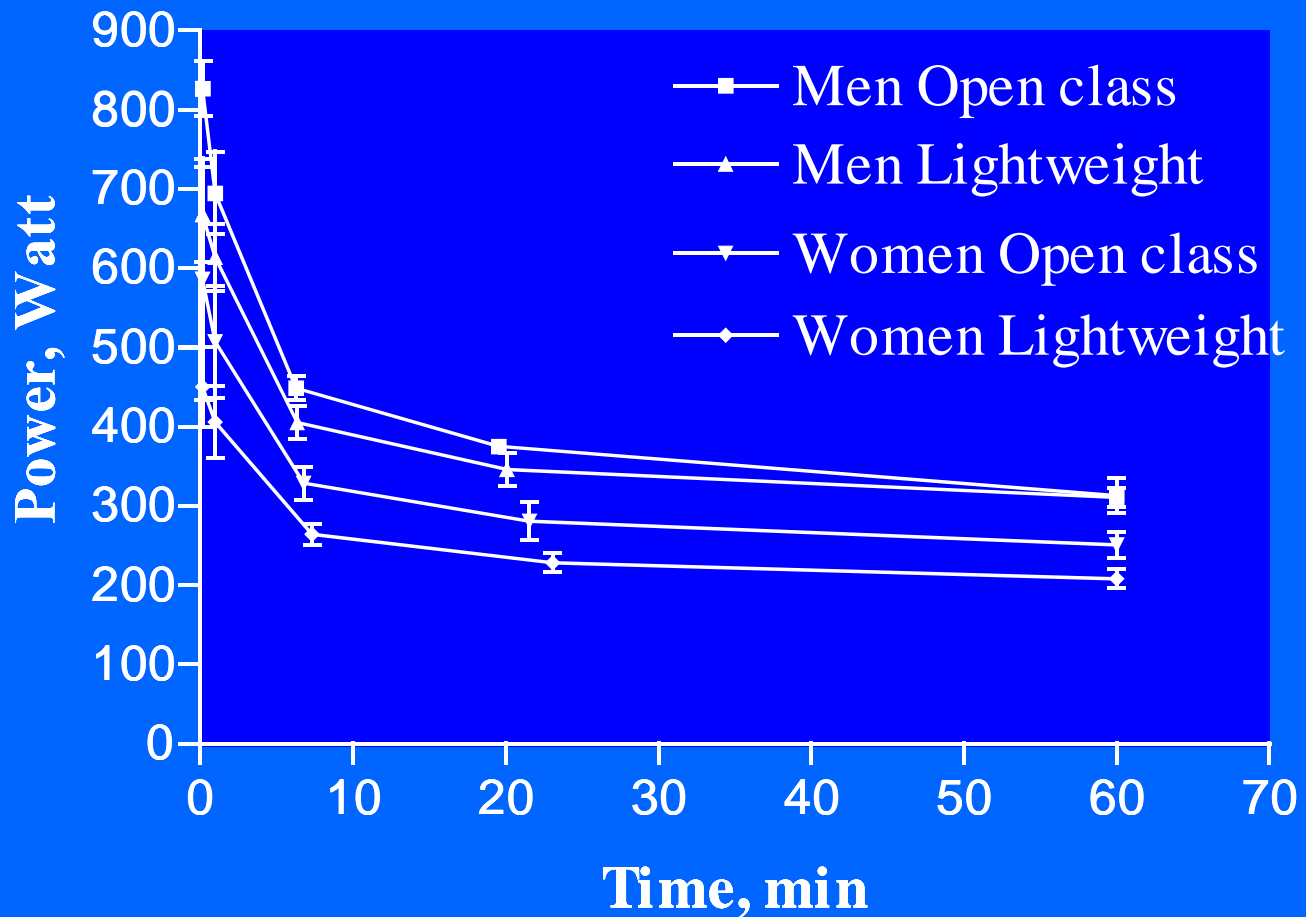
Results

HWT men

| | | |
|--------|---------------------|---------------|
| 100m | "Anaerob Power" | 827 ± 35 Watt |
| 1min | "Anaerob Capacity" | 695 ± 52 Watt |
| 2k | "Aerob Power" | 446 ± 15 Watt |
| 6k | "Anaerob Threshold" | 375 ± 8 Watt |
| 1 hour | "Aerob Endurance" | 313 ± 22 Watt |

2019-2020
LOCAL TEST WEEK

Power – endurance curve

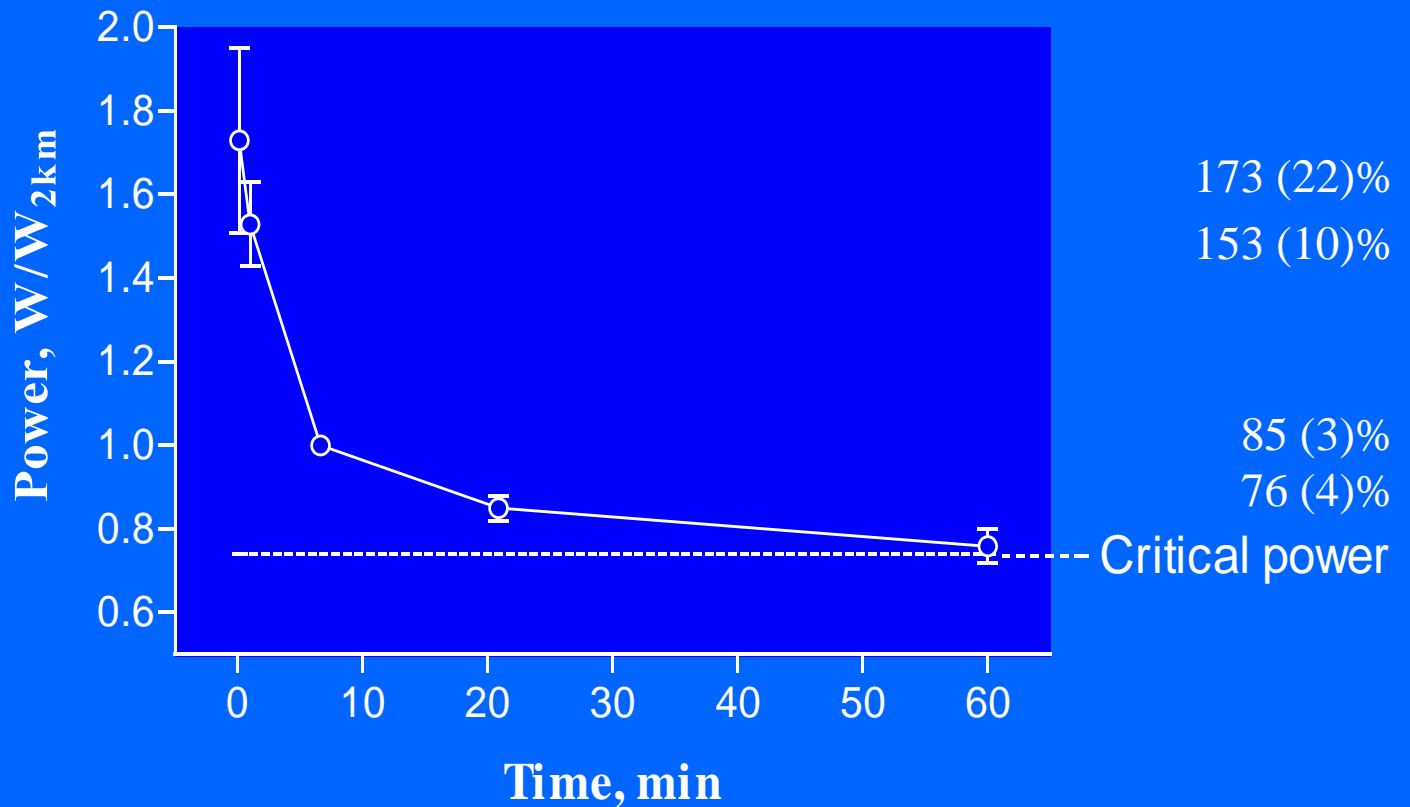


Results

HWT men (relative to 2km)

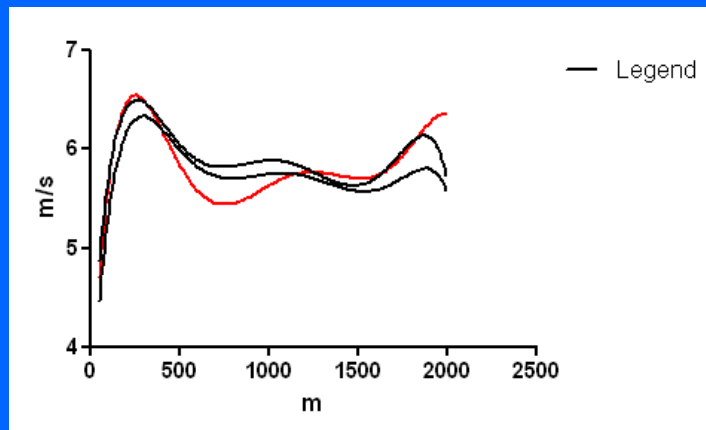
| | | |
|--------|---------------------|------------------|
| 100m | "Anaerob Power" | $827/446 = 1.85$ |
| 1min | "Anaerob Capacity" | $695/446 = 1.56$ |
| 2k | "Aerob Power" | $446/446 = 1.00$ |
| 6k | "Anaerob Threshold" | $375/446 = 0.84$ |
| 1 hour | "Aerob Endurance" | $313/446 = 0.70$ |

Relative power – endurance curve

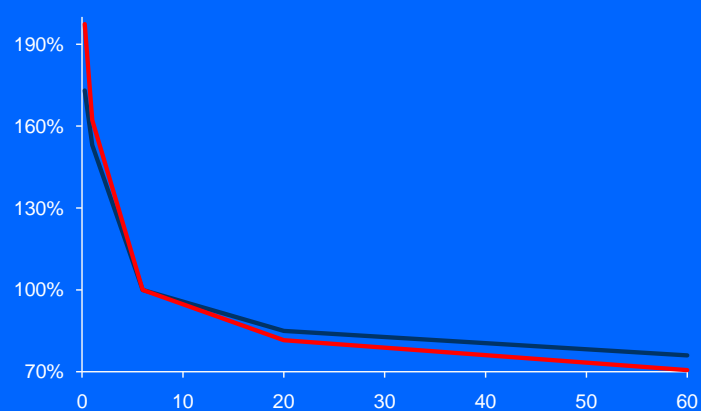


- The optimal balance needs to be developed further
- By including international top rowers from different nations
- Everyone should/should not be equal
- May be also depending of boat types

How does a Week Test Profile look like in a fast boat?

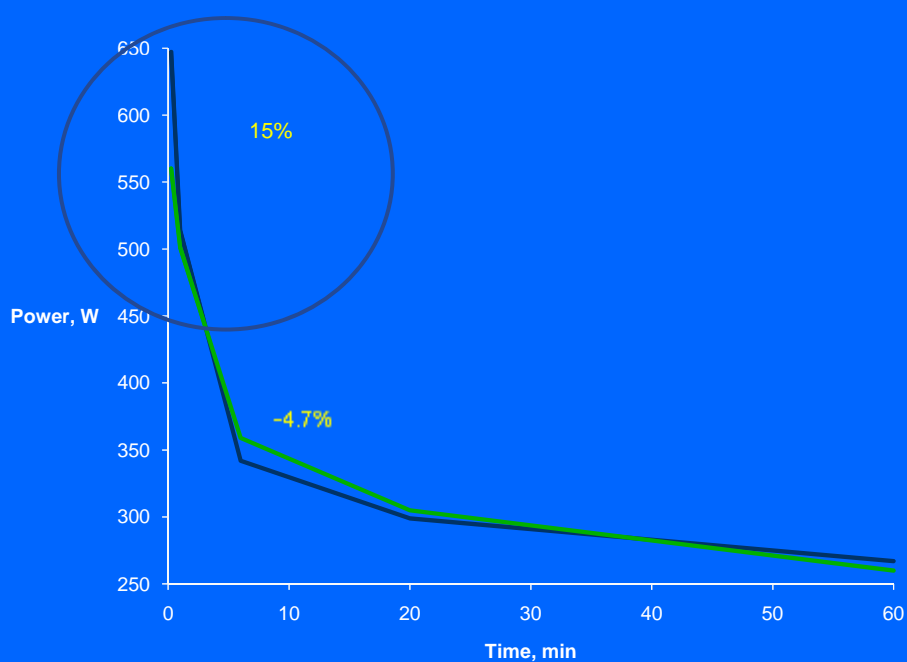


Week test profile of a fast boat:



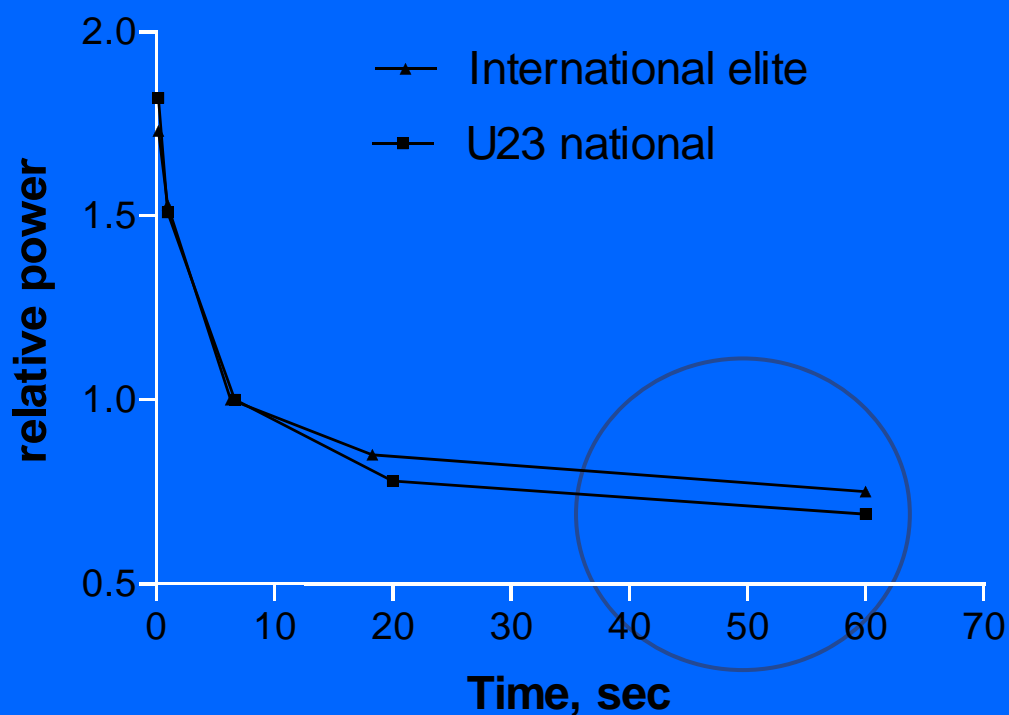
What can strenght training do to your week profile?

2 months of intense heavy weight training after rowing season

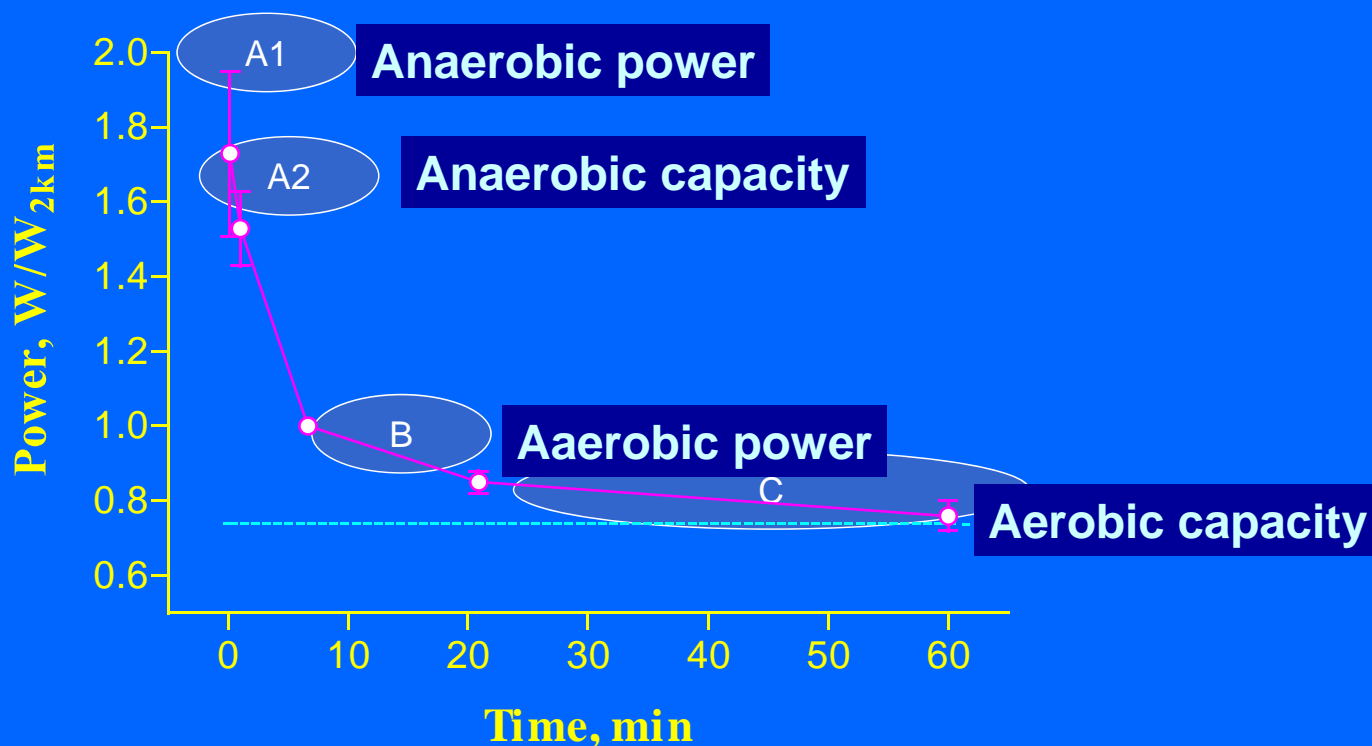


What can endurance training do to your week profile?

Years of endurance training in U23 (n=23) compared to elite rowers (n=17)

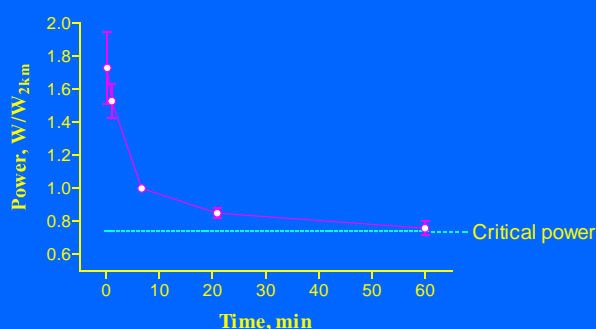


Application in the training

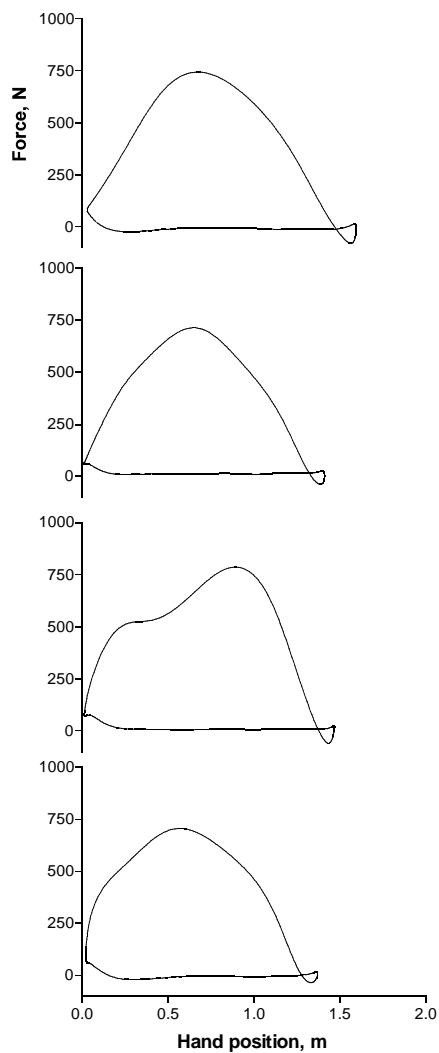


Description of Intensity

- A1/A2 high to very high intensity
- B/C medium to race pace intensity
- D/E low to very low intensity

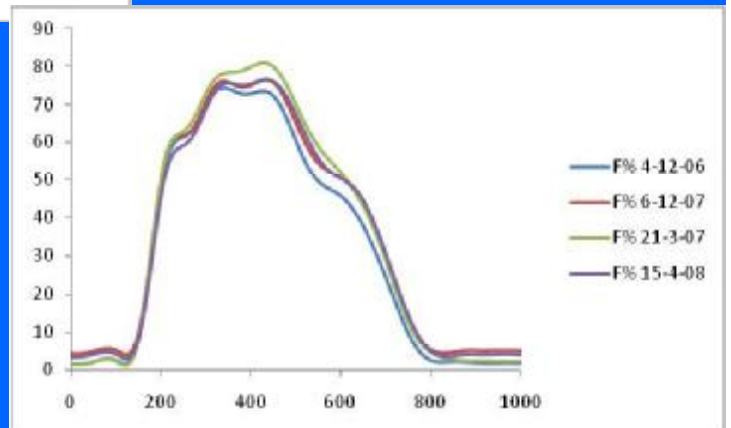
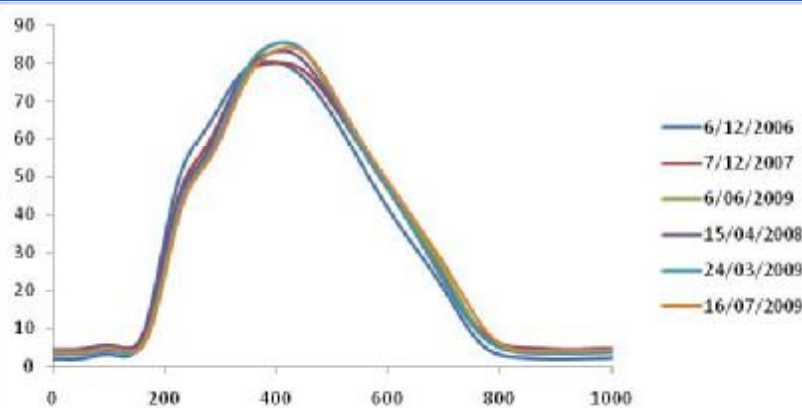


| | Pace | %2km | Time | Reps | Str Rate | BL | HR% | Physio. Eff. |
|------|---------|-------|--------|-------|----------|-----|--------|--------------|
| • A1 | Start | >160 | 5-10" | 24-12 | 44-48 | | | Ana Power |
| • A2 | End | >110 | 30-40" | 12-6 | 40-44 | | | Ana Cap |
| • B | 2-3 km | 100 | 3-6' | 8-4 | 34-38 | >10 | 95-100 | Aer Power |
| • C | 8-10km | 80 | 10-20' | 6-3 | 26-32 | 3-5 | 90 | Aer Cap |
| • D | 15-20km | 70 | 1-2hrs | | 24-26 | 2-3 | 80 | Aer Endur |
| • E | Rec | 50-60 | Hrs | | 18-22 | 1-2 | 70 | Adaptation |

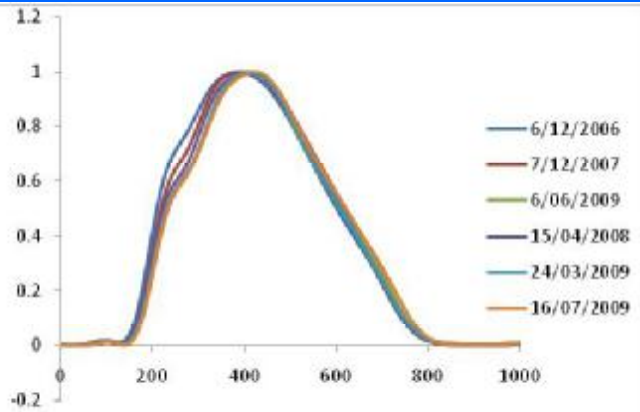


- Individual stroke profiles during rowing in a boat

"Finger-prints"
Who is who?



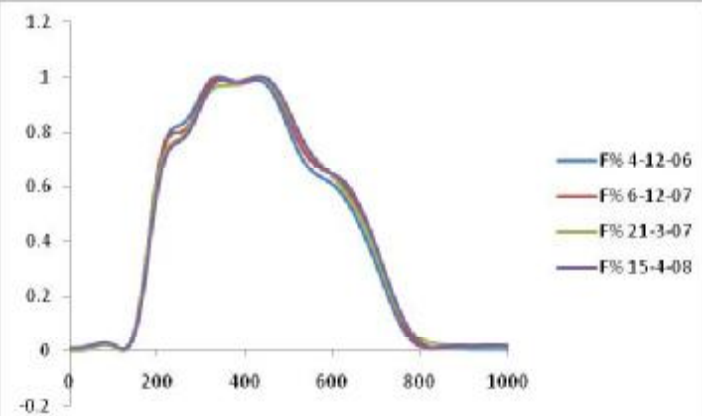
Relativ Force



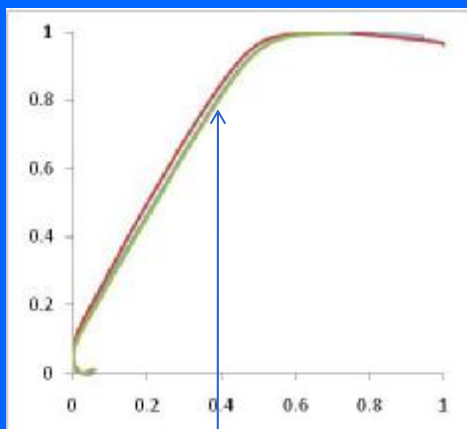
Genvej til mads rasmussen.avi.lnk



Genvej til eskild ebbesen.avi.lnk

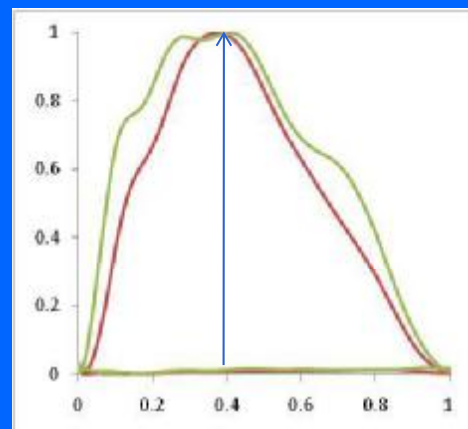


Legs

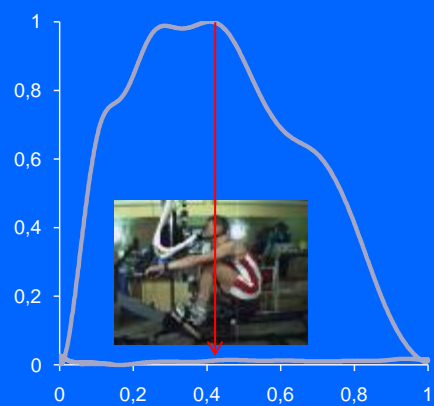


Arms

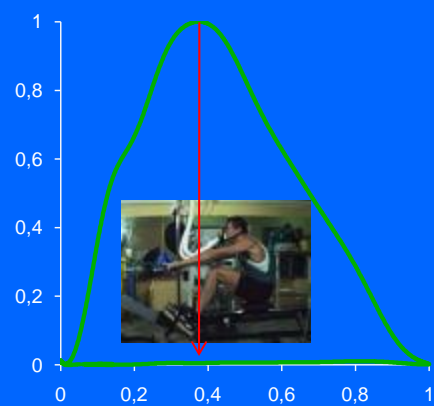
Force



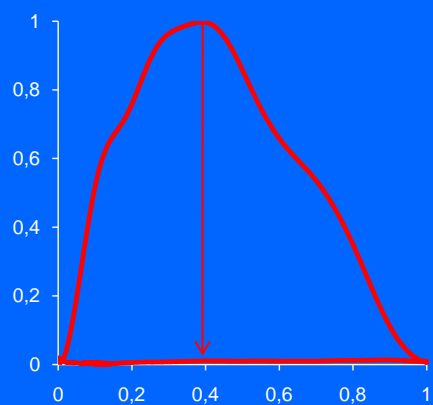
Arms



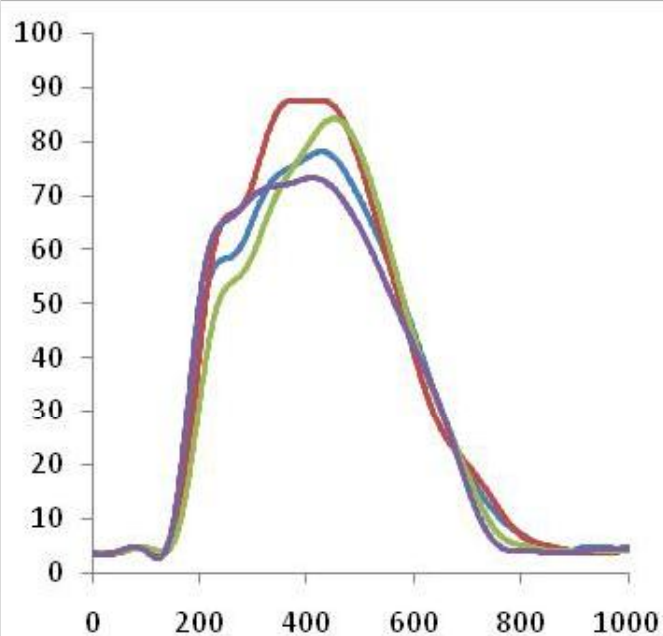
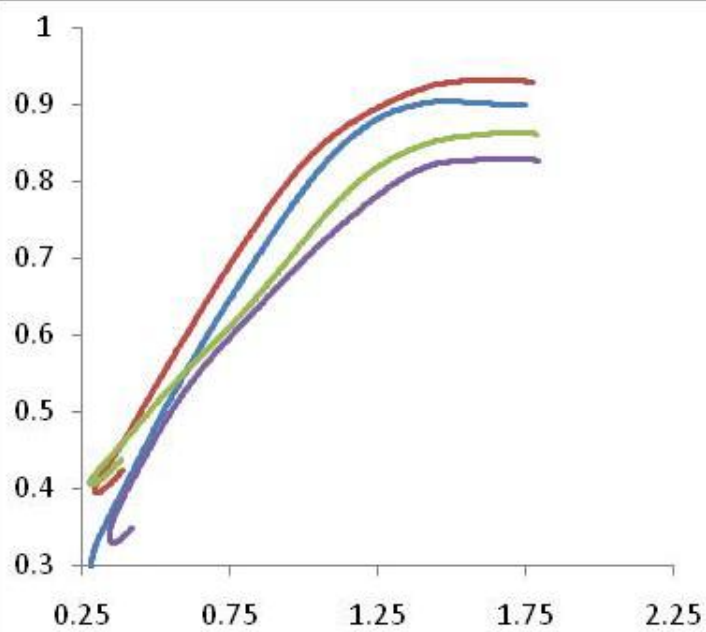
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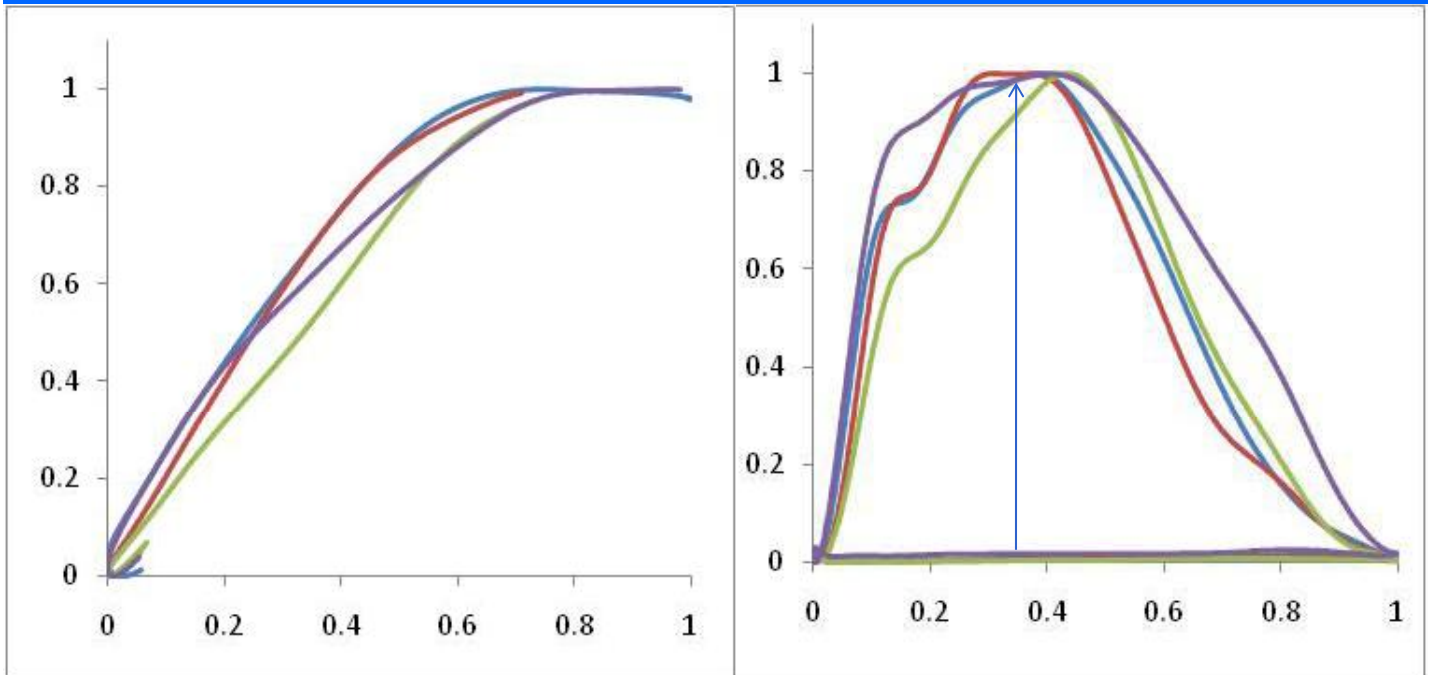
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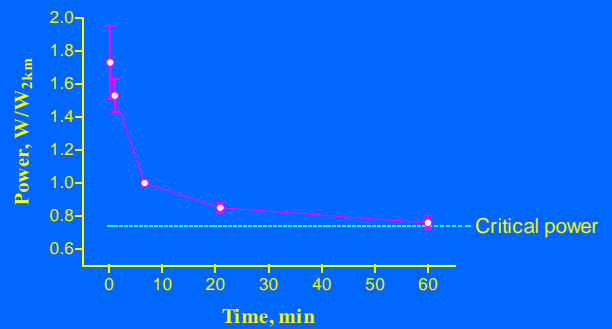
Training

Balanced approach

Individualisation

The Effects of High-Intensity Interval Training in Well-Trained Rowers, Matthew W. Driller, 2009

- "Four weeks of HIT improves 2000-m time-trial performance and relative $\text{Vo}_{2\text{peak}}$ in competitive rowers, more than a traditional approach"

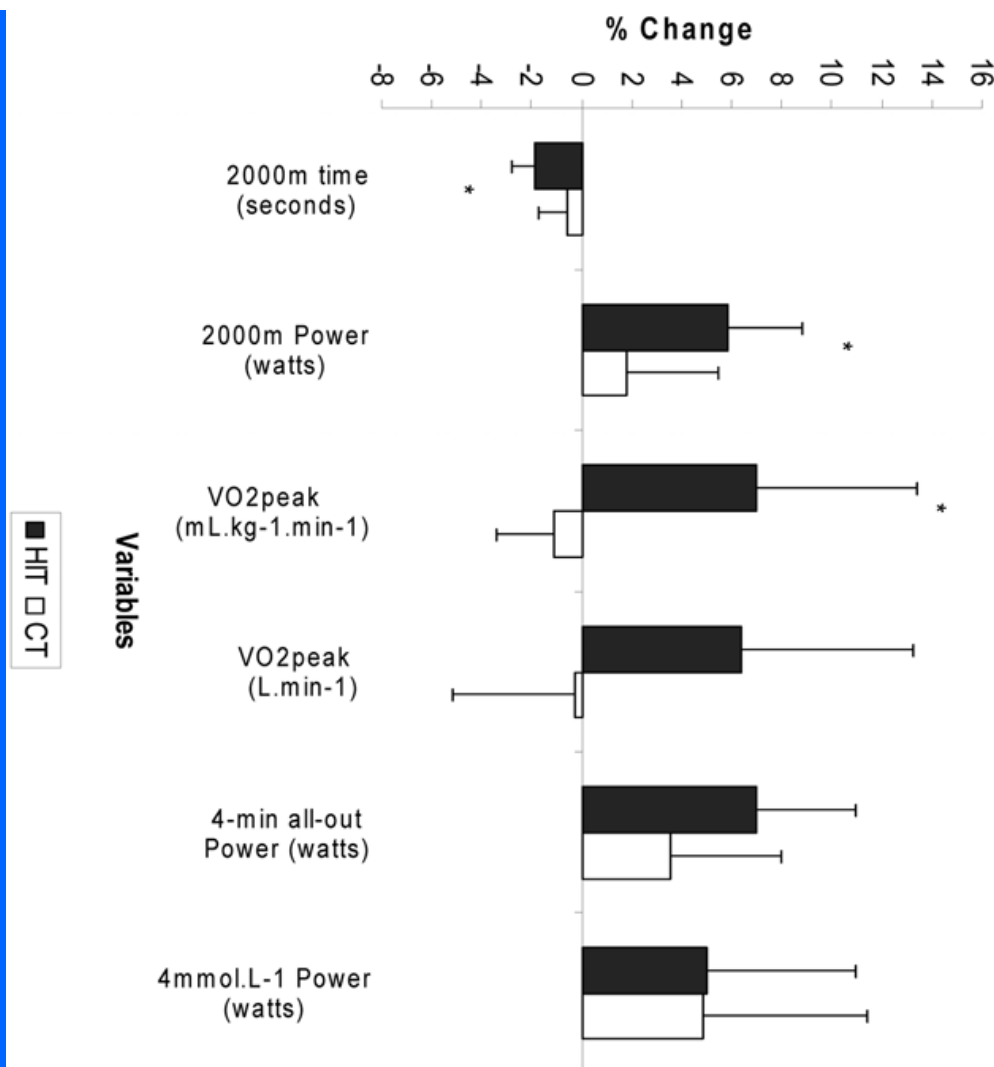


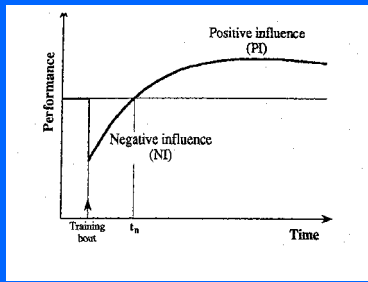
• HIT:

- The HIT group trained twice per week for 4 weeks, completing 7 HIT sessions
- One session completed 8 intervals 2.5 minutes, rec. <5min corresponding BL ~10 mmol/l

• CT:

- 10 or 5 min, BL ~2 mmol/l
- 5 or 10 min, BL ~3 mmol/l
- 10 or 5 min, BL ~2mmol/l
- 5 or 10 min, BL ~3 mmol/l
- 10 or 5 min, BL ~2 mmol/l





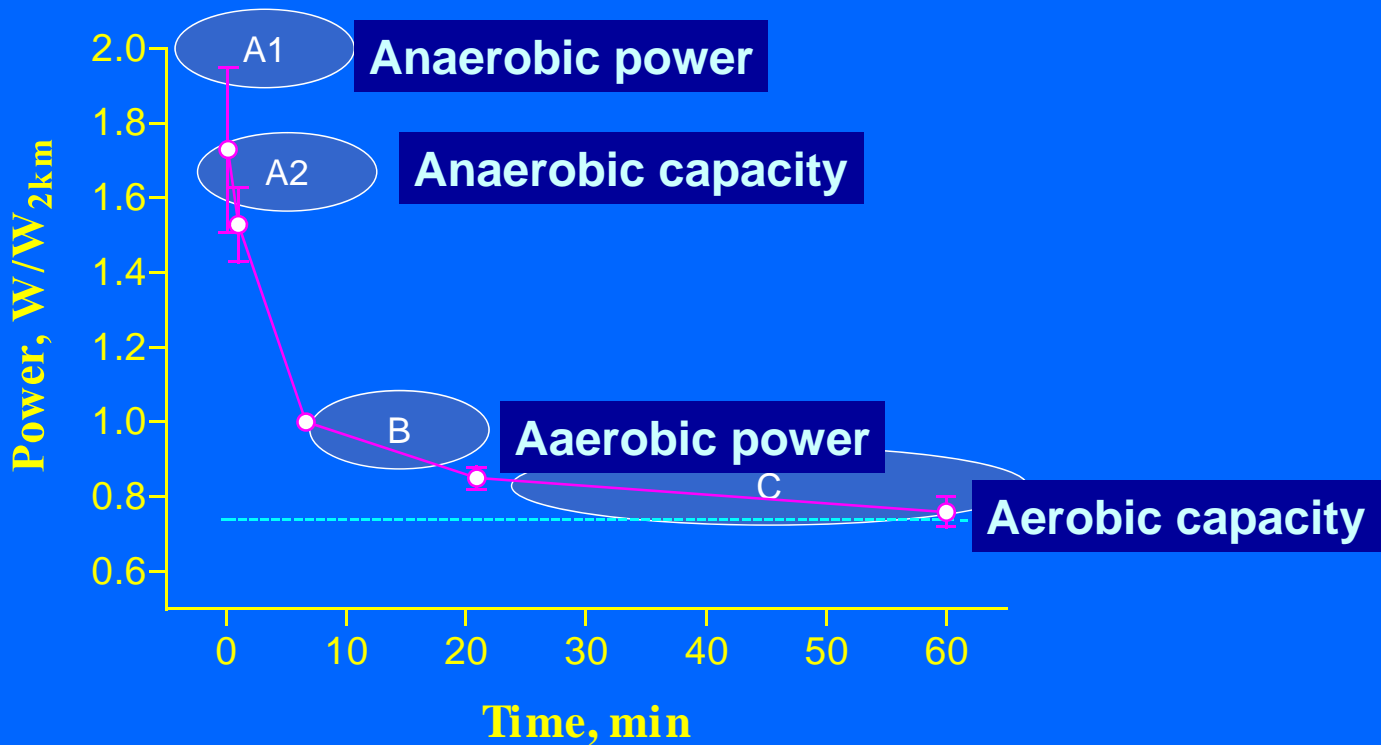
Training, individualization

To improve rowing performance

- **The role of intensity**
- To improve efficiency and technique
- To improve anaerobic energy system
- To improve aerobic transportation system
- **The role of duration:**
- To improve efficiency and technique
- To improve aerobic endurance performance
- To improve training resistance, adaptation and recovery?

Training, individualization

Application in the training



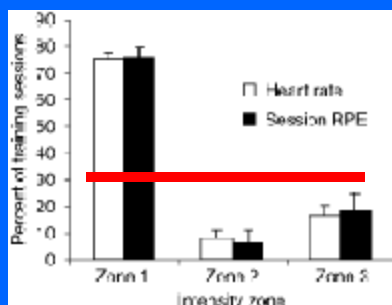
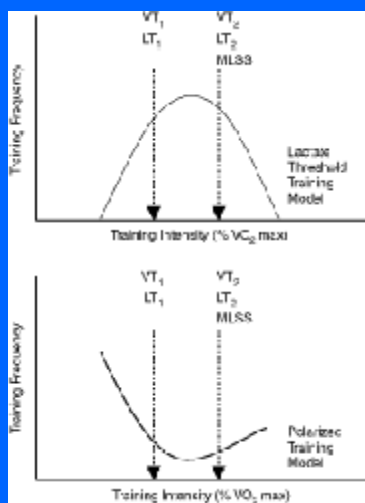
Training week: Two rower profiles

- Profile one (fast twitch, powerfull type)
 - Continously longer SS
 - Profile II (endurant, steady type)
 - Shorter more intense. +strength training
-
- | | |
|--|--|
| <ul style="list-style-type: none"> • Mo D • Tue C • Wed D • Tue C • Fri D/E • Sa Team • Su Team | <ul style="list-style-type: none"> • Mo D +A1 • Tue B • Wed C • Tue B/A • Fri D/E +A1 • Sa Team • Su Team |
|--|--|

Quantifying training intensity distribution in elite endurance athletes: is there evidence for an "optimal" distribution?

K. Stephen Seiler, Glenn Øvrevik Kjerland Department of Health and Sports, Agder University College, Kristiansand, Norway

VT1 - VT2 ~ BL 2-4 mmol ~ VO2max% 74-89

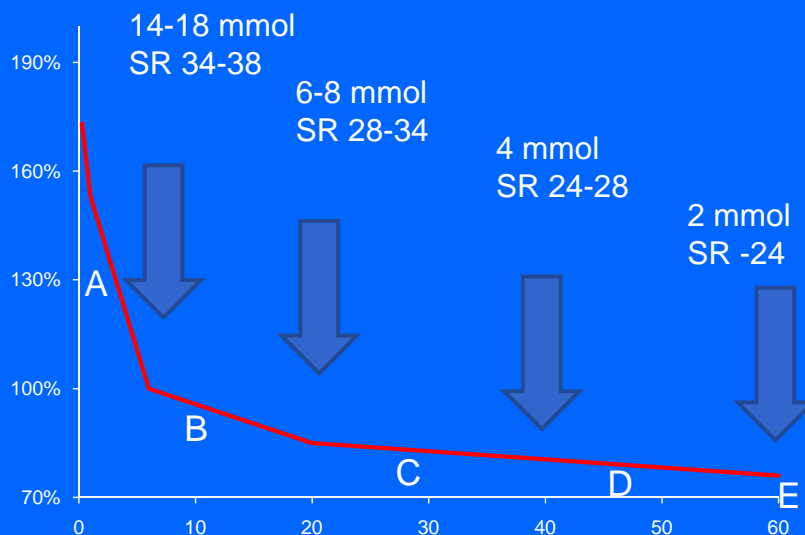


Overall distribution of rowing sessions (vinter):

Zone 1 ~E (3 sessions per week)

Zone 2 ~D (3 sessions per week)

Zone 3 ~C/B/A (3 sessions per week)



Thank You

<http://www.sdu.dk/staff/KJensen.aspx>