

Sykes Racing 2008 Rowing Australia
Coaches Conference



The Rowing Ergometer; It's Relevance to Training and Testing

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1. Discussion of some fundamentals about the rowing ergometer
2. Presentation of Drag Factor study results
3. Advice & recommendations

I AM NOT HERE TO TELL YOU TO STOP USING THE ERGOMETER!

Does it accurately reflect what happens on water?

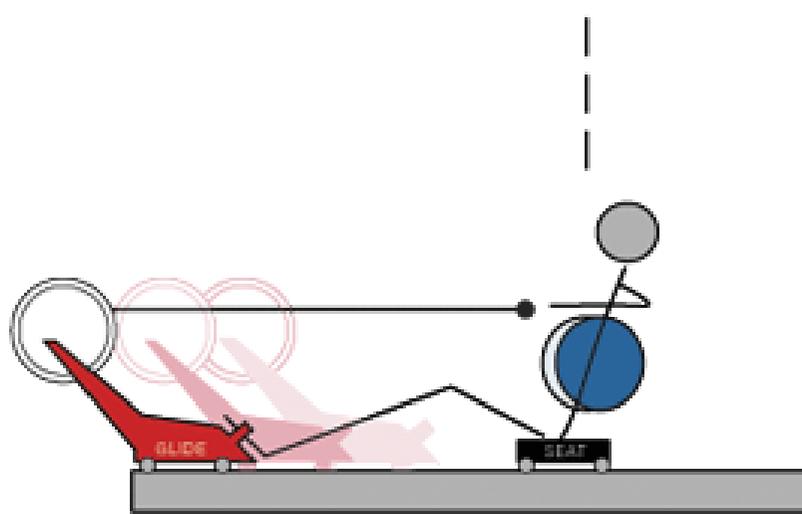
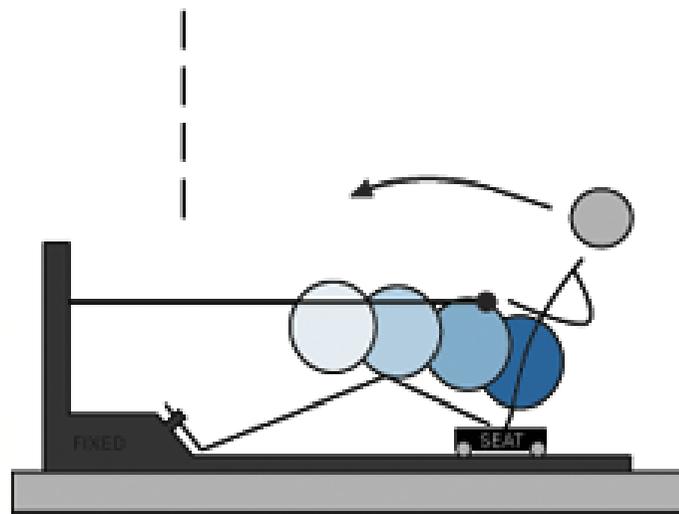
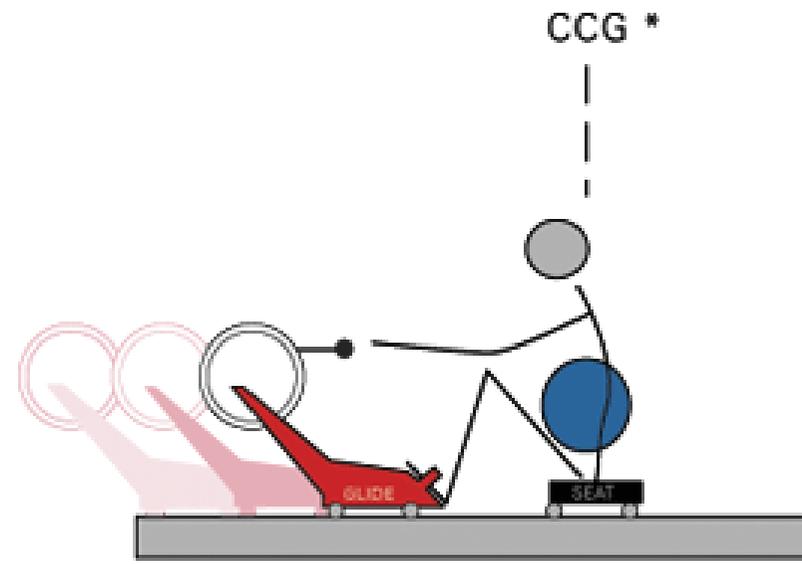
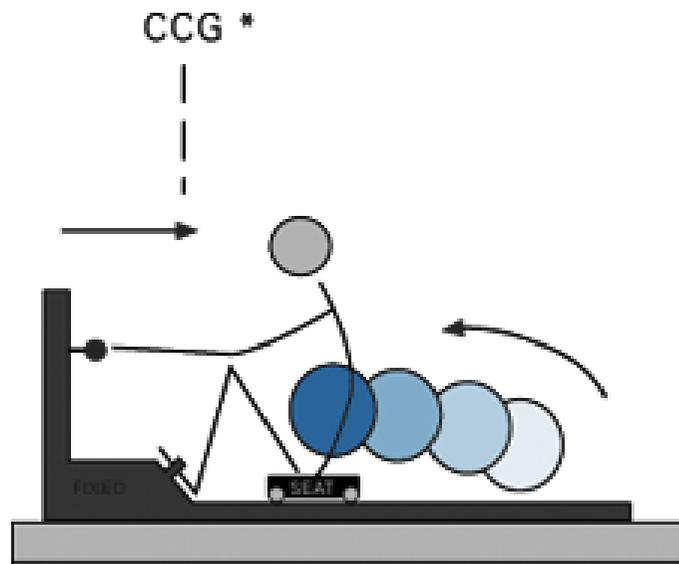
- Kleshnev (2001, 2003, 2005) lists six key differences
 1. Stroke rate is always 10-15% lower *
 2. The stroke length is 3-5% longer *
 3. Handle force has a higher peak and develops later
 4. Handle and footstretcher forces nearly equal as opposed to footstretcher force on water being 30% higher
 5. Difference in the timing of stretcher and handle forces *
 6. Maximal legs velocity is lower on an ergometer *

* a dynamic ergometer significantly alters or eliminates this difference

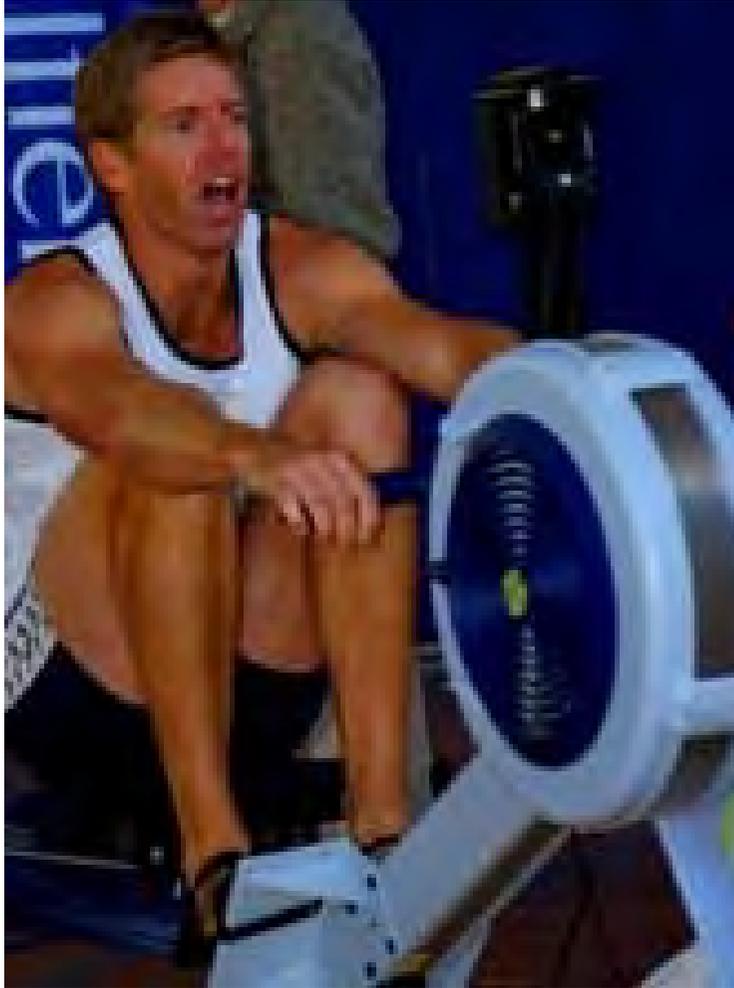
“Rowers with fast legs produce more power on water, while athletes with slower legs and stronger upper bodies have relatively higher ergo scores”



Fixed vs Dynamic Ergometers



The rowing ergometer



- While static ergometers may have been useful for training physical fitness, they may also adversely alter the coordination of the muscles used in on water rowing. (Elliot, 2002)

Fixed vs Dynamic Ergometers



- Bernstein et al, 2002
 - Athletes rowed average 53mm longer on a fixed ergometer
 - As pieces progressed, there was an increase in stroke length at the catch on a fixed ergometer
 - The mean forces developed during the power phase were significantly higher with the fixed ergometer
- Colloud et al, 2006
 - Rowing on a dynamic ergometer seems to require different muscular coordination to produce external force contact patterns
 - The lower catch and maximum values for external contact forces on a dynamic ergometer could decrease the risk factors for injuries



- Teitz et al, 2002
 - Ergometer training for longer than 30 mins was the most significant and consistent predictor of back pain for all age groups
- Holt et al 2003
 - 5% increase in lumbar flexion during a one hour ergometer at training intensities
 - Attributed to fatigue of the lumbar muscles
- Reid & McNair, 2000
 - The combination of lumbar flexion and muscular fatigue has long been identified as a cause of lumbar spine injury amongst rowers

- Bernstein et al, 2002
 - In elite rowers, land based training carries a 10-fold higher risk of injury per hour than water based training, the leading causes suggested being weights and ergometer training
- Wilson et al, 2008
 - Time spent ergometer training had the most significant impact on injury risk
 - This confirms biomechanical observations that the loading to the joints in ergometer sessions is different to the patterns seen on water
 - Nov, Dec & Jan highest months for injuries and this is related to high volumes of land training during winter months

If we can confidently say that the ergometer is not the same as on water rowing, and that it is clearly linked to injury, isn't it time we did something about it?



- Ergometer testing is often completed at stroke rates well below on water race pace
- Many athletes report the current drag factor (DF) settings feel too heavy
- Many coaches now prescribe ergometer training at lower DF's
- There is increased interest in using the Concept II sliders as training tools



What Do Crews Rate?



2007 World Championships

Class	SR	Class	SR
M8+	40	W8+	39.1
M4-	40.5	W4x	37.4
M4x	39.3	W2x	35.9
M2x	38.2	W2-	37.4
M2-	38.8	W1x	34.1
M1x	36.3	LW2x	36.1
LM4-	40.6		
LM2x	38.8		



- Small study designed to add some knowledge to the following questions:
 - Are the current drag factor settings appropriate?
 - What effect do Concept II sliders have on stroke rate?
 - Can we manipulate DF +/- sliders to get stroke rate closer to on water race rates?
 - Are Concept II sliders a reliable form of testing?



On Water vs Ergometer?



- Can we compare forces?
- Assumption
 - If we manipulate variables to get rate similar to on water racing, then forces must be close to similar

What Would Change?

- Perhaps a test that is more predictive of on water performance??
- A training tool that may be closer to enhancing the correct skill pattern??
- Likely decrease in low back injury rates!!

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