

Sport Science for Competitive Lifesaving

© Christopher Stock
BSc (Hons) MSc



Introduction

- Warm-up
- Cool Down
- Starts
- Take Over's
- Turns
- Basic Performance Analysis



Warm-Up's

- What is the aim of a warm-up?
 - “The goal of a warm-up period is to prepare the athlete both mentally and physically”

(Hoffman, 2002)

Key Words

- Taking this into account, what are the benefits and effects of a warm-up?

Benefits & Effects of Warming-Up

PHYSIOLOGICAL	PSYCHOLOGICAL
↑ Heart rate	Arousal control
↑ Blood flow to working muscles	Mood Change
↑ Muscle and core temperature	Helps athletes focus on goals
↑ O ₂ flow to working muscles	Pre-performance routines
↑ Muscle strength and power	Optimise attention focus
↑ Rate & effectiveness of contraction/relaxation of muscles	Allows an athlete to become accustomed to the swimming pool
↑ Rate of force development	↑ Team Cohesion
↑ Reaction time	
↑ Flexibility & joint range of motion	
↑ Elasticity of connective tissue	
↓ Risk of Injury	

Warm-Up Structure

- Dependent on situation
 - What's in the training session?
 - Anaerobic? Aerobic?
 - Start of competition day?
 - Just before a race?
- Basic structure:
 - Stretching (dynamic, not static or ballistic)
 - Ensure you're already warm (tracksuit on)
 - Gentle non specific
 - General aerobic swimming (start F/C, but incorporate a range of strokes for warming-up different muscles)
 - Higher intensity specific
 - Geared towards the first hard section of session
 - May not be a clear definition between W-up & session

Warm-Up Key Points

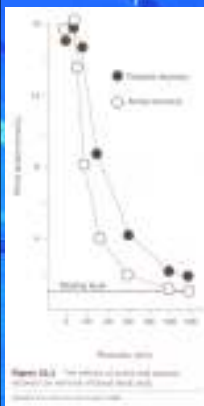
- Warming-up very important in both **training & competition**.
- Don't overdo it → test intensities during training.
- Start general, get more specific.
 - E.g. Before fin swimming, start whole body finish legs only
- All physiological effects of a warm-up are lost after 45mins, some are lost after just a couple of mins.

Cooling Down

- What is the aim of a cool down?
 - The cool-down gradually reduces the body temperature and heart rate and speeds the recovery process before the next training session or competitive experience.
 - One of the most important and neglected post race & post training procedures for swimmers. (Maglischo, 2003)



Cooling Down



- Prevents blood pooling, through maintaining elevated venous return.
- Maintains elevated minute ventilation.
- Speeds up the removal of blood lactate and other metabolic waste to pre-exercise levels.
- Therefore, increased speed of recovery.

- When? → after any training, where physical activity levels are above light and competitive swimming.
- What? → Start moderate, progress to low intensity. 5-20mins length. Static stretching 5-10mins

Starts & Turns

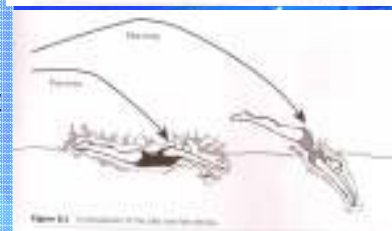
- Often neglected, yet IMPORTANT to success.
 - Diving and turning with fins requires lots of practice
 - Can make big difference
- Research on elite swimmers found:
 - Dive practice decrease time by minimum of 0.10s
 - Turn practice 0.20s per length
- Turns become more important for short course
- Response time = reaction time + movement time
 - Attention focus → link with warm-up
 - Needs to be well learnt so no thinking time.



Starts & Turns

- Key starting points:
 - On take your marks command, you should tense up like a coiled spring (stretch reflex)
 - Flight time is important but don't try to go too far (3-4m)
 - Hands should enter first and rest of body follow the 'hole' made.
 - Maintain streamline until near surface, first pull should be controlled but powerful to break through surface.
 - Go deeper when fin swimming

DON'T BREATHE FIRST STROKE



Starts & Turns

Starting with a Manikin



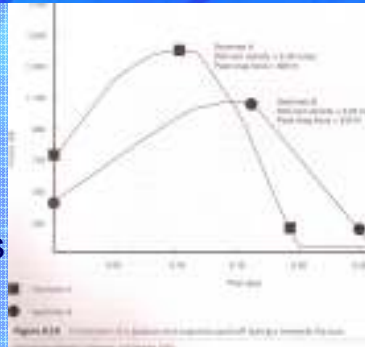
Key points:

- Manikins \neq hydrodynamic
- Keep inline with body
- Manikin in as horizontal position as possible.
- Ensure you can bend your knees enough to push off powerfully.



Starts & Turns

- Key turning points:
 - Fast in helps fast out!
 - Explode off wall in quick powerful motion
 - Treat every turn in practice as if real
 - Don't come up too soon
 - swim under surface turbulence.
 - Kick hard out of turn
 - Constant action, no pauses
- DON'T BREATHE FIRST STROKE**



Take Over's

- **Key Rule:** you can be diving before swimmer touches the wall, but must have contact with block.
 - In medley relay final leg, competitor must have hold of wall with one hand.
- Start techniques used are different
 - See Maglischo (2003) or other high quality swimming coaching guide.
- Finishing swimmer must NOT slow down before touching.
- If there is no starting block, pre-plan which side you are going to swim/take over.



Performance Analysis

- What is performance analysis?
 - Objective feedback to a performer to try to get a positive change in performance.
 - Key for improving performance
 - Does not always have to be scientific



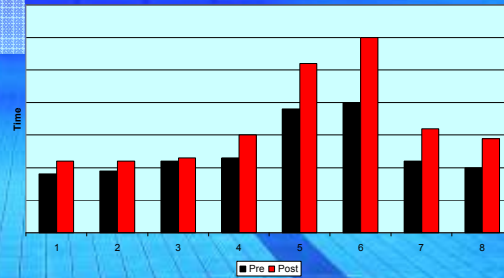
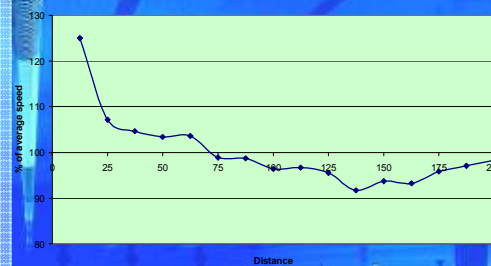
Performance Analysis

- Designing your own test:
 - Is it **repeatable** is it **valid**?
 - Repeated easily to measure success?
 - Try to ensure all other variables are the same, so any changes in results are solely down to the performance.
 - Try to get as many measures as possible.
 - E.g. Rope throw: coil time, throw time, pull in time
 - Record all your results so that you can compare over time.
 - One test will not show any trends
 - You can often do this after a race using video footage.

Performance Analysis

Example:

- 200m Obstacle race
 - Need two stopwatches
 - Record time every 12.5m
 - Record time 5m pre & post every obstacle



Performance Analysis

Design your own:

Group 1: 100m Manikin Tow & 4 x 50m Obs

Group 2: 50m Manikin Carry & 200m Super Lifesaver

Group 3: 100m Manikin Carry & 4 x 25m Manikin carry

Key texts and guides

- Maglischo, E. W. (2003) *Swimming Fastest*. Champaign, IL: Human Kinetics.
- Sweetenham, W. and Atkinson, J. (2003) *Championship Swim Training*. Champaign, IL: Human Kinetics.
- Inett, R. (2005) *Lifesaving Sport: A Technical Manual For The Sport Of Lifesaving*. Broom, UK: RLSS UK
- SLSA Australia (2005) *High Performance Fitness Testing Protocols*. Available at:http://www.slsa.com.au/site/_content/resource/00001374-docsource.pdf