

# Effectively Improving Technique of Developing Swimmers

Ryan Atkison, MSc, CSCS

Sport Biomechanist

Canadian Sport Institute Ontario



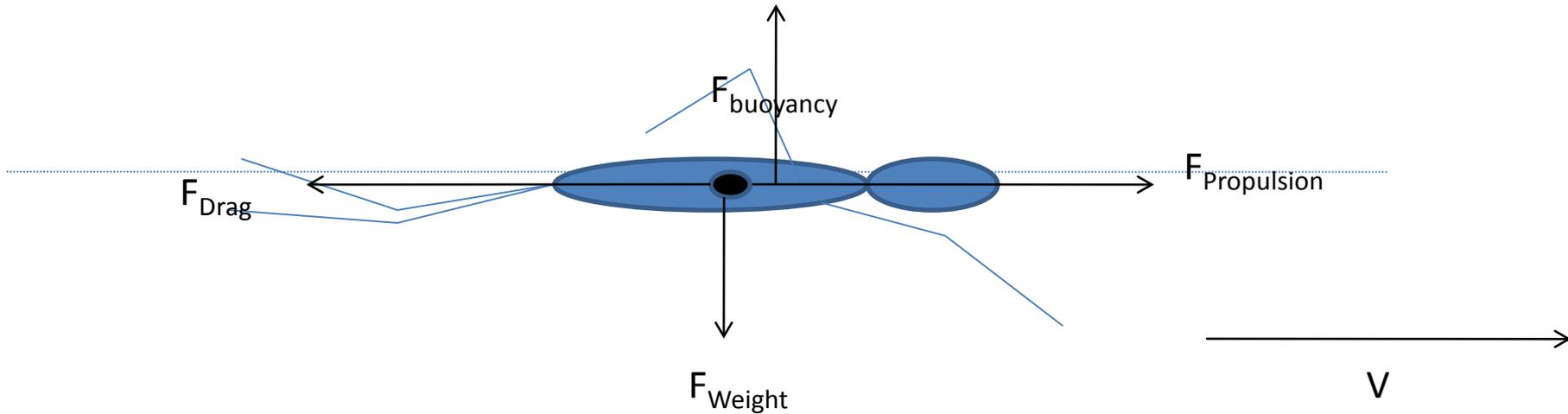
# Effectively Improving Technique of Developing Swimmers

- \*Traditional swimming training does not result in positive changes in technique<sup>1,2</sup>
- ‘Deliberate practice’ strategies are essential to develop expert skill performance<sup>3</sup>
- \*Deliberate practice in swimming can result in significant technique improvements<sup>4,5,6</sup>

**\*When compared over a 4-8 week macrocycle**

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# Forces in Surface Swimming



- Must minimize resistive drag forces to fully realize future gains in propulsion

# Quantifying Swimming Technique

## – Passive Drag

- Resistance produced during gliding
- Quantified using towing techniques & computer simulations

## – Active Drag

- Resistance produced by swimmer moving through the water
- Quantified using tethered or towing techniques & computer simulations

## – Propulsive forces

- Amount of force imparted by the swimmer onto the water during a stroke cycle
- Quantified using pressure sensors & computer simulations

# Purposeful Practice

- Clear Instructions
- Appropriate Task Difficulty & Complexity
- Sufficient number of Repetitions
- Appropriate Task Variety
- Effective Feedback
- Evaluate

# Clear Instructions

MONA - Optimal Breaststroke Technique

**Stroke**  
FL BK BR FR

**Head Cue**  
See pool wall above surface

**Arm Phase**  
Outward Pull - Inward Pull  
Transition

**Arm Cue**  
Feel elbows stay near surface  
as hands move together

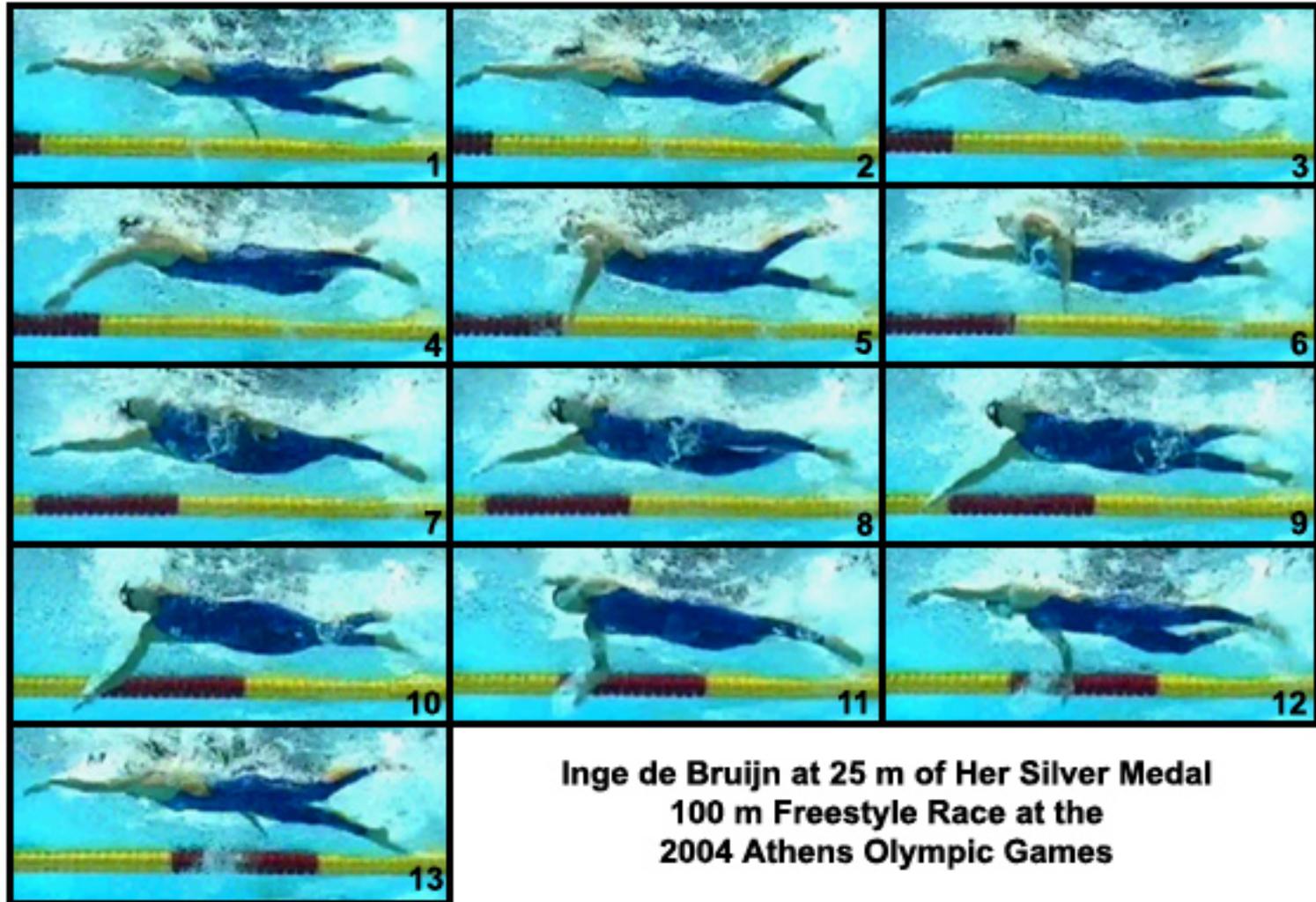
**Leg Phase**  
Recovery

**Leg Cue**  
Feel legs straight with toes  
pointed

**Notes**  
Lift head only enough to get  
mouth above surface

EXIT MONA

# Clear Instructions



# Clear Instructions

## Underwater and Breakout Checklist:

- Glide before first kick/underwater pull
- Small, fast kicks (like a fish)
- Kick in both directions!
- Maintain strong streamline position
- Maintain kick tempo through breakout (or quickly transition to flutter kick)
- Begin first pull with your bottom hand
- Maintain a neutral head position during streamline and breakout

# Complexity

**Blocked Practice:** practicing one skill continuously for a set of practice attempts before practicing another skill (i.e. practice dives and swimming separately)

**Random Practice:** Alternating between two or more skills or variations on each practice attempts (i.e. practice dives and swimming together)

- Blocked practice more effective for beginners or for new skills<sup>1</sup>
- Random practice more effective for intermediate-advanced swimmers or familiar skills<sup>1</sup>
- Difficulty needs to increase as skill level increases<sup>2</sup>

# Repetitions

- Require many *perfect* repetitions to effect a change
- Practice capacity depends on development level<sup>1</sup>
  - *Be aware of mental fatigue* (i.e. unable to execute desired technique)
  - Plan for and provide appropriate mental and physical breaks

# Variety

- Teach to a variety of learning styles (VARK)<sup>1,2</sup>
- Multi-modal approach to teaching technique (videos, pictures, checklists, classroom/poolside instruction, kinesthetic tools, etc.)<sup>1,2</sup>
- Avoid too much variety in a single session (conflicts with repetition)<sup>1,2</sup>

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# Feedback

- Augmented feedback better than conventional learning techniques<sup>1</sup>
- Focus on positive aspects of a performance<sup>2,3</sup>
- Concurrent feedback best for short term performance gains, poor for long-term retention<sup>4,5</sup>
- Delayed feedback best for long-term retention, poor for short term performance gains<sup>6</sup>
- ↑ feedback frequency for complex skills, ↓ for simple skills<sup>7</sup>
- Feedback reliability more important than specificity or accuracy<sup>8,9,10</sup>  
(accuracy becomes more important as skill level ↑<sup>11</sup>)
- External focus cues better than internal<sup>1</sup>

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# Evaluation

- Evaluate technique by referring back to models
- Demonstrate improvements over time
  - Checklists, pictures, videos, etc.
- Evaluate your programming
  - i.e. Did streamline glides improve after 6-week focus?*
- *Don't just rely on speed/times* as improvements can also be due to growth, physical development, etc.

# Coach Tips

- Cues and drills appropriate for the *cognitive* and *physical* development and *skill* level of the swimmer
- Difficulty needs to increase as skill level increases
  - Stack learned skills
- Use your resources
- Vary your perspective
- Refer back to your models
- Ensure athletes remain focused *on the task*
- *Avoid over-coaching*

# Example #1

14-year old backstroker recovers arms to side:

Cue: “See arm recover toward ceiling”

Set 1\*:  $n \times$  16 x 25 Drill ^ @30/45  
100 play

Feedback:

- Review head-on video after even 25s
- Provide focus cues to help direct attention
- *Practice, think, watch/assess, repeat*

\*Structure is very simple in early stages

# Example #1

14-year old backstroker recovers arms to side:

Cue: “See arm recover toward ceiling”

Set 2\*:  $n$  x      12 x 25 Drill ^ @30/45  
                         2 x 50 Swim @1:00/1:30, >6 UDK  
                         100 play

Feedback:      - Review head-on video after even 25s & 2<sup>nd</sup> 50  
                         - Provide focus cues to help direct attention  
                         - *Practice, think, watch/assess, repeat*

\*If improvement seen then add complexity/challenge

# Example #2

24x 11 & 12 swimmers, developing catch-phase in freestyle

Drill: Dog-Paddle Catch Drill – Focus on establishing catch position

Cue: “See fingertips point toward pool bottom”

Set 1\*: 4x            2x 25 Drill^ head-up @1:00, :15 apart  
                         6x 25 Drill^ head-down @1:00, :15 apart

Feedback:

- Show video of expert to group
- 2x25 internal cues (visual from swimmer)
- 6x25 swimmers watch the next swimmer from UW & provide feedback (rotate positions each round)
- Remind group every round with appropriate focus cues

\*Structure is very simple in early stages

# Example #2

24x 11 & 12 swimmers, developing catch-phase in freestyle

Drill: Dog-Paddle Catch Drill – Focus on establishing catch position

Cue: “See fingertips point toward pool bottom”

Set 2\*: 4x            2x 25 Drill^ head-up @1:00, :15 apart  
                          3x 25 Drill^ head-down @1:00, :15 apart  
                          3x 25 Swim with perfect catch @1:00

Feedback:

- Show video of expert to group
- 2x25 internal cues (visual from swimmer)
- 6x25 swimmers watch the next swimmer from UW & provide feedback (rotate positions each round)
- Remind group every round with appropriate focus cues

\*Swimmers that demonstrate success integrate into swim for last 2x25 at coach discretion