This is What's Up

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Freestyle: the Catch

- The catch is critical
- The catch is directly related to pull width
  - Pull width is directly related to rotation
  - A high head position makes the catch easier

Freestyle: Breathing

- The timing of the breath is just as important as head position
  - It can lead to a good head position
  - Direct implication on the opposite arm catch

Freestyle: Kicking

- Knees have to bend to have a good kick.
  - I have never seen anyone kick too big or too deep
  - Follow-through (extend) in front of the body
  - Hip flexors
- 2- or 6-beat kicks only.
  - 4- or 8-beat kicks are abnormal and asymmetrical.
- Kicks pausing or crossing is often caused by rotation/breath.

Freestyle: Rotation

- The stroke is much more on stomach than on side
- Rotate shoulders FORWARD and around
  - Not side-to-side
- A swinging recovery isn't bad technique.
  - Dislike the stigma around the term "straight arm"

Freestyle: Shoulder Injuries

- Many shoulder injuries happen because of hyperextension
  - Repetitive motion of flawed technique, not just repetitive motion
- Hyperextension: Shoulder is extended past the scapular plane
  - Back and upper-arm have to match up
    - At point of arm entry and catch
    - Transition from finish to recovery

Freestyle: 15m stats

- Men's 100 free
  - Top 8 performers: 5.4 – 5.8 sec, avg: 3.5 strokes
  - 5.4 sec – Cielo: 3 strokes, Moore: 1 stroke
  - 5.8 sec – Magnussen (relay, semi, final)
- Women's 100 free
  - 9 of top 10 performers: 6.1 – 6.5 sec, avg: 3.3 strokes
  - Breakout dist: 9.5 – 14.5m
    - Fastest four: 12.5 – 14.5m, 7 – 10 kicks
  - 2011 World Champions
    - Ottesen: 6.1 sec, 9 kicks, 13m
    - Herasimenia: 6.5 sec, 4 kicks, 9.5m

Freestyle: Men's 100 free

- Top 8 performers: 47.49 – 48.15
  - Top 3 performances: Magnussen, 47.49-47.63-47.90
- Cycle Counts: 32.0 – 37.0 (Mags: 33.0 – 33.5)
  - 1st 50: 14.0 – 17.5 (Mags: 15.0)
  - 2nd 50: 15.5 – 20.0 (Mags: 18.0 – 18.5)
- Tempo:
  - 1st 50: 1.05 – 1.31 sec/cyc
  - 2nd 50: 1.13 – 1.32 sec/cyc

Freestyle: Men's 100 free

- To swim a 48.0, generally looking at 23.0/25.0
- Magnussen & Phelps swim very similar races
  - Out controlled, back fast.
  - Mags out 6th, 10th, 11th fastest. Phelps out 12th.
  - Mags back 1st, 2nd, 3rd fastest. Phelps back 4th.
  - 1st and 2nd 50 tempos only vary ±0.01 sec/cyc
  - Slowest tempos on 1st and 2nd 50's
  - 7.8 seconds in last 15m

Freestyle: Women's 100 free

- 9 of top 10 performers: 53.45 – 54.05
- Cycle Counts: 35.0–43.5 (Ottesen: 37.0, Herasimenia: 42.5)
  - 1st 50: 16.5 – 20.5 (Ottesen: 17.0, Herasimenia: 19.5)
  - 2nd 50: 18.5 – 23.5 (Ottesen: 20.0, Herasimenia: 23.5)
- Tempo:
  - 1st 50: 1.05–1.21 s/c (Ottesen: 1.19, Herasimenia: 1.09)
  - 2nd 50: 1.11–1.25 s/c (Ottesen: 1.17, Herasimenia: 1.16)

Freestyle: 400m free

- Men: 17 textile performances under 3:43
- Women: 24 textile performances under 4:05
  - 12 in 2011 alone

	Men's 400m	Women's 400m
Negative split	29% (5 of 17)	29% (7 of 24)
	2 of top 3 performances	6 of top 12 performances
Descend last 300m	53% (9 of 17)	67% (16 of 24)
Ascend first 300m	47% (8 of 17)	33% (8 of 24)

Breaststroke

- Driving the **body** forward is what great breaststrokers do
  - Not necessarily best pullers or kickers
- Speed is dictated by glide time and heel speed.
  - Not by pulling faster or harder.

Breaststroke: the Pull

- The pull/recovery transition is key
  - Look for quickness. Quickness is a product of the body too.
- The pull pattern must be rounded and circular
  - This is the best way to activate the body surge.
  - The arms can get in the way. Keep elbows apart.
  - No direct backward force applied on the water.
    - Not the strongest pull. Overall speed is what matters.
- It's ok for the elbows to come next to the body
- Pulling hips forward?

Breaststroke: Timing

- The sequence/timing is:

  (1) pull

  (2) arm recovery/kick set-up

  (3) kick

  - Not simulataneous or “kicking the hands forward”

Breaststroke: Kick

- Feet must set up wider than the knees for the best kick
  - Most common deficiency is kicking around, and not pushing back
- Knees typically about shoulder width; some people wider
- A sharp thigh angle (or deep knee) is fine
  - Priority is in generating the most force
  - Drag trade-off is ok
- Heel speed / kick set-up speed

Breaststroke: Pullout

- Body line is the absolute priority
- Put kick where the line stays best
  - For most people, it's after hand separation and before pull down
- A big dolphin kick isn't necessarily best

Breaststroke: Stats

- Men's 100m observations
  - 18 performances (8 individuals) under 1:00 since 2010
    - 58.71 – 59.98
  - Average 3.6 second difference between 1st and 2nd 50
  - Cycle count: 38 – 43 cycles
    - 1st 50: 17 – 20 cycles
    - 2nd 50: 20 – 23 cycles
    - Average 3 cycle difference between 1st and 2nd 50
  - Tempo: 1.1 – 1.3 sec/cyc
    - 2nd 50 tempo faster than 1st 50 (7 of 8 swimmers)
    - Tempo sped up on 2nd 50 (12 of 15 performances)

Backstroke

- The catch is critical
- The catch is directly related to rotation timing
  - Rotation timing is directly related to the finish
    - Connect the finish to the opposite entry

Backstroke

- Rotation timing is what matters
  - The catch!!
  - Corrects most issues with hand entry – too narrow or entering with back of hand
- How much rotation is not important
  - Above water: Shoulders stay next to face
  - Underwater: Shallow catch and pull is good!
    - Just under the surface

Backstroke: 15m Stats

Athlete	Time	# kicks	b/o dist	strokes
Coughlin (11 Worlds f)	6.8	11	14.75	0
Zhao (11 Worlds f)	6.9	11	14.50	1
Coughlin (11 Worlds r)	6.9	12	14.75	0
Coughlin (11 Worlds sf)	6.9	11	14.50	1
Seebohm (11 Worlds)	7.1	11	14.00	1
Terakawa (11 Worlds)	7.1	13	14.00	1
Koga (10 Pan Pacs)	6.0	10	14.00	1
Thoman (10 Pan Pacs)	6.1	11	14.00	1
Grevers (10 Austin GP)	6.2	9	14.00	1
Stravius (10 Euros)	6.2	--	14.50	--
Peirsol (10 Nationals)	6.3	11	14.50	1
Lochte (10 Pan Pacs)	6.3	8	14.00	1
LaCourt (10 Euros)	6.3	9	13.50	1

Butterfly

- Drive body forward
- Press forward with chin and chest
  - Chin not tucked, head not diving down

Butterfly: the Catch

- The catch is critical, but much harder than free
- Looking forward makes it easier
- Have to initially go wide after entry/extension

Butterfly: Kicking

- Two kicks, equal in power and size
- For the exit kick (2nd kick), the knees need to drive down, otherwise feet go way out of the water

Butterfly: Pull Pattern

- Teach to push water back, don't teach a particular pull pattern
- Pull pattern dictated by how deep someone presses their chest/body
  - Deeper press → wider catch → narrow finish
  - Shallow press → shoulder-width catch → pull straight back

Dolphin Kick

- The power from the kick comes from the legs (quads), and stabilized by the core
- Knees must bend to set-up the kick
- Follow through and finish the kick in front of the body

Dolphin Kick: Hips/body

- Aim to minimize hip movement, purely so the kick moves the body forward, not up or down
- Upper body movement varies among the best
  - Nearly everyone has a distinct “stretch” with the upper body at the finish of each kick

Dolphin Kick: Back v. Front

- Kicking on your back is much easier to have good technique because the up-kick keeps the swimmer underwater.
- Kicking on your stomach, the down-kick pushes the swimmer toward the surface. In order to stay underwater, the optimal technique for speed is compromised with a lot of hip movement.

Dolphin Kick: Tempo

- Looking at 9 of the best dolphin kickers over 18 races, the average tempo of their kicks off the start is between 0.37 – 0.47 seconds per kick
  - Crocker, Pelton, Grevers, Phelps, Coughlin, Thoman, Lochte, Irie (JPN), Shields
- In the future: larger sample, differentiate by stroke, gender, 100/200 event, start v. turn

Dolphin Kick: Transitions

- Off the wall
  - Kicks immediately off the wall, 2-3 while rotating
- At the breakout
  - Dolphin kick during the first pull

Filming Equipment

- Sanyo VPC-WH1

- iPad w/ SD card adapter

Front Start

- Use arms to pull body forward and down, aim low and forward, hit water with a good line
- With wedge:
  - Don’t have to lean back as much
  - Try the wedge at the front settings first, and then move it back to find the best setting for you
    - …as opposed from trying from the last setting first
- You HAVE to use side handles whenever available

Backstroke Start

- Push away from the wall
  - Flat walls more so than gutter walls
  - Higher foot placement allows better backward push
- Hands/arms go over the top
- Try different back angles on set-up