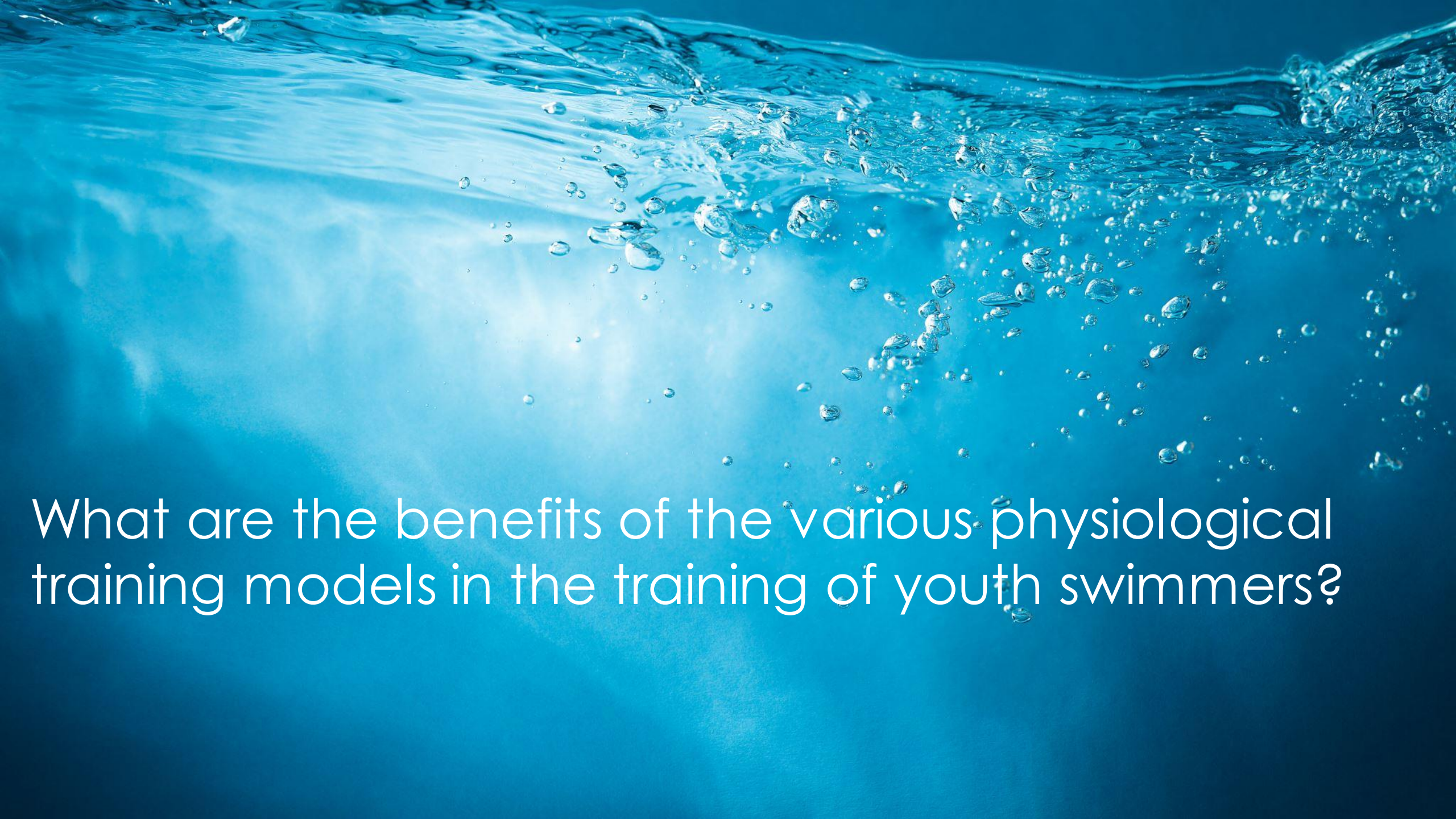


What are the benefits of the various physiological training models in the training of youth swimmers?

Last Week

- What is Physiology
- What is training adaptation
- 3 Energy Systems & how they are stimulated through training classification

- Linear Sequence
- Block Periodization
- Reverse Periodization
- Concurrent Periodization

This Week

1. USRPT
2. Jan Olbrecht
3. John Urbancheck
4. Long Term Athlete Development
5. Athlete considerations
6. Effects of coronavirus (Bowman & Troy)

The 3 Energy Systems used in energy production

- **ATP-PC:** Produces a large amount of energy very quickly (10 seconds)
- **Glycolytic System:** Breaks down Carbohydrates to produce energy (10 seconds to 2 minutes)
- **Aerobic System:** Produces energy with oxygen and glucose stores for up to 90 minutes.

Energy System Classification

Training Zones	British Swimming	Descriptions	Adaptations
1	A1	Aerobic Low Intensity	Fat Metabolism & slow twitch recruitment
2	A2	Aerobic Maintenance	Improves cardio-respiratory system
3	A3	Aerobic Threshold	Enhances Lactate removal
4	AT	Anaerobic Threshold	Development of Aerobic capacity
5	VO2 / Critical Speed	Aerobic Overload	Improves VO2max & aerobic power
5	LP	Lactate Production	Enhance rate of glycogen production
5	LT	Lactate Tolerence	Develop the ability to tolerate lactate (acidosis)
5	Speed	Basic Speed	Improve Alactic energy production, neuromuscular coordination & fast twitch muscle recruitment

Aerobic v Anaerobic training Considerations

Importantly the body draws on all three energy systems regardless of the type of effort. Percentage of each system is adjusted according to the intensity of the activity

Increased aerobic training will reduce anaerobic adaptations

Increased anaerobic training will reduce aerobic adaptaions

All training models are essentially a balance of these classification

They differ through:

How many types of modality are used	How much training is delivered within each modality	Timing of each modality within the cycle

Physiological Training Models

Linear Sequencing

	A1-AT	VO2 Max	LP/LT	Speed
General Prep	60%	0%	5%	5%
Specific End	55%	0-10%	5-10%	5-10%
Pre-Comp	55%	2-5%	5-10%	5-10%
Taper	55%	0-5%	5%	5-10%
Variance for Individual athletes				

Block Periodisation

	A1-AT	LP/LT	Speed
Accumulation Phase:	85%	12%	3%
Transmutation Phase:	75%	15%	10%
Realization Phase:	80%	8%	12%
Variance necessary for individual athletes			

Reverse Periodisation

	A1-AT	LP/LT	Speed
Teathered Training:	60%	20%	20%
Ultra-short Training:	65%	20%	15%
Competitive Training:	75%	15%	10%
Taper	75%	15%	10%

Concurrent Periodisation

	A1-AT	LP/LT	Speed
Concurrent:	80%	10%	5%

USRPT (Ultra Short Race Pace Training)

- Physiological model
  - Only swim at your goal race pace or faster in practice
  - Essentially a focus of training around 1 modality of training
  - USRPT takes race splits and asks the swimmer to repeat in training. When a time is missed they miss a repetition.
  - Also aims to re-produce race skills
  - Programme designed to improve 50m & 100m events
  - Requires the completion of 2-3 'sets' per session over 10 sessions per week.

USRPT (Ultra Short Race Pace Training)

- Season Progression
  - Single cycle based
  - Progression based on missing fewer times
  - Essentially a concurrent programme of delivery
  - High intensity work with recovery stresses the ATP-PC and Glycolytic System.

USRPT (Ultra Short Race Pace Training)

	A1-AT	LP/LT	Speed
Concurrent:	0%	50%	50%
Can adjust based on athlete			

USRPT (Ultra Short Race Pace Training)

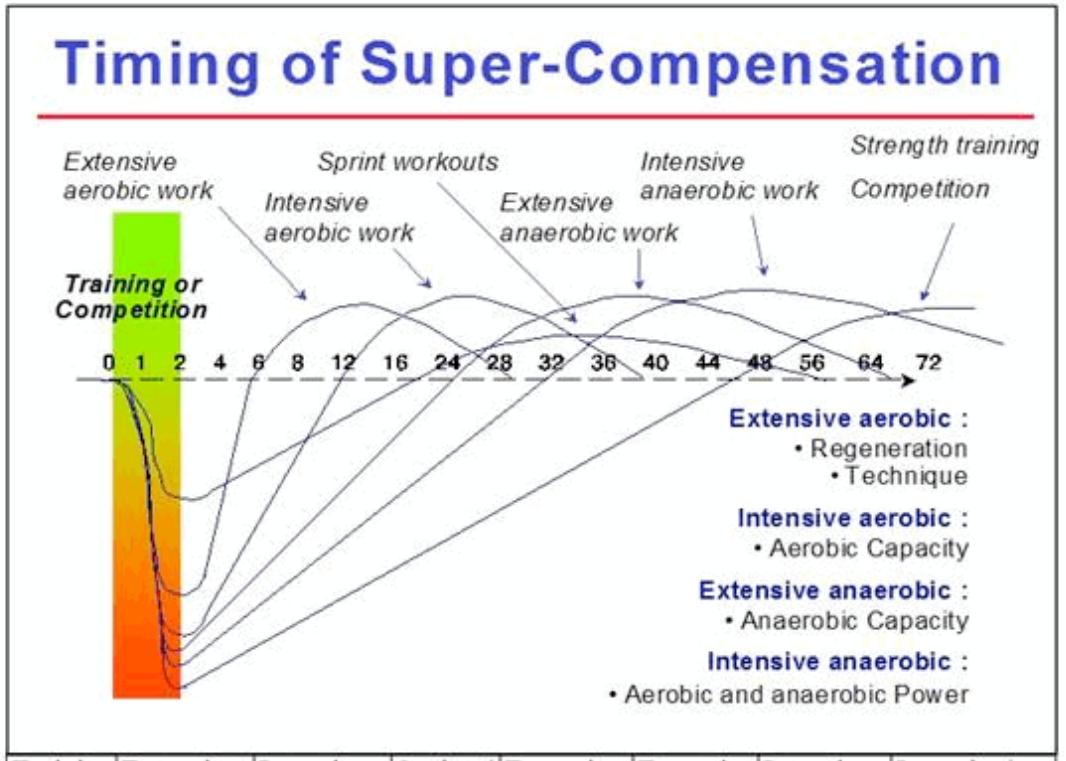
- Consideration:
  - Positive for race practice
  - Reduce skill breakdown throughout training

  - Questionable Science back-up
  - USRPT has essentially become a ‘brand’
  - Only 1 modality of training being developed can increase drop-out and burnout
  - Includes no land training
  - Very hard to run in a club environment (everyone needs times)

Jan Olbrecht

- Based on scientific and individual testing to prescribe training.
- Anaerobic & aerobic test to establish which needs development at which time in any training cycle. Believes in stimulation of capacities.
- Capacity v Power
- Polarized training

Jan Olbrecht



Training types	Extensive Endurance	Intensive Endurance	Sprints/ Short Sets	Extensive Anaerobic Training	Extensive Strength Training	Intensive Anaerobic Training	Intensive/ Strength Training/ Competition
From	8	24	30	36	40	40	48
To	12	30	40	48	60	60	72

Jan Olbrecht

	11-12	13-14	15-16	17-18	19-20
Aerobic Endurance	1-2	2	2	2-3	2-3
Aerobic Capacity	1	1-2	1-3	1-3	1-3
Anaerobic Capacity	1	1	1-2	1-3	1-3
Aerobic Power			1	1	1-2
Anaerobic Power		1	1-2	1-2	1-3
Sprint Training	2-3	2-3	2-3	2-4	3-5
Technique	2-3	2-3	2-3	1-3	1-3

Jan Olbrecht

- Considerations
  - Individualized programme to maximize each swimmer's potential
  - Low impact programme so low injury risk
  - Provides a lot of opportunity for technical work
  - Provides a progressive programme through age groups to senior swimming

  - Does rely on scientific testing that can be expensive
  - Required huge commitment from the athlete

John Urbanchek

- Physiological model
  - Training Intensities are established from Lactate tests, interval sets & continuous steady state swims (T30)
  - Famously colour coded training intensities

ZONE	TITLE	DESCRIPTION
RECOVERY	EASY	Cool down & recovery sets. Typically done after race pace and sprint sets.
EN1	MODERATE	Warm up & drill sets. Pace that could be swum for long durations where maintaing stroke technique requires concentration.
EN2	ENDURANCE	Cruise pace; can be held for extended periods of time. Breathing and stroke are rhythmic and become strained after ~ 10 minutes.
EN3	THRESHOLD	Short rest; edge of aerobic threshold. Pace that is primarily taxing your VO2 Max system. Can be maintained for only 5-10 minutes.
SP1	BEST AVERAGE	Extremely hard efforts that can be maintained for the duration of the total set's distance.
SP2	RACE PACE	The maximum pace that can be held for a single repitition of a set; lactate.
SP3	SPRINT	Focus on speed, power, and tempo; taxes the neuromuscular system. Cannot be maintained for more than 60 seconds.

John Urbanchek

- Season Progression
  - Three training cycles:
  - 1. 6 weeks aerobic & skills, 6 weeks of aerobic, anaerobic threshold, VO2 Max & Lactate then compete
  - 2. 3 weeks aerobic, 10 weeks of all training zones
  - 3. 3 week taper: reduce from 70,000m per week to 30,000 – 20,000m per week

John Urbanchek

ZONE	TITLE	Set Distance (m)	Set Duration (min)	HR (% of max)	Work : Rest	Sample Set (Advanced Swimmer)
RECOVERY	EASY	Variable	Variable	< 70	N/A	600 Easy Free
EN1	MODERATE	1,000 - 4,000	≥ 15	70 - 80	20 - 30 Seconds Rest	6 x 400s Free @ 10 Seconds Rest
EN2	ENDURANCE	600 - 2,000	10 - 40	80 - 90	15 - 30 Seconds Rest	4 x 300s Free @ 15 Seconds Rest
EN3	THRESHOLD	400 - 1,600	6 - 30	90 - 100	10 - 30 Seconds Rest	4 x 150s Free @ 30 Seconds Rest
SP1	BEST AVERAGE	200 - 600	2 - 15	95 - 100	2:1 - 1:1	6 x 50s Free Race Tempo @ 45 Seconds Reset
SP2	RACE PACE	200 - 600	4 - 12	100	1:2 - 1:4	4 x 50s Free Race Pace @ 90 Seconds Rest
SP3	SPRINT	25 - 100	1 - 2	100	1:3 - 1:4	4 x 25s Free Max Speed @ 60 Seconds Rest

John Urbanchek

- Considerations
  - Colour system makes it easier for swimmers to understand the intensities they should be training at.
  - Very deliverable in a club environment
  - Season layout is more akin to University programme but can be adapted.
  - Built on a strong aerobic foundation then sharpened towards major meets

Long Term Athlete Development

- Physiological Model
  - 5 General phases of chronological training (FUNdamental, Learn to train, Training to train, Training to compete, Training to win)
  - Each training phase looks to maximise 'windows of opportunity' through growth and maturation.
  - Each phase provides detailed progression for the athlete
  - Designed to maximise performance in the long term not short
  - Aims to reduce dropout through encourage late specialisation

Long Term Athlete Development

- Train to Compete
  - Female 14-16 years, Male 15-18 years. (train to Compete)
  - Sports specific training all year round.
  - High volume, increasing intensity.
  - Period of peak strength development.
  - Compete in range of events (strokes or distance).
  - Emphasis on optimum preparation by modelling training and competition.
  - Develop individual strengths and weaknesses.
  - 16-24 hours pool time
  - 3-4 hours land training

Long Term Athlete Development

- Considerations:
  - Developmental & progressive model
  - Clear segmentation of roles and progression
  - Based on scientific research and targets development progression

  - Need to consider that this is not an individualised programme
  - Due to the length of the programme it's relatively unproven

Consideration: Who?

- Athlete maturation (biological)
- Athlete emotional maturity
- Pool space
- Athlete to coach ratio's
- Male v Female
- The Athletes next steps (i.e. does your programme align with other squads, clubs or universities)

Considerations: Event

Distance	ATP-PC	Glycolytic	Aerobic
50m	38%	58%	4%
100m	20%	39%	41%
200m	13%	29%	58%
400m	6%	21%	73%
800m	4%	14%	82%
1500m	3%	11%	86%

- And future potential need to be considered

What are the best in the world doing?

- Dick Shoulberg:
  - Strong base goes a long way in developing a career foundation
  - High-volume workouts that emphasize all four strokes
- Bill Rose:
  - The over-distance approach pays the best dividends
  - Allows swimmers to perform better at a later age

What are the best in the world doing?

- Gregg Troy
  - More volume = more commitment
  - Over-distance
  - Lifetime mileage base matters for planning late career training
  - Must isolate one aspect of swimming to improve that area
- Bob Bowman
  - Capacity training prepares you for tomorrow, utilization training prepares you for 'next week'

What are the best in the world doing?

- Michael Lohberg:
  - Aerobic-base & gradual buildup
  - Aerobic threshold development through lactate testing
  - Always believed in his athletes
- Jon Urbanchek:
  - Believes in aerobic system and keeping it simple
- Teri McKeever:
  - Believes in variety
  - Asks swimmers feedbacks
  - Writes 'unique' sets to keep it interesting

Periodization on return from lockdown

- Bowman: 4 Olympic Teams & 18 Gold Medals
- Troy: 4 Olympic teams, 68 Olympic swimmers & 16 Olympic Medals

Any Questions?

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