ADVANCED EXERCISE TECHNIQUES

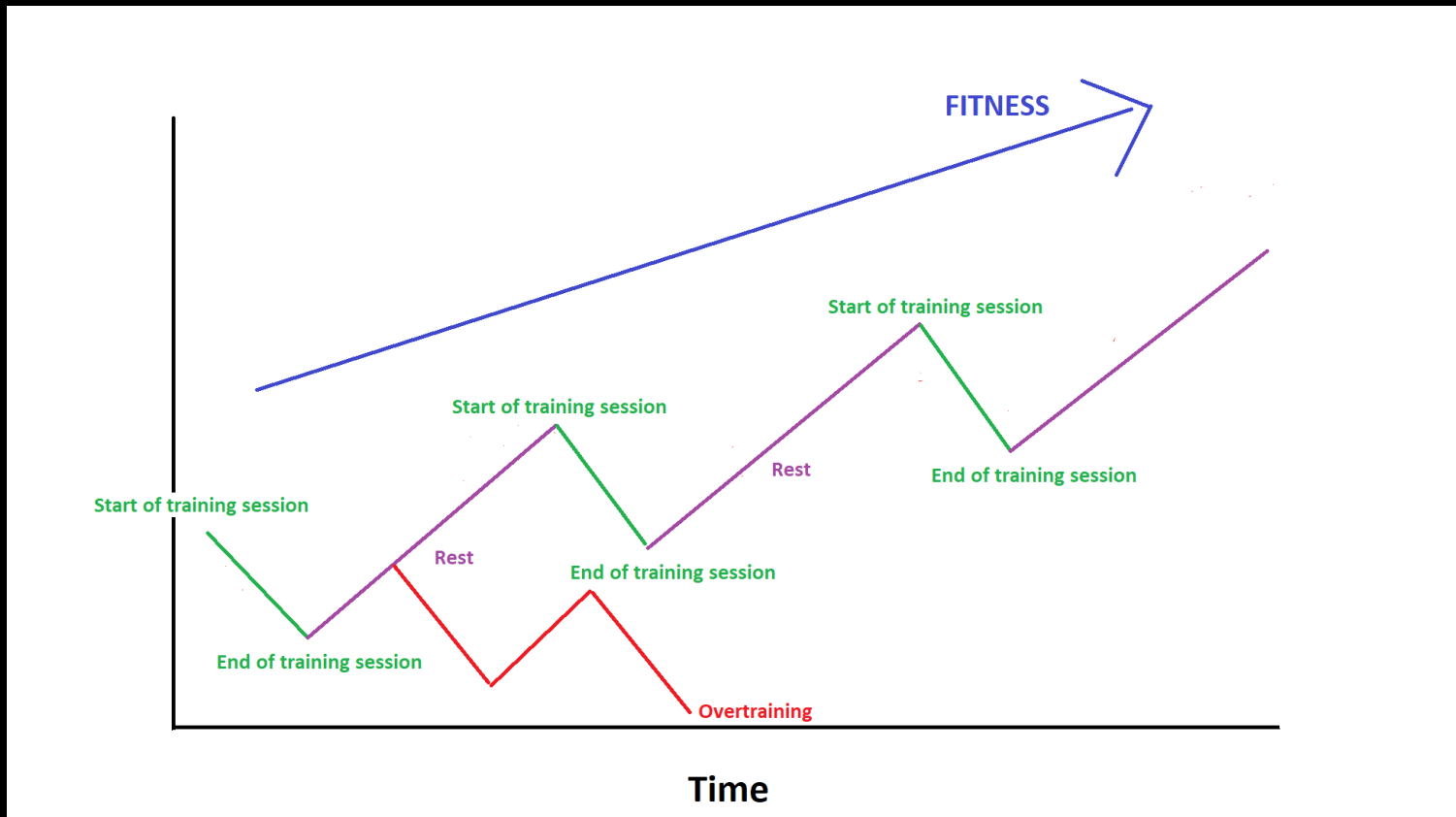
Practical Strategies to Help You Break Through Your Fitness Plateaus

WHO IS THIS SESSION FOR?

- Individuals who already exercise regularly
- People who are looking to go faster, farther or get stronger
- People who are bored
- This session is NOT intended for individuals who are currently inactive and are just looking to get started.

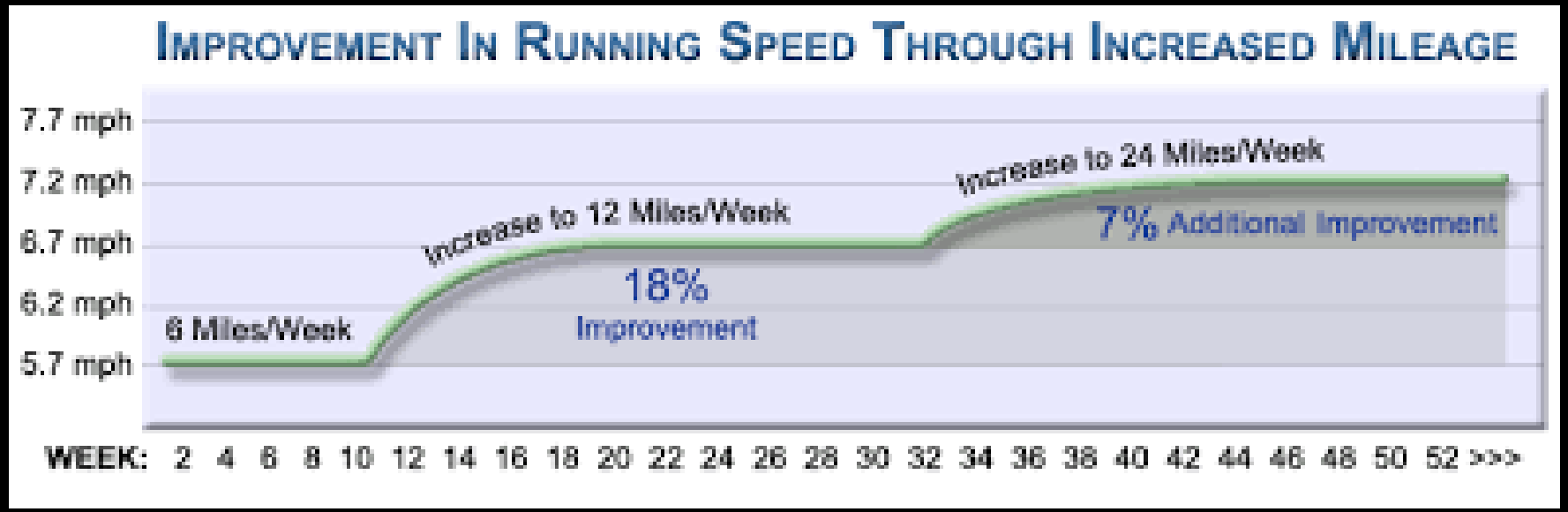
HOW TO GAIN FITNESS

- The body breaks down during a training session
- During rest the body rebuilds and supercompensates
- GOAL: Next training session at the peak of supercompensation.
  - Too soon = overtraining
  - Too late = excessive soreness, limited fitness gains



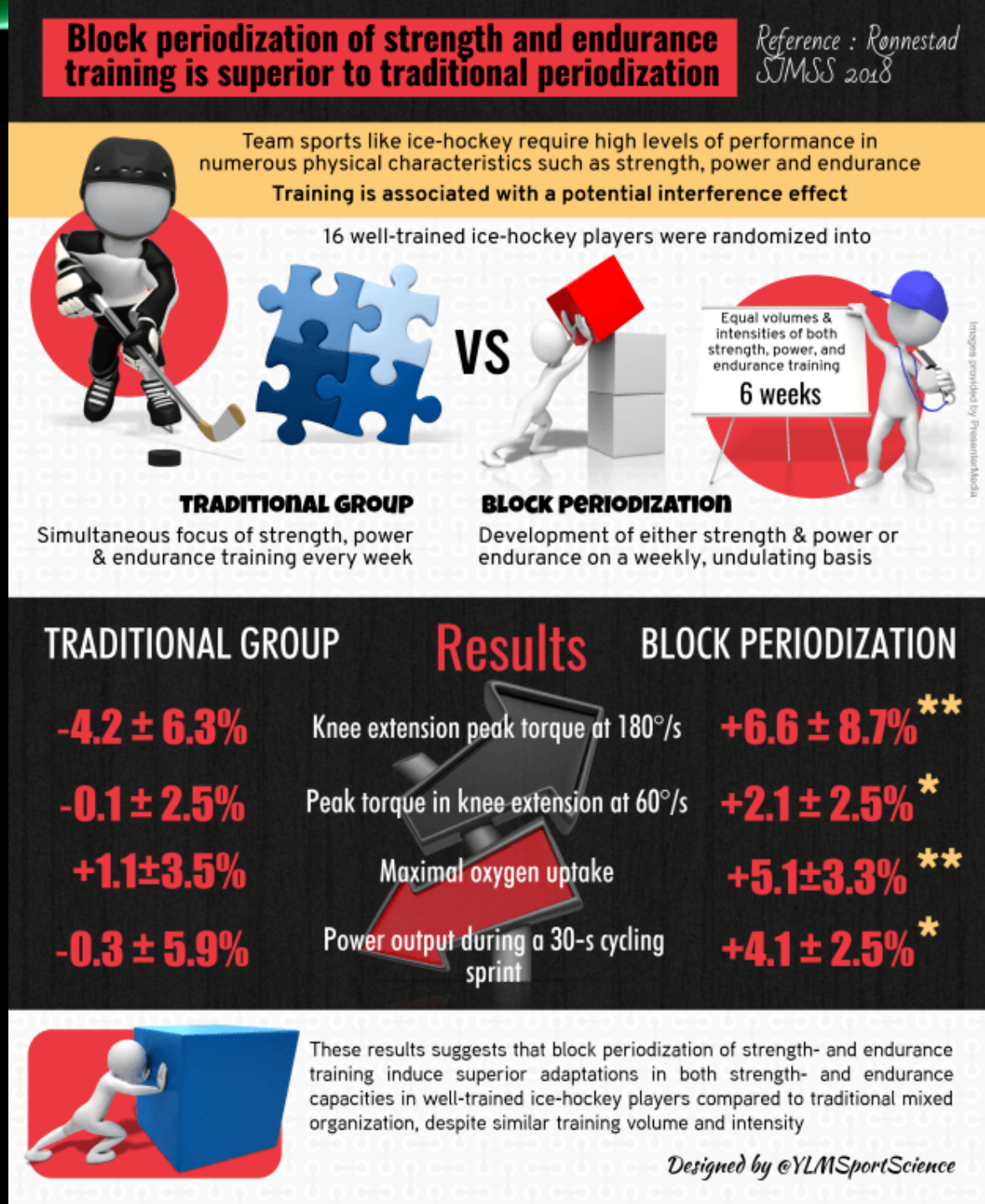
DIMINISHING RETURNS

- Body adapts to stimulus via supercompensation, over time this leads to diminishing returns and eventual plateau
  - The solution – increase frequency/intensity, or introduce a different stimulus.



PERIODIZATION

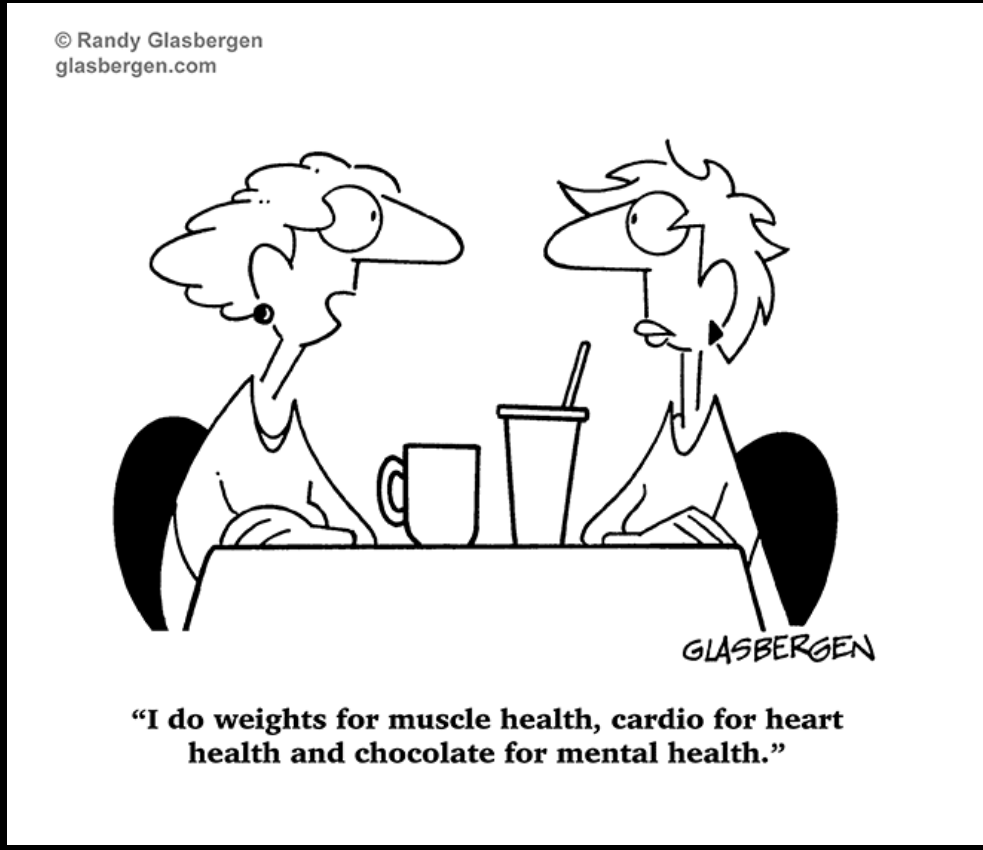
- AKA as "muscle confusion."
- Cycle the focus of your workouts so that the body needs to continually respond to a stimulus.
- Systematic planning of workouts to peak for a specific time frame or event.



FITT PRINCIPLE

- Frequency
  - Sessions per week
- Intensity
  - % of maximum
- Time
  - Duration of exercise
- Type
  - Isometric, eccentric, ballistic
  - Machines, dumbbells, bands

- Manipulate variables to stimulate a response



https://www.glasbergen.com/womens-fitness-cartoons/

	Months	October					November				December					January				February				March				April				May				June				July				August				September			
	Weeks	1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	4	11	18	25	4	11	18	25	1	8	15	22	29	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26	2	9	16	23
Calendar of Comptitions	Domestic																																																		
	International																																																			
	Location																																																			
Periodisation Plan	Training Phase																																																		
	Strength																																																			
	Endurance																																																			
	Speed																																																		
	Macrocycles																																																		
	Microcycles	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
	Weight - Reps																																																		
	Weight - Sets																																																		
	% Intensity																																																		
	Volume Load (kg)																																																		
	Sprint Work (% Intensity)																																																	
	Peaking Index																																																		
	Testing Dates																																																	

Blank periodization template:

http://www.anb.ca/page.php?content=Yearly%20Periodization%20Templates

Strength and Conditioning 12-13

Annual Periodised Training Programme

Case Study Assignment

Month	January					February				March				April				May					June				July					August		September			October					November				December			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
Comp phase + Training phase macro	In season																																																		
Meso Cycle	6									7	8	9		10					11		12		13	14		15	16		17		18	19		20					1		2			3		4		5		
Intensity 1-5	3	3	3	3	3	3	3	3	3	3	3	4	4	4	5	5	5	5	2	2	2	3	4	2	2	2	3	3	2	2	2	2	2	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3
Volume 1-5	4	4	4	4	4	4	4	4	4	4	3	5	5	5	4	4	4	4	3	3	2	3	3	2	2	2	3	3	2	2	2	3	3	1	1	1	1	1	1	2	2	2	2	3	3	3	3	3	3	3	4	3
Peaking 1-9	4									5				6					7								8					9		7			2				3					4						
Testing																																																		
Goals																																																		
In Pool	Build aerobic fitness, increase techincal ability through drill work									Mild taper	Competition in order to gain times/assess fitness		Increased volume at lactate threshold, technical drills performed at speed		High quality speed work across all four strokes				Taper down for major comp		First major comp: assess performance/gain national qualification times		Speed sets working at race pace		Taper down for major comp		Second major comp: aim for SB in event		Short speed sets, focus on techincal ability and tactical pacing			Taper down for major comp		Final major comp, aim for PB and final		Low intensity work, recover from previous competitions			Low volume, low intensity, no training structure					Assess technical ability				Implement new drills to improve from last season, medium sets at low intensity				Increase volume of sets				Increase intensity of sets, build speed work				Increase volume at medium intensity, assess techincal ability/speed			
In Gym	Maintain power & muscular endurance, 1 RM & Multiple RM tests									Mild taper	Competition in order to gain times/assess fitness			Maximum strength				Convert to power & muscular endurance					Taper down for major comp		First major comp: assess performance/gain national qualification times			Maintain power & muscular endurance		Taper down for major comp		Second major comp: aim for SB in event			Maintain power & muscular endurance		Taper down for major comp		Final major comp, aim for PB and final		Low intensity work, recover from previous competitions			Low volume, low intensity, no training structure					1RM & multiple RM tests, FMS				Anatomical Adaptation				Maximum strength				Maximum strength				Convert to Power & Muscular endurance, 1RM & Multiple RM tests			

Taper period

Competion

Training camp

Recovery period

Testing blocks

KEY PRINCIPLES

- Focus on one aspect at a time:
  - Volume (ie km/wk, sets, reps, sessions/wk)
    - Improves endurance
    - Less rest between sets (60-90s)
  - Intensity (ie intervals, %1RM)
    - Improves strength
    - More rest between sets (2-5min)
  - Power (ie hill sprints, box jumps)
    - Force over time
  - Technique/Specificity (ie race pace, race terrain, Olympic Lifts)
    - Prepare for competition, increase efficiency

VOLUME

- Max increase 10-15%/wk
  - Cardio - Total distance or time/wk
    - Increase fat metabolism
    - Increase efficiency
    - Increase blood flow to muscles
    - Strengthen connective tissue
  - Resistance - Total weight lifted, # of sets or # of reps
    - Increase blood flow to muscles. “Muscle pump”
    - Time under tension

VOLUME WORKOUT EXAMPLES

- Base building phase for runners.
  - 6-12 week easy build to max volume (distance/wk)
  - Include one faster workout per week, or at least add some strides.
- German Volume Training for body builders.
  - https://www.strengthsensei.com/german-volume-training-introduction/
  - 10x10, alternating opposing muscle groups
- Sheiko
  - 3x/wk, tons of sets.
  - https://www.powerliftingtowin.com/sheiko/

INTENSITY

- Over 80% of VO2max or HRmax
  - HR Zones 4 and 5
  - https://www.polar.com/blog/running-heart-rate-zones-basics/
  - Most people should limit to 20% of total training volume
  - Improves lactate clearance, running economy, speed endurance

- Increase %1RM
  - Less reps, higher weight
  - Muscle density, motor unit recruitment

- Rep Speed
  - Tempo training or eccentric training
  - Cross-bridge loading

INTENSITY WORKOUT EXAMPLES

Cardio

- 6x 3min hard, 2-3min easy
- 15x 1min fast, 1min jog
- 10x 400m @5km race pace, 200m jog recovery

Strength

- 5x5 program (Stronglifts app)
  - https://stronglifts.com/5x5/#gref
  - Crossover between volume and intensity, for intermediate lifters
- 5-3-1
  - http://www.powerliftingtowin.com/beyond-531/
  - https://exrx.net/WeightTraining/Powerlifting/531

POWER

- Force production over time
- Increase Type II recruitment, tendon stiffness, neuromuscular adaptations
- Closely linked to body weight

- Examples:
  - Acceleration
  - Jumping
  - Olympic Lifting

POWER WORKOUT EXAMPLES

- Hill Sprints (20s or less) with full recovery (2-5min)
- 40 yard dash
- Olympic Lifts
  - Highly technical so they also cross over into the technical/specificity phase
- Training for power
  - https://www.t-nation.com/training/how-to-train-for-power

TECHNIQUE/SPECIFICITY

- Incorporate more target race pace
- Simulate race terrain
- Simulate competition environment
  - Equipment
  - Nutrition/hydration
  - Climate
  - Trouble-shooting
- Focus on technique to become more efficient
- Be careful! Too much time in this phase will make you feel stale/flat

TECHNIQUE/SPECIFICITY EXAMPLES

- Training runs on the race course
- 30km run, with 2x 8km at race pace
- Integrate specific competition warm up sequence for power lifting or Olympic lifting competition
- Focus on nutrition/hydration
  - Before, during and recovery

SPORT NUTRITION

- Pre-Exercise
  - Goal: optimize performance and limit GI discomfort
- During Exercise
  - Goal: optimize performance and limit GI discomfort
- Post-Exercise
  - Goal: optimize training gains and reduce recovery time to enable higher training volume/intensity

NUTRITION FOR MUSCLE GROWTH

Nutritional interventions to augment resistance training-induced muscle hypertrophy

Designed by @YLMSportScience

Protein dose

Ingest 0.4 grams of protein per kg per meal to optimally stimulate muscle protein synthesis

Timing of Protein Ingestion

Ingest proteins throughout the day (e.g. 20 grams each 3-4h) and a larger dose pre-sleep (40 grams casein or up to 0.6g/kg/meal) to augment both acute muscle protein synthesis and chronic muscle adaptations

Protein Quality

Post-exercise muscle protein synthesis is optimized by protein ingestion that contains a high leucine content where proteins are rapidly digested (i.e.,whey)

Zzzz

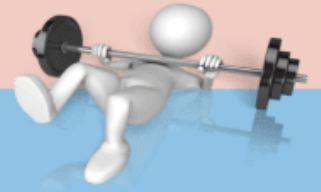
The ingestion of casein may be more effective at sustaining muscle protein synthesis and possibly at attenuating negative net protein balance over longer periods

Protein & Carbohydrate Co-ingestion

While ingestion of carbohydrates post-exercise would be necessary to replenish depleted glycogen stores, there is no strong need to recommend carbohydrates on top of protein to be consumed post-exercise to maximize muscle protein synthesis

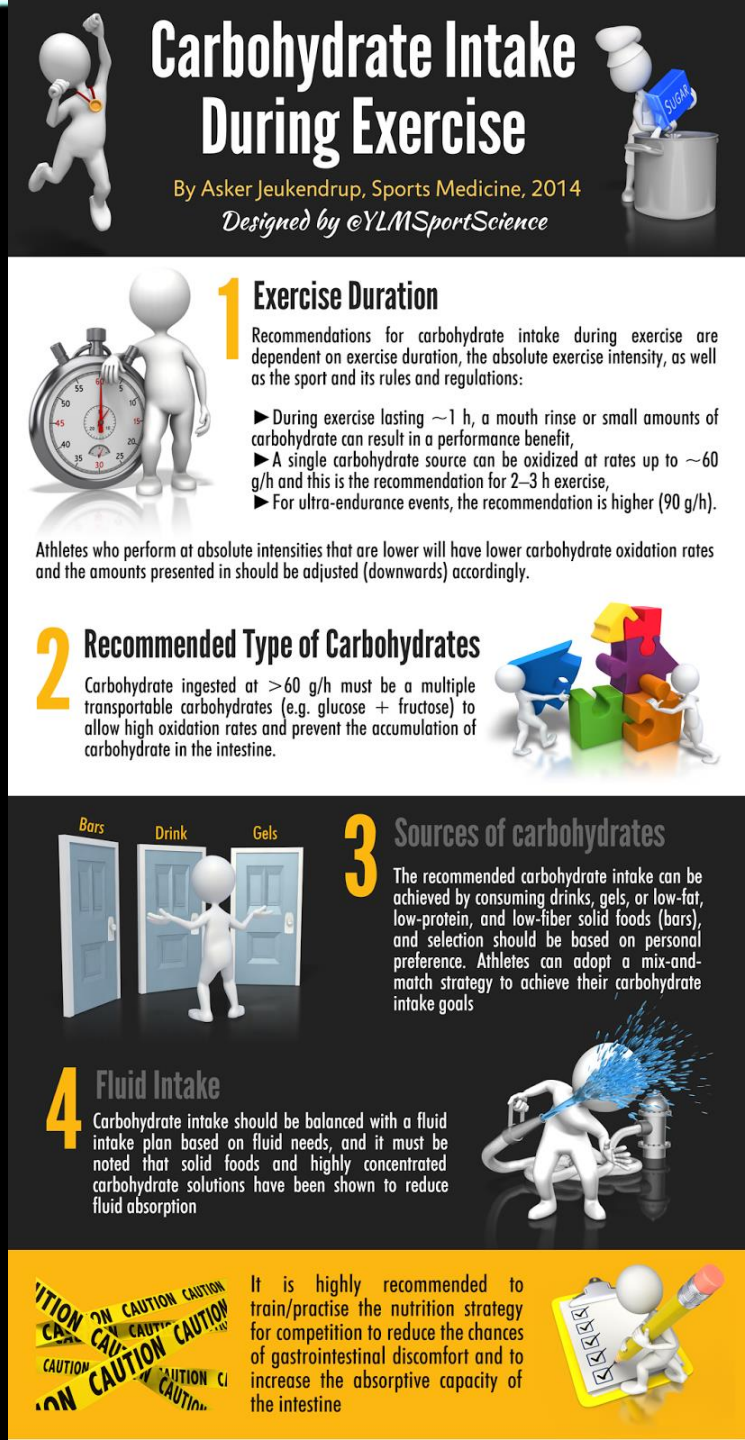
Resistance Exercise Program Variables and Training

Instead of any particular medley of resistance exercise variables, muscular hypertrophy is fundamentally driven by maximal motor unit recruitment and exercising until contractile failure



Reference: Robert W Morton, Chris McGlory & Stuart Phillips, in Frontiers in Physiology, 2015

GUIDELINES FOR CARBOHYDRATE INTAKE DURING EXERCISE



POST-WORKOUT NUTRITION

https://www.bodybuilding.com/content/the-importance-of-post-workout-nutrition.html

- 1g CHO/kg of bodyweight
  - More for endurance athletes
- 0.4g PRO/kg of bodyweight
  - High leucine (whey)

- Goals
  - Reduce protein breakdown (catabolism)
  - Increase protein uptake (anabolism)
  - Refuel (liver and muscle glycogen stores)
  - Rehydrate (water and electrolytes)

RESOURCES

- Books
  - Periodization – Tudor Bompa
  - Daniels' Running Formula – Jack Daniels
- All Topics
  - YLM Sport Science – infographics on all the latest sport studies
  - EXRX – exercise library and educational resources.
- Nutrition
  - Precision Nutrition - articles
- Weight Lifting
  - Power Lifting to Win - programming
- Endurance Training
  - Mcmillan Running – article library
  - Jason Koop with CTS – blog posts on all things endurance