

DAY 2

PROGRESSION FOR STRENGTH: NEEDS ANALYSIS

- *Specificity is contingent on the physiological objectives for time frame being examined.*
 - Increases in strength are not a direct physiological adaptation but the *ability to express* multiple adaptations
 - What type(s) of adaptations are we biasing at a given moment within a periodized plan?

	Volume/Hypertrophy	Intensity/Neurological	Tapering/Max Strength expression
Intensity of Load (% 1 RM)	moderate	moderate-high	moderate-high
Avg Intensity of Effort (RPE/RIR)	~1-3 RIR	~1-4 RIR	~1-5 RIR
Set Volume	highest	moderate	low

PROGRESSION FOR STRENGTH: PROACTIVE STRATEGIES

- **Preplanned increases in the absolute training stress**
 - Usually via an increase in reps, load, sets, or combination
 - With strength goals, load progression is often the weapon of choice due to the benefits of higher intensities on strength outcomes.

- **Benefits**
 - Stimulus progression is inevitably occurring
 - Can increase self awareness for performance capabilities/accuracy of RIR
 - Novices/anyone who has a tendency to “sandbag”
 - New exercises where proficiency can improve significantly session to session

- **Drawbacks**
 - Does not account for daily readiness
 - Recovery
 - Rate of adaptation
 - Potential increased injury risk if athlete is inadequately adapted

PROGRESSION FOR STRENGTH: REACTIVE STRATEGIES

- Reactive strategies aim to “match” desired stimulus with individual’s state of readiness (including rates of adaptation)
 - Helps us to capitalize on when readiness is higher and scale back when readiness is lower.
 - Generally still includes a planned “avenue” for progression (reps, load, etc)
 - magnitude of increase is generally autoregulated (often via RPE/RIR)

- Benefits
 - Accounts for daily readiness
 - Often an easier diagnostic assessment of efficacy

- Drawbacks
 - Requires quite a bit of objectivity w/ capabilities for a given day.
 - This is especially true if only provided with a rep and RPE pairing (e.g. top set)

REACTIVE PROGRESSION W/ FIXED LOAD INCREASES

- Can use regular load increases to promote strength adaptations, while still scaling overall stimulus with daily readiness.
 - Neural adaptations and skill acquisition
 - Confidence/familiarity moving progressively heavier loads
 - Load dependent connective tissue adaptations

SETS	REPS	LOAD	EFFORT (RPE/RIR)
Variable depending on goal/phase	Perform up to assigned RPE/RIR or avg velocity stop Ex: Reps up to 7-8 RPE	Preplanned increases/range for increase based on warmups Ex: +10 lbs/session	Can climb or remain static. Either way, it is predetermined. Ex: ~7-8 RPE
Wk 1 Top set: <ul style="list-style-type: none">● 400 lbs x 4 @ 8 RPE (e1RM ~478 lbs)	Wk 2 Top Set <ul style="list-style-type: none">● 410 lbs x 3 @ 7.5 RPE (e1RM 482 lbs)	Wk 3 Top Set <ul style="list-style-type: none">● 420 lbs x 3 @ 8 RPE (e1RM 487 lbs)	Wk 4 Top Set <ul style="list-style-type: none">● 430 lbs x 2 @ 7.5 RPE (e1RM 490 lbs)

RPE/RIR Targets

HOW CAN TRAINING CLOSE TO FAILURE IMPACT THE TRAINING STIMULUS?

Acutely (within a set)

- ↑ Metabolic cost
- ↑ MU recruitment (in relation to the resistance)
- ↑ perceived discomfort

Residually (btwn sets & sessions)

- ↑ muscle damage (1)
- ↑ neuromuscular fatigue (1)
 - Peripheral
 - Central
- A reduced capacity for performance can limit ability to impose desired stimulus in subsequent sets/sessions.

Takeaway: We should train in a manner which aims to maximize the conceptual adaptation:stimulus ratio across a given timeframe.

1. Refalo, M. C., Helms, E. R., Hamilton, D. L. & Fyfe, J. J. Towards an improved understanding of proximity-to-failure in resistance training and its influence on skeletal muscle hypertrophy, neuromuscular fatigue, muscle damage, and perceived discomfort: A scoping review. *J Sports Sci* 1–23 (2022)

HOW DOES GOAL IMPACT THE MANAGEMENT OF RPE/RIR?

- RIR needs to be managed within the context of the other important variables for a goal.
 - Hypertrophy
 - Balanced combination of resistance, effort per set, and # sets
 - Given the loading is generally more moderate, proximity to failure should likely be within ~ 4 RIR on most sets.
 - Strength
 - Biased towards load, total force output per rep, and # sets
 - Heavier loading requires greater MU recruitment out of the gate, which means peripheral fatigue contributes less to that end
 - Maximizing force output per rep can benefit from training a bit further from failure (and potentially increasing sets)
 - As bar speed slows across a set, HTMUs may be producing more force, but TOTAL force output will be less when acceleration is less with a given load.
 - Metabolic
 - Can benefit from higher effort per set (lower RIR) , higher reps, and increased density of sets (less rest between)

WORK CAPACITY:

Definition and acute influential variables

- Defining work capacity
 - The ability to sustain/replicate force output for a given task over a given amount of time.
 - Within session
 - Session to session
 - How well is performance maintained across sets?

- What can acutely impact work capacity within a session?
 - Rest intervals
 - Proximity to failure
 - The closer each set is to failure, the more fatiguing it will be, and generally the lower our ability to perform as well in subsequent sets.
 - Muscle glycogen levels
 - Degree of influence is going to be largely dependent on rep range

WORK CAPACITY:

How can a low work capacity negatively affect the stimulus?

- Fatigue between sets can lead to less mechanical tension in subsequent sets, *despite similar “effective reps”*.
 - Example:
 - Set 1: 100 lbs x 12 @ 2 RIR
 - Set 2: 90 lbs x 12 @ 2 RIR

WORK CAPACITY:

“Making the right read”

- If acute work capacity is high:
 - Progressing in effort is a good option
 - If progressing to lower RIRs results in more robust dropoff then consider option below:
- If acute work capacity is low(er):
 - We can to limit the drop-off in performance by scaling back RIR and making up that decrease in per set stimulus by adding sets.
 - May potentially also limit residual fatigue through reductions in muscle damage
 - Can then work your way back up using effort progressions

SHOULD SET PROGRESSION BE PRIORITIZED OVER LOAD/REP PROGRESSION?

- Some have proposed weekly set progression should be prioritized over load progression (%1RM).
 - Crux of argument for (1):
 - Dose response relationship has been shown between set volume and hypertrophy (2)
 - Similar hypertrophy can be observed across a wide spectrum of loading ranges (3)
 - Therefore, if load doesn't matter, and set volume does, should we focus more on set volume progression?
 - Claim that a reduction in reps and increases in load are likely suboptimal for hypertrophy (1).
 - As we adapt our Minimal effective stimulus and optimal stimulus increases and we therefore will benefit from increasing volume
 - Arguments against (4):
 - The research showing a dose response for volume is comparing two or more cohorts with different volume prescriptions across the same period of time. They are *not* examining the effects of volume increases *within that period of time*. To date, no study examining this actual question has been performed.
 - Absence of evidence is not evidence of absence.
 - Lack of evidence to support that reductions in reps and increases in load are increasingly fatiguing, or decreasingly stimulative (e.g, 10RM to 8 RM to 6 RM referenced).
 - *Potential* increase in injury risk
 - Diminishing rates of hypertrophy with additional sets

1. Israetel, M., Feather, J., Faleiro, T. V. & Juneau, C.-E. Mesocycle Progression in Hypertrophy: Volume Versus Intensity. *Strength & Conditioning Journal Publish Ahead of Print*, (2020).

2. Schoenfeld, B. J., Ogborn, D. & Krieger, J. W. Dose-response relationship between weekly resistance training volume and increases in muscle mass: A systematic review and meta-analysis. *J Sports Sci* **35**, 1073–1082 (2017).

3. Schoenfeld, B., Grgic, J., Ogborn, D. & Krieger, J. Strength and hypertrophy adaptations between low- versus high-load resistance training: A systematic review and meta-analysis. *Journal of strength and conditioning research* (2017).

4. Minor, B., Helms, E. & Schepis, J. RE: Mesocycle Progression in Hypertrophy: Volume Versus Intensity. *Strength & Conditioning Journal Publish Ahead of Print*, (2020).

WHEN MAY AN ADDITION OF SETS WARRANTED?

- In situations of low acute work capacity (as discussed earlier)
- Is performance improving *over time*?
 - If YES, then we know we are likely operating at or above the stimulus threshold.
 - Stimulus threshold is influenced by degree or prior adaptations/capacity NOT acute prior performance
 - If NO, then first audit factors that influence recovery
 - Sleep
 - Energy balance
 - Protein intake
 - Stress
 - Training stimulus (are you perhaps doing too much?/need a deload?)
 - If recovery is in check, then you may want to consider increasing set volume
- If you are feeling healthy, and know you are already operating below optimal set volume for a given movement, effort, rest intervals, etc.
 - Practical ways to assess this on the fly?