

Tendon Health for the Specialized Athlete

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Thank you!

“Gratitude is the
wine for the soul.
Go on. Get
drunk.”

RUMI

thegoalchaser.com

Main Take Aways

- Think about sports as collision management
- High Velocity Training/Movements increases RFD & Performance, makes tendons stiffer, and increases risk of muscle pull
- Tempo'd Strength Training decreases RFD & Performance, decreases stiffness at MTJ, and increases health of tendon
- Where is the balance?

Collision Management

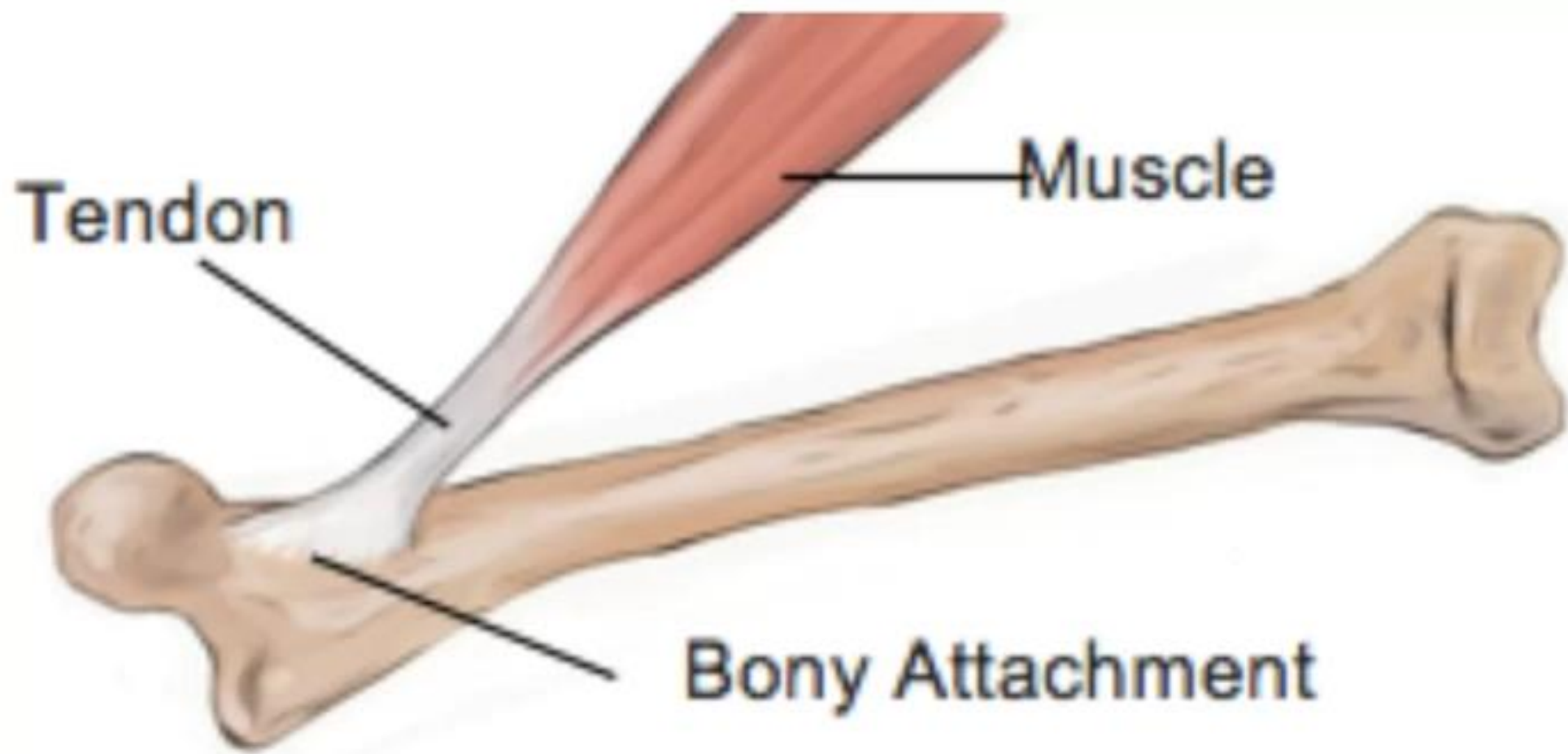
- Avg. GRF = 3 – 5 x BW
- Football collisions equate to 350 – 400 lbs of force
- Contact with Ball = 250 – 300 lb of force

- I believe it's a coach's responsibility to prepare athlete for the collisions they will have on the field and in life.
- Are you vulnerable enough to do a self-assessment on your programs?

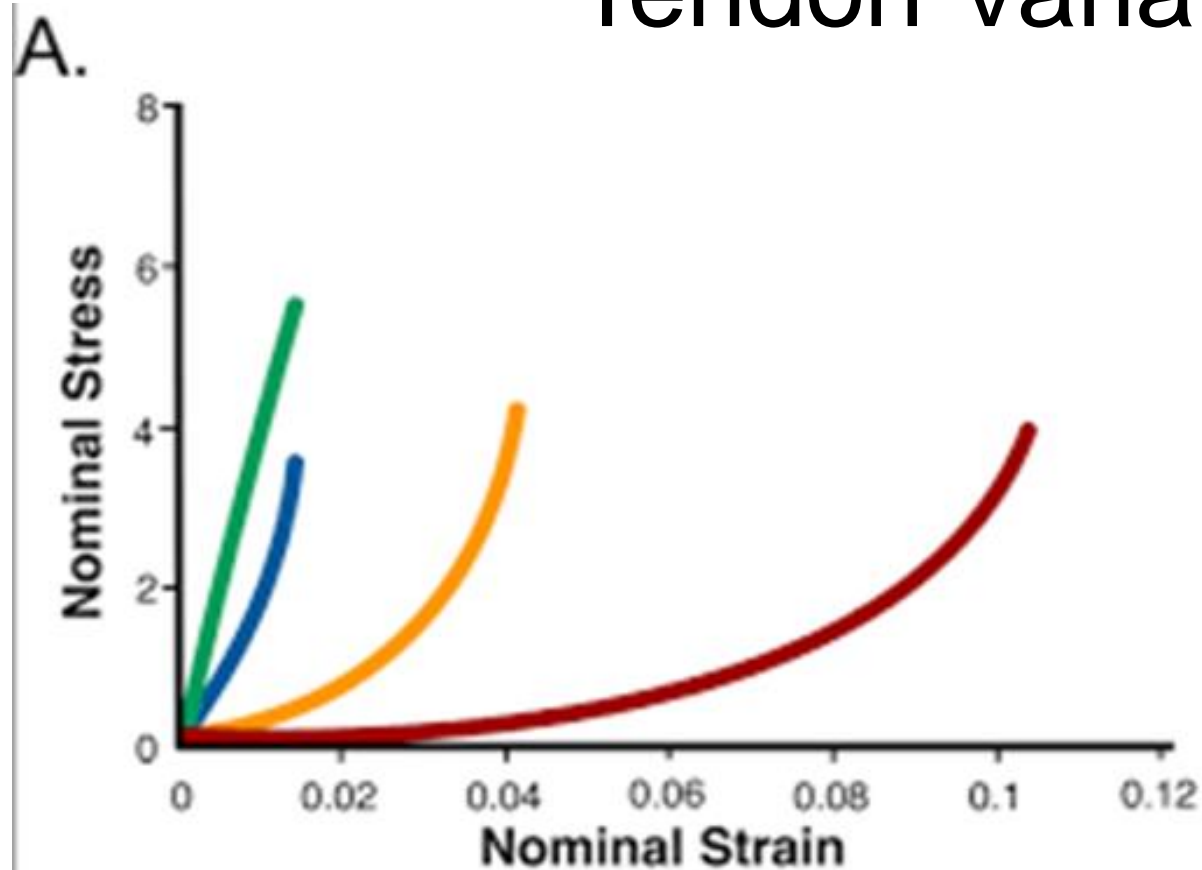
Car Collision Management

- Crumple Zones
- Adaptive Headlights
- Collision Avoidance
- Automatic Braking
- Lane Awareness





Tendon Variation



- PMCID: PMC5371618

Crumple Zones (Tendon Stiffness)

- RFD/Transfer of force is determined by the stiffness of tendons (Stiffer equals quicker)
- Stiffness is determined by # of crosslinks
- Crosslinks are built through high velocity movements
- Crosslinks are broken through tempo'd strength training

Power = Force x Velocity

- New equation
 - Stiffness = Tempo'd Strength Training x Max Velocity/Speed/Sport work
- Strength Training Breaks Crosslinks
- Velocity adds crosslinks
- If tendon is stiffer than muscle is strong, Pop goes the weasel

Warmup = Collision Prep

- Prepare For Collisions with the Ground
 - Foot/Calf/Ankle (Triple Extension)
- Prepare for Collisions with the ball or other athletes
 - (Kinesthetic Awareness) – Lane Awareness, Automatic Braking
- Prepare for unseen obstacles
 - (Neurological Prep) – Adaptive headlights, Collision Avoidance

Spring Ankle Work

- Find The Tripod
 - Big Toe Awareness
 - Adapt and Adjust to what you're feeling
-
- Cal Dietz & Chris Korfist (Spring Ankle Model)







Kinesthetic Awareness

- Patterning – G,H, Contralateral QL
- Glute Isometrics
 - Side plank hip thrusts
- Contralateral Control
 - Vector Torso Strap Hip Airplanes
- Adapt & Adjust to what your feeling



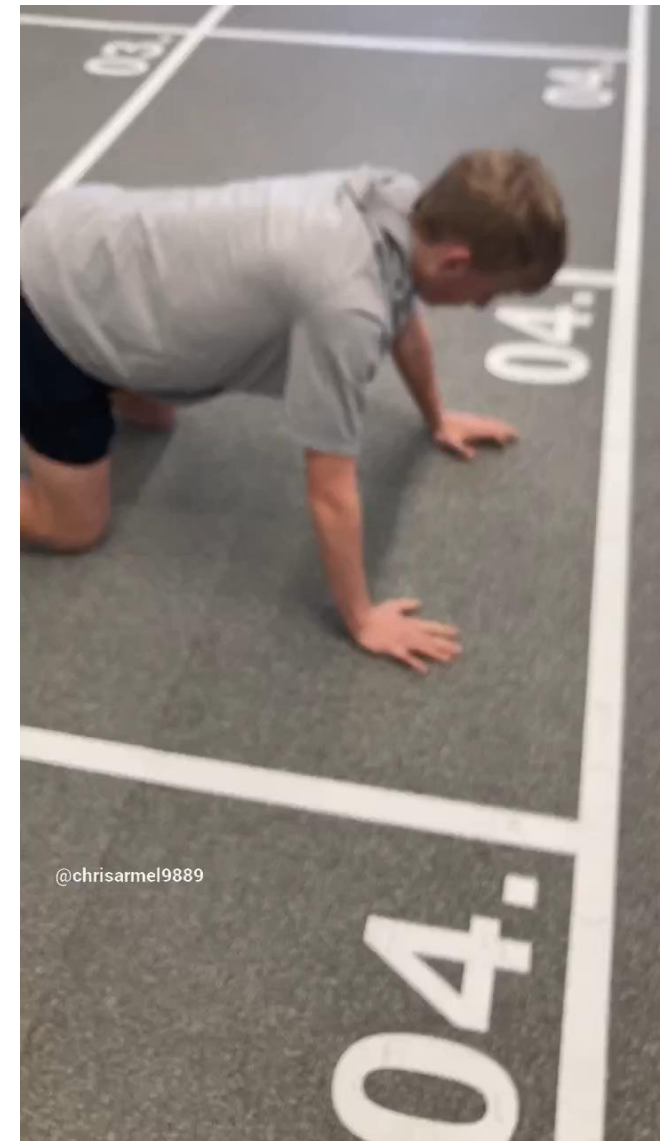
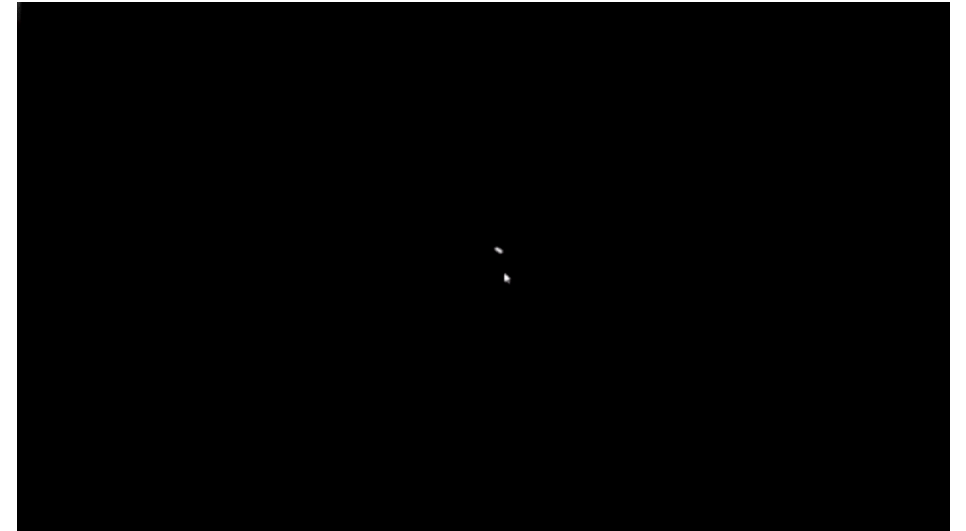


Figure 8 Drill/Infinity Walk or Run

- Get the bad reps out of the way
- Combination of movements allows for movement deficiencies to be seen easier and worked through neurologically
- Core Control (linking UB with LB and vision)
- Circles hit all planes of motion in a myriad of different angles
- Variables
 - Vision, pass around, communication with authority, Match, Band resisted (only limited by your own creativity)
 - Creates new neural pathways and optimized current ones





@chrisarmel9889



A, B, C's but Skip a letter



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lth
ether.

Workout

Check in with the athlete to determine what type of session would be best.

Decrease or Increase Stiffness?

Majority of the time we are taking out
High Velocity/Impact movements

Crane Scale/RFD Check In

- Who's got the cash for a force plate?
- Cheap tool
- Not a perfect number, but still a good measurement
- How's the athlete doing today (tired, lack of nutrition, etc.)
 - Helps us start a conversation with each athlete
 - If > 30 lbs we start to ask questions

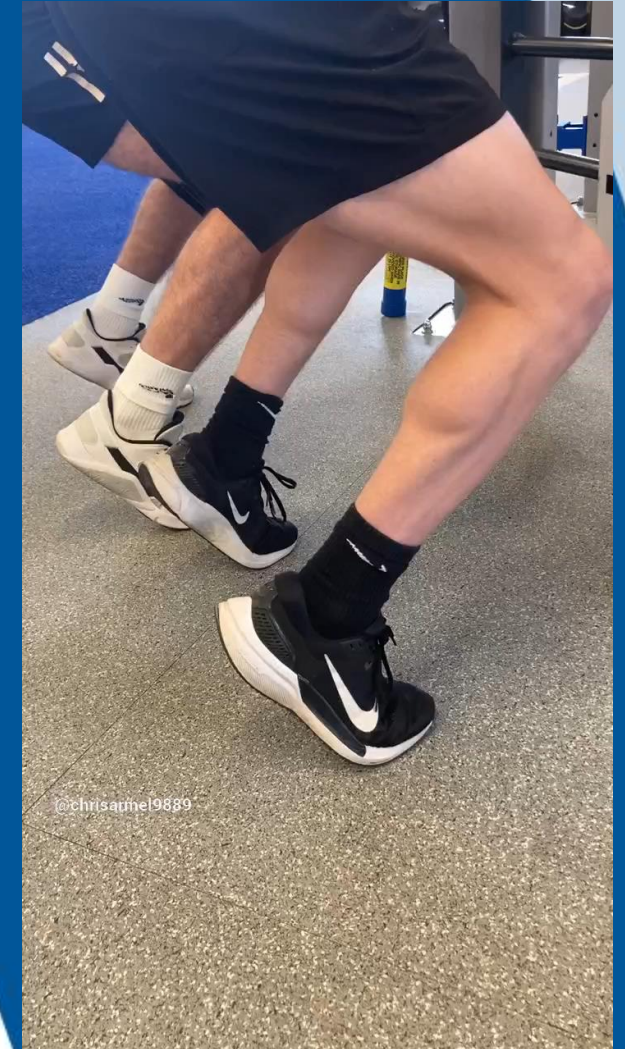


Decrease Stiffness

- Break crosslinks through eccentrics and isometrics
- Include Omni-directional, sub-maximal, multi planar movements to train fascial system

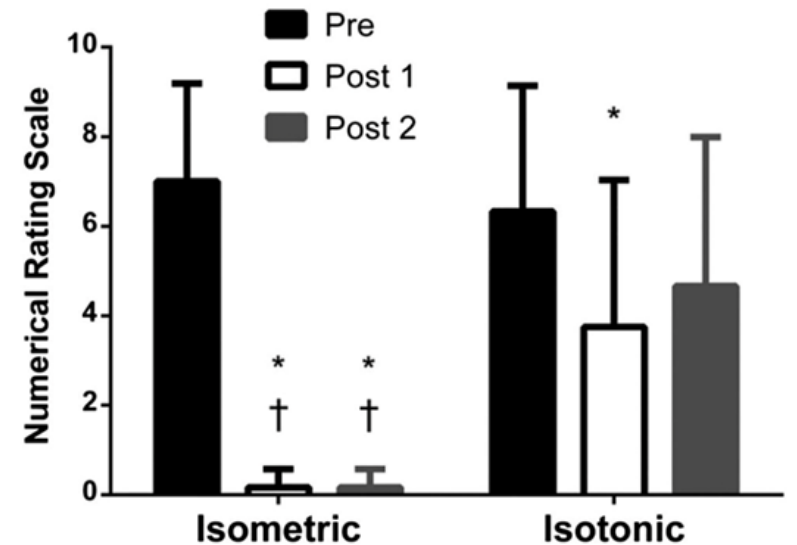
Brake Crosslinks

- The longer it takes to complete a muscle contraction
 - The more the muscle has to work, and less stress on the tendon
 - Thumper Response



:30 Magic Trick

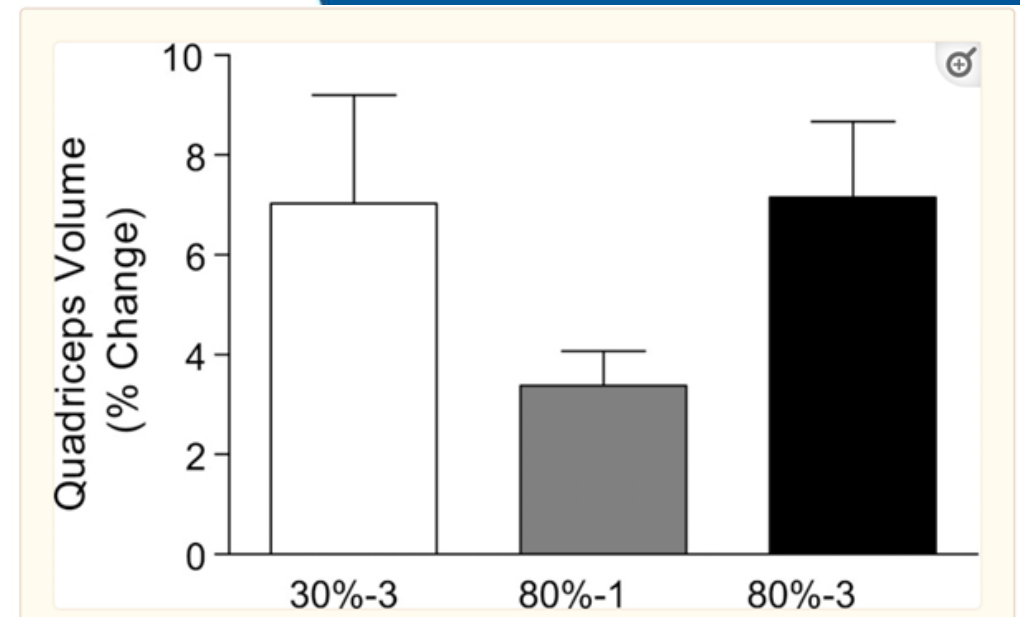
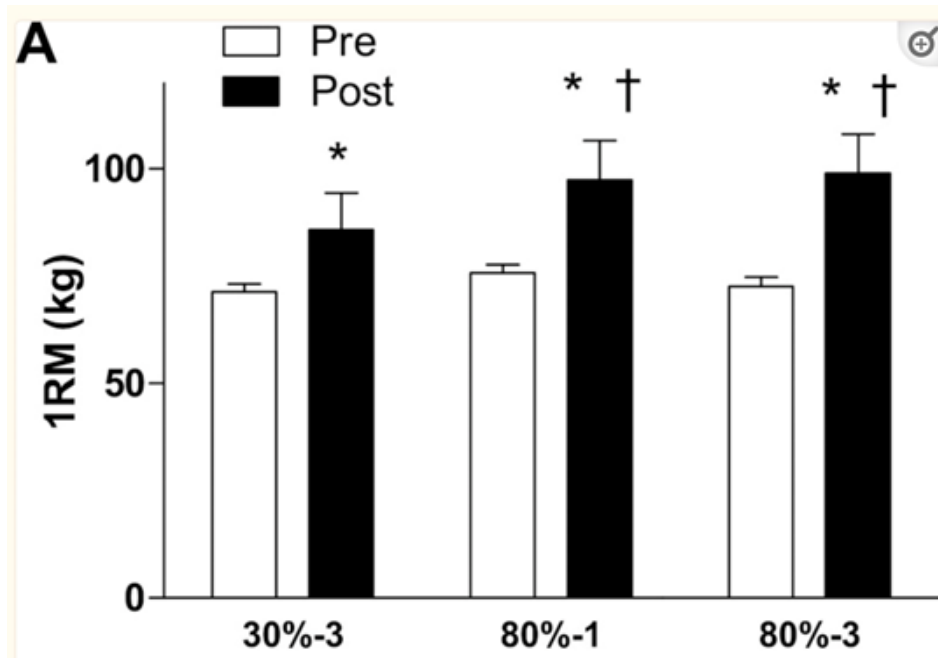
- Isometrics induce analgesia and reduce inhibition (pain and discomfort) in patellar tendinopathy (PMID: 25979840)
- Isometrics also see scleraxis and collagen 1 expression (i.e. healing) PMID: 35358711
- Isometric at most susceptible joint



Breaking Crosslinks cont.

- Strength Training decreases Risk of Injury by 2/3rd (66%)
 - Lauersen 2014 – PMID 24100287
- Heavy Strength Training decreases RFD due to decrease in stiffness
 - Lis et al – PMID 34808597

Last Set AMRAP @ 80%



- Mitchell, 2012 PMID (22518835)

Variables

- Change Velocity/Tempo, not Volume (Set Timer AMRAP)
 - Do you want to Increase or Decrease Stiffness
- Manage Load (Last Set AMRAP)
- Match the Movement

ESD With Intent

- Measured Sprints up to 200 meters, run at % of their timed speed (Run 100 meters in 10 sec, do intervals of 50, 60 etc. at 75, 80, and 90%)
- Chasing 40/50/60
- Timed Sled Push, how far can you get (Get same percentage in distance)
- Sandbag Sprints (Time 10- or 20-yard sprint), run at 130-150% of that time with sandbag

Our plan of action

- 9 KPI/month (Squat, Hinge, Lunge (H), Lunge (S), Push (V/H) Pull (V/H), Carry)
- Manage Velocity, not load
- When able, train at max velocity to prepare for max velocity
- Rest with Purpose!

Finish = Collision Prep

- Bill Bucker
 - Career fielding percentage of .991 at first base and left field
 - Bill Buckner Video



In Summary

- High Velocity increases stiffness, increases performance, increases risk of muscle pull
- Slow/Isometric movements decrease stiffness at MTJ, decrease RFD, and risk of muscle pull
- Are you prepared for the collisions in your sport and in your life?

#StayReadySoYouDontHaveToGetReady



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