Functional Core Stability

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Traditional core programs [1,3,4]

Aim to just restore spinal ROM & muscle strength

Increased lumbar ROM/mobility often leads to instability

One directional strengthening does not = spine stability

Overlook core stability needed during FUNCTION.

Spine often put in disadvantageous positions

-Full sit ups = 300 N of compressive force

-Superman's = high compression load on spine

-FULL posterior pelvic tilt = too much flexion

Typical Low Back injuries [1,3,4]

Usually a history of excessive loading

High reps and **light** load or **low** reps and **high** load

Often flexion with twisting & shear, compressive loading on spine

Motor changes are present with low back pain:
-delayed transverse abdominis, decreased multifidus, faster fatigue in spine extensors.

New Research [4,3,5]

Shift away from restoring lumbar motion and focus on **enhancing core stability.** (thoracic /hip mobility YES)

Muscular contraction dramatically increases stiffness of spine
-must be 360-degree stiffness or instability occurs
-train all the muscles to work together not specific ones

Spinal stiffness is1st key, keeping that stiffness is 2nd key.
Emphasize **endurance** not strength.

Understand core FUNCTION & spinal control needed and train for these functional positions/motions.

Functional core stability – starting point [3,2,4]

The core's role is to spare the spine from excessive load.

- #1 Stop what they are doing that is causing harm
- #2 Train neutral spine (avoid forced pelvic tilt)
- #3 Train abdominal brace (entire core, more than RA)
  10-20% EMG NOT max compression.

  Neutral – brace – **breath**

  Diaphragmatic breathing pattern promotes co-contraction of the abdominal muscles= trunk stiffness and stability.

Next – Has to be in order! [3,4,5]

#1 Teach proper muscle firing patterns
Ex: (glutes not hamstring) (core not hip flexors)

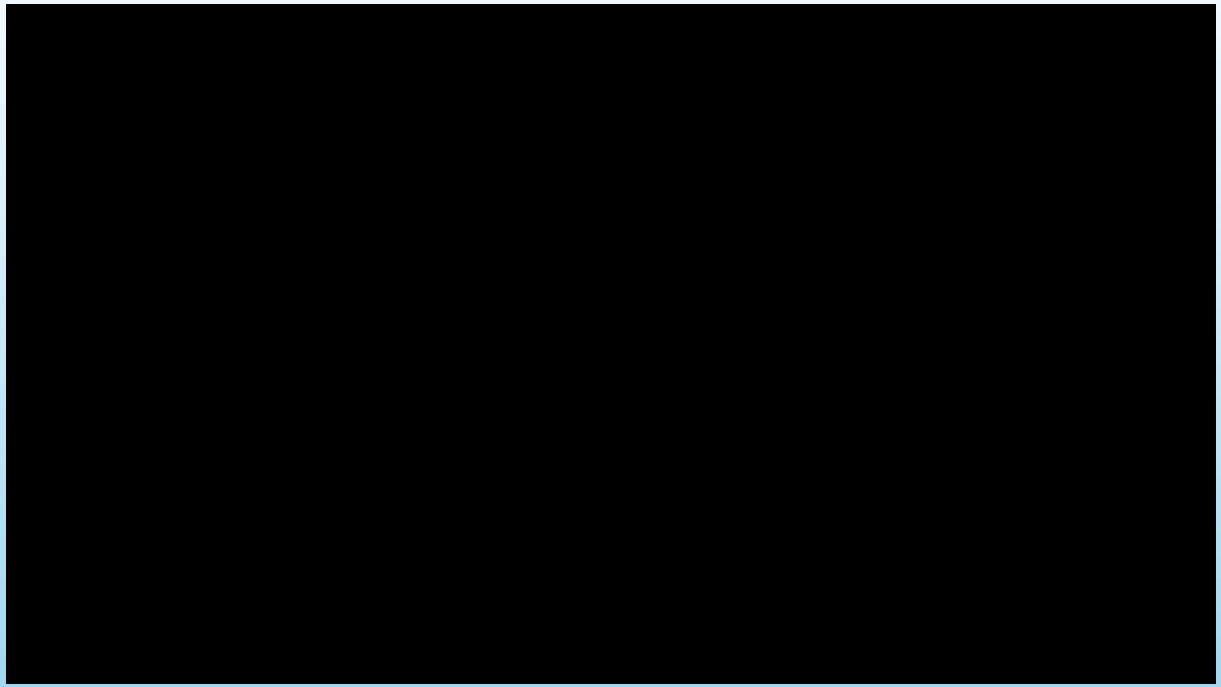
#2 Training simultaneous bracing and extremity movement
-Progress stable to unstable surfaces
-Challenge the stabilizing system **randomly**

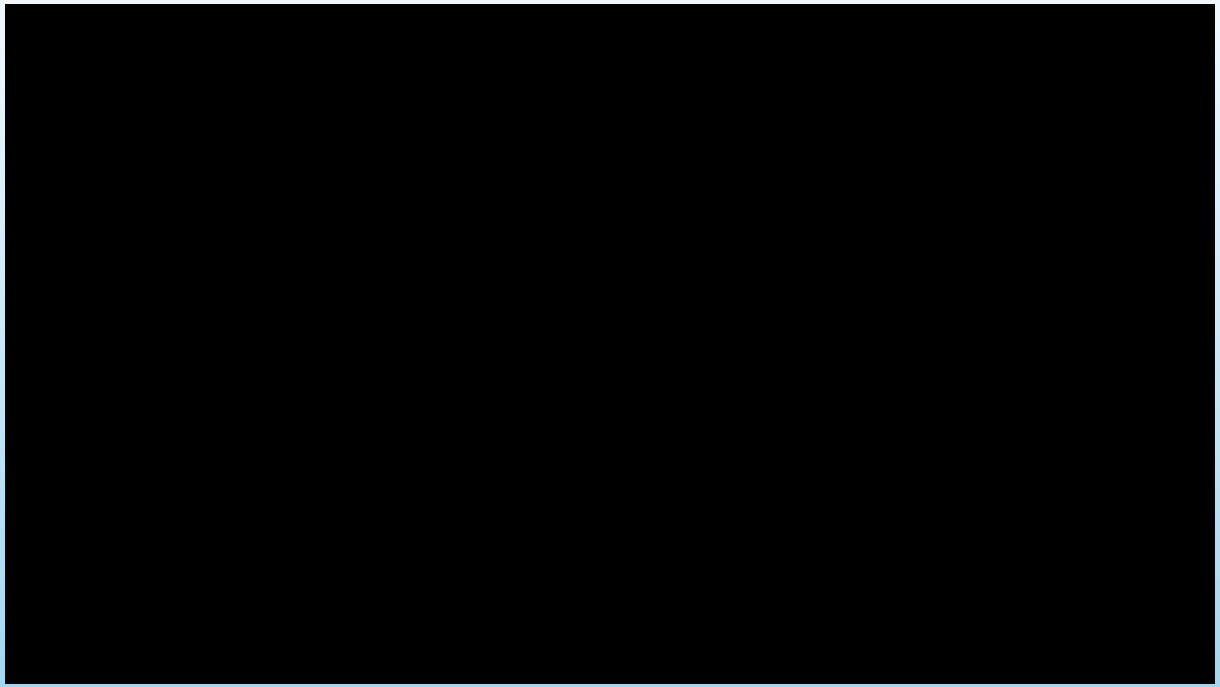
#3 Progression to functional movement patterns
-isolated (core) to integrated (involve extremities) to functional(sport)

FORM is everything which requires coaching and cues not just a HEP.

Anterior Chain – ANTI EXTENSION [1,3,4]

- **Curl up –** neutral spine NOT max posterior tilt. Up though thoracic NOT through hip flexors and lumbar.
- **Dead bug –** just arms, then just legs, perturbations, both, perturbations, add weights, unstable surface.
- **Front plank -** Neutral/brace/breathe. Rhythmic stabilizations, unstable surface, movement then RS again.
- ***Roll outs -** on knees with ball or TRX-better.
- **Chop & Lift -** ISO holds (rip trainer/ dowel in front of body, cord anchored from behind) Brace/neutral then hold dowel at 90 deg, add in rotatory resistance component. Now RS + movement.
- ***Reverse crunch**
- **Med ball -** low then above shoulder height.





Curl up progressions

Dead bug

Front Plank progression

Roll outs

ISOMETRIC HOLDS

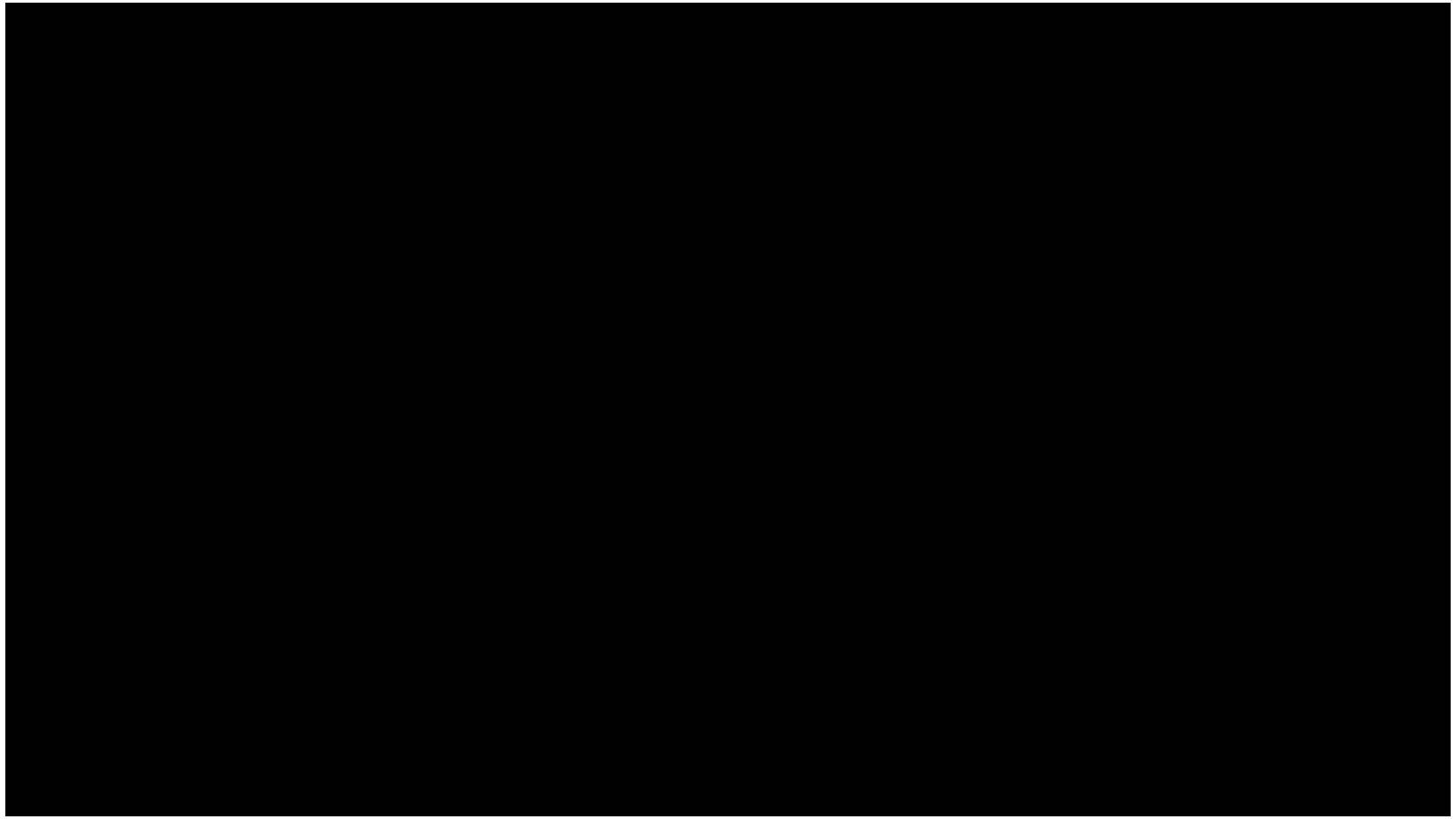
Reverse Crunch

Med ball throw

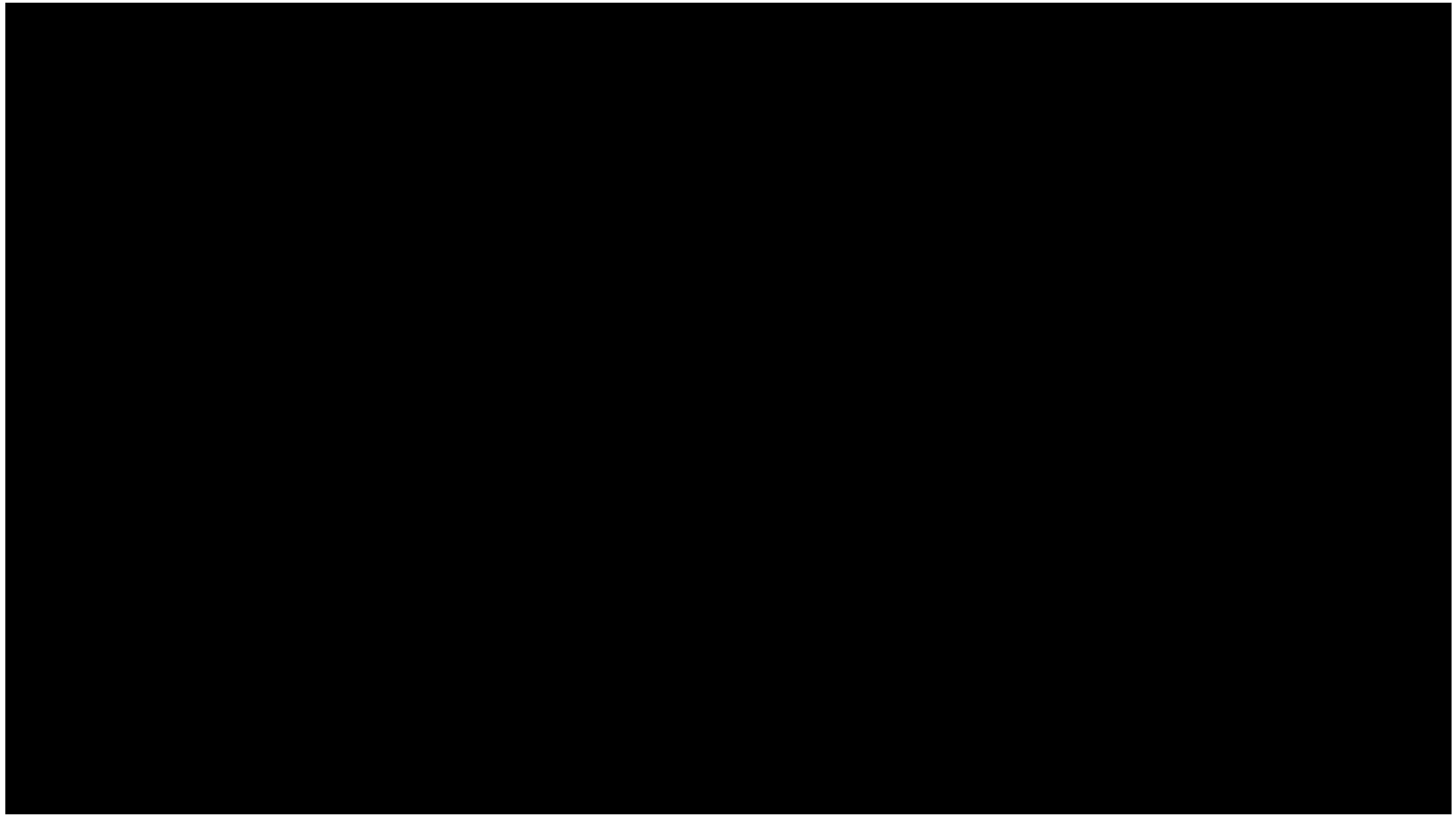
Posterior Chain – Anti Flexion [1,3,4]

- **Bridge:** foot flat = glutes – push down through toes (heels =hamstring) No HE of back. Extend leg = rotatory control. EXTEND knee not lift hip! Add RS at leg. Add cuff weights. UNSTABLE. (back on ball)
- **Birddogs:** teach hip exten. not lumbar exten. Start one limb at a time & hold. Neutral, brace breath. Work into RS arm/leg. -Need hip/thoracic mobility & strength for the core to work well. Work to current limitation.
- **Tubing lifts-** standing bands in front anchored on each end of dowel in front, face anchor, 0-120, RS. RIP trainer, only one side for rotatory control.
- **UNSTABLE:** roll out on ball and hold 8 seconds, roll back. Palms face floor. Progress to swimming. One arm two arms. Weights arms. RS.
- **Deadlifts:** Turn on glutes vs hamstring/low back extensors. Unilat.+ weights.

Bridge

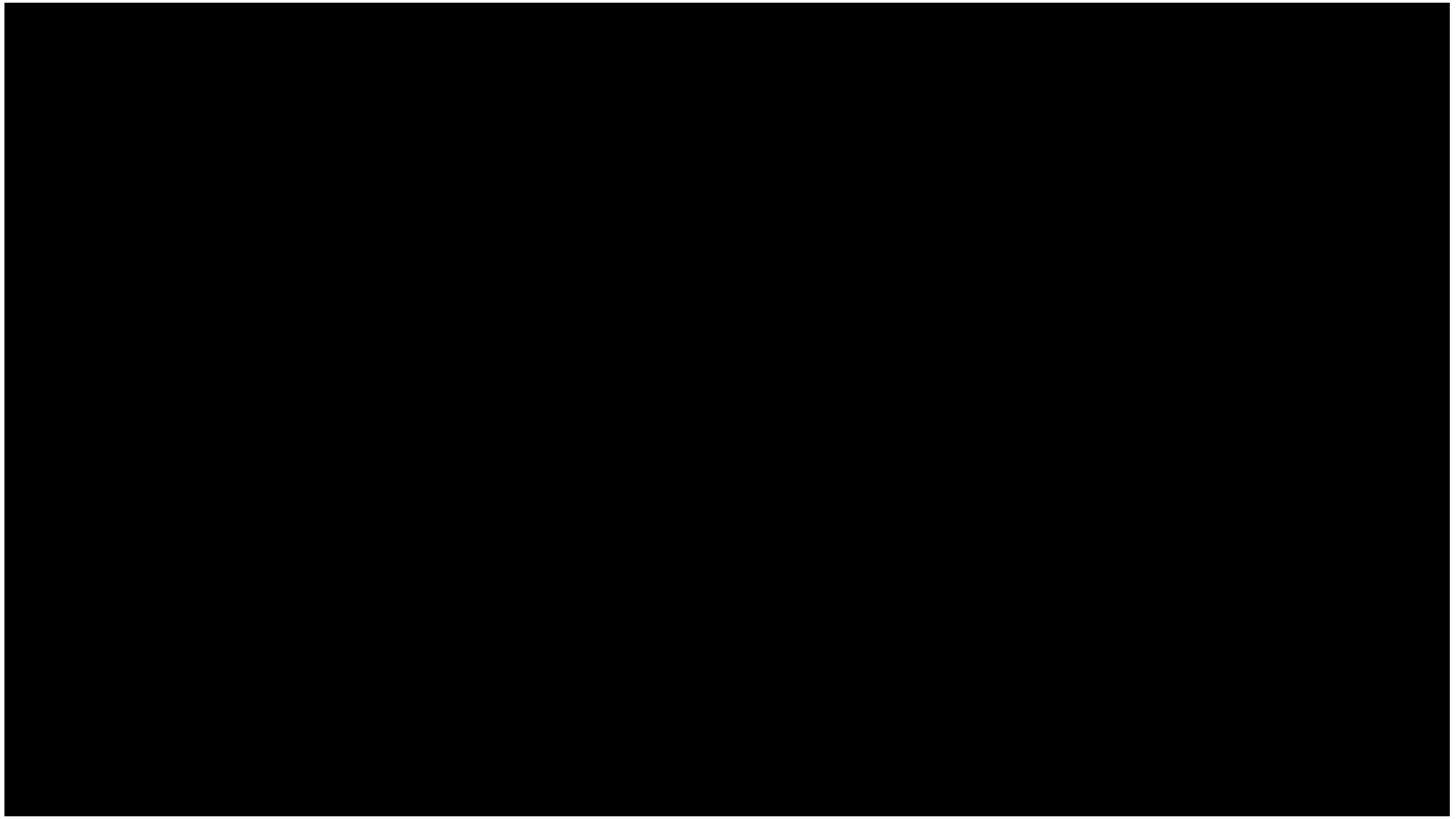


Birddogs



Tubing lifts- Isometric holds (anti flexion)

Roll outs



Deadlifts

Lateral Chain Progression [1,3,4]

Side plank: Start knees. Then feet. Add rhythmic stabilization.
-Modified: Feet ON box or feet in TRX (unstable) lying on side of shoulder. (Side bent to straight). Add clam/ABD.

Isometric (cable) holds: (anti side bend) dowel vertical with bungee on top. Start close to body then extend out and hold. Add rhythmic stabilization.

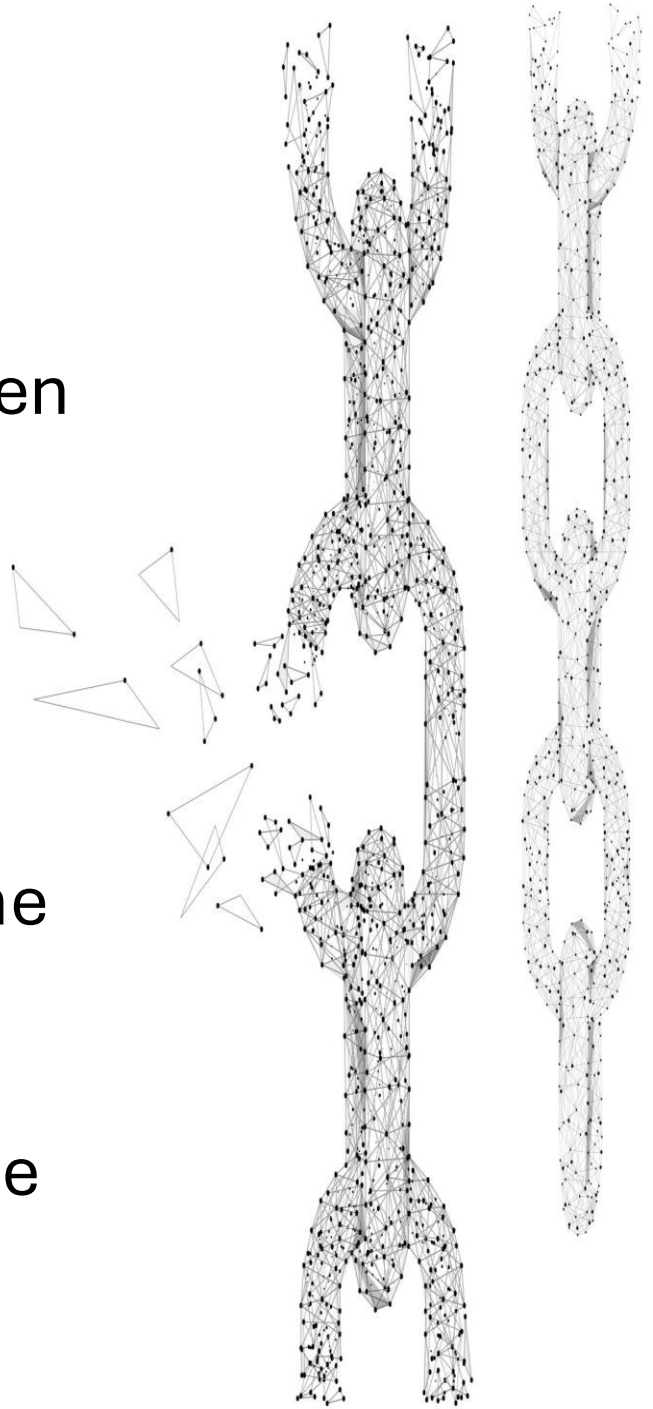
Huge for Quadratus Lumborum!

Side plank

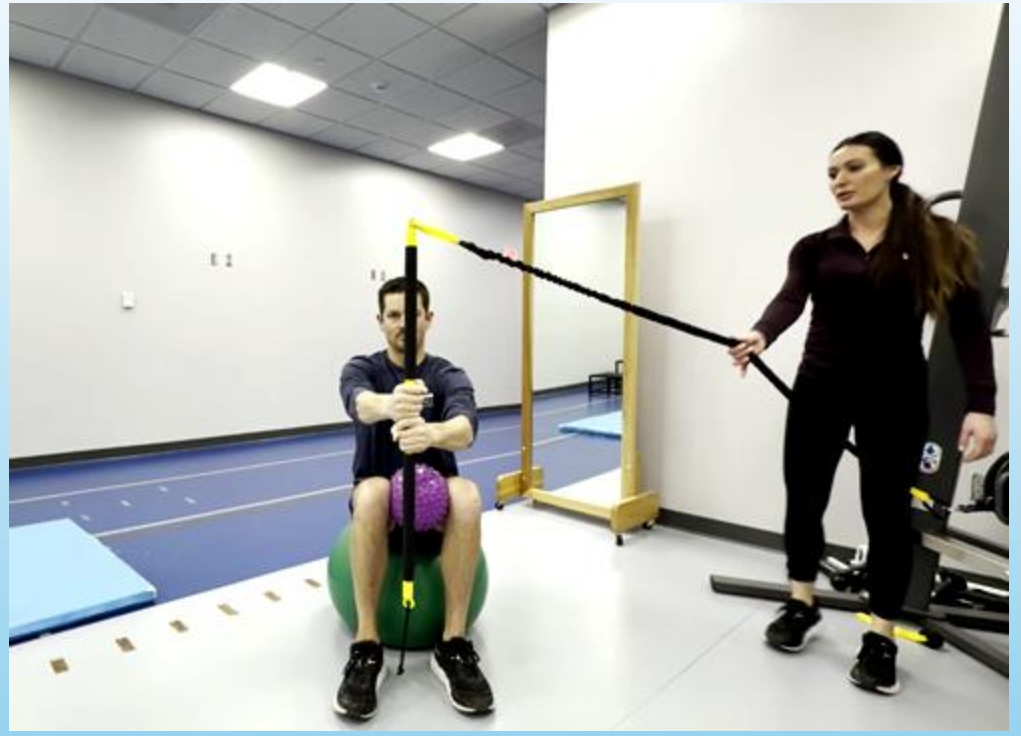
CABLE ISO HOLDS

Rotary Chain Progression [1,3,4]

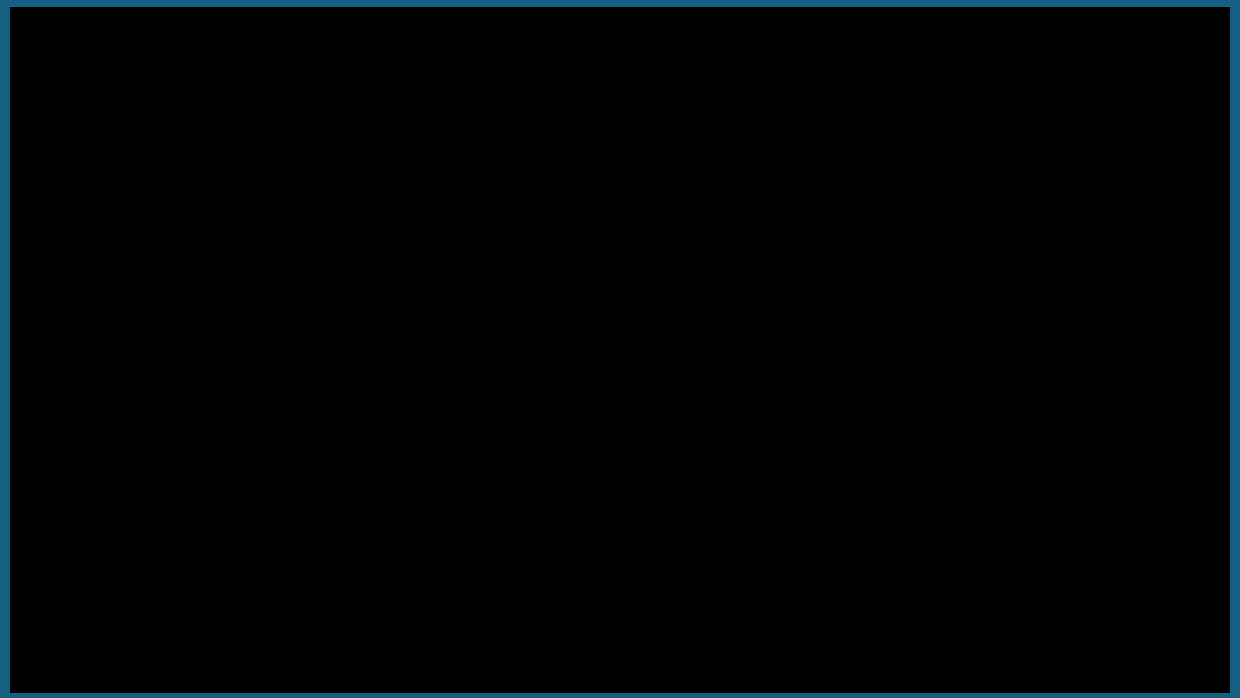
- **ISO hold cable:** Neutral, brace, breath, start at chest then out stabilize/hold. (cable tied to wall to side of you then switch sides) ADD RS. Progress ROM – do at end range. Rotate body (through thoracic).Progress to split squat position.
- **Swiss ball sitting:** ball in between knees. Now rotate through thoracic side to side, add cable rotations. T spine only moves, Lumbar stable. Progress to **Med ball toss.**
- **Arm lift plank.** Lift left arm off wall first. Then other. Progress to floor. Progress to rotating as a segment prone to side plank.



CABLE ISO HOLDS



Arm lift planks



Integrated [1,3,4]

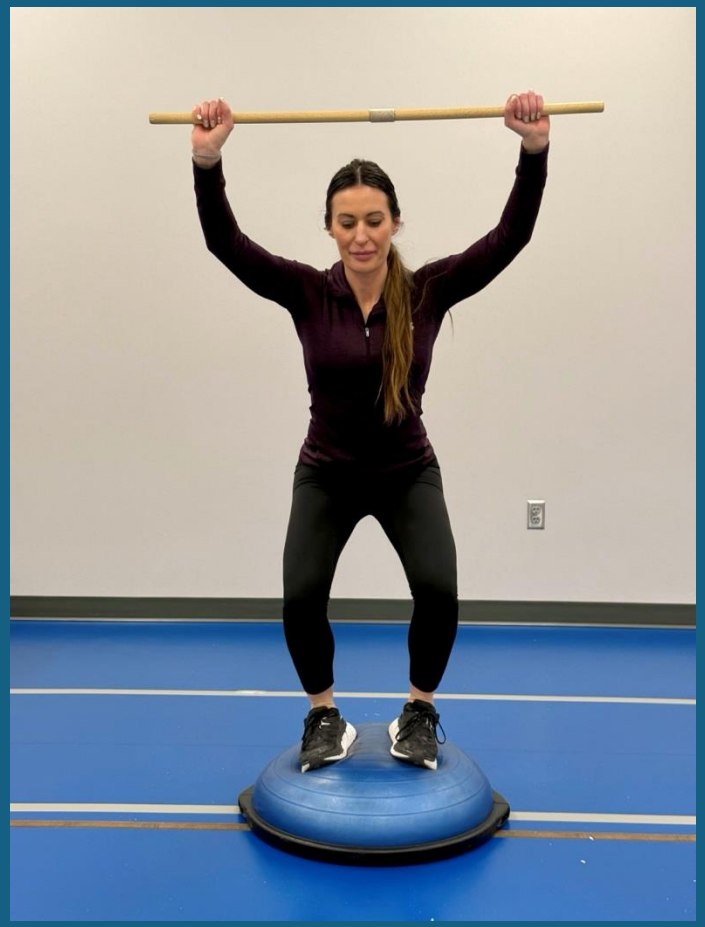
- **Chops / Lifts:** split squat/ kneeling

-PNF pattern- D1D2 flex/exten (cable on one side) LIFT = down and over or up and over. Have to stabilize throughout.

- OTHER ex's: **squats.** Add core into it and hold! Stable – unstable surface (bosu/foam). Dynamic: hold arms up (dowel). Hold brace/breathe during.
- **Lunge walk/Step down:** weight on one side. PREVENT side bend.
- **Rotations with cable/MED ball throws:** Lumbar stable rot with hips and t-spine.

Chops / Lifts/ Rotations

Add into LE / functional exercises



Med ball throws / cable rotations

Functional CORE stability [1,3,4,5]

EMPHASIZE:

Stability > lumbar motion

Endurance > strength

360 stiffness not just one muscle group

All 4 Quadrants need the ability to **RESIST**

Perturbations – randomly & Unstable surface = **real life**

Functional progressions when ready and watched closely!

References

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