

Lower Extremity Rehab:

A modern approach

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2004 Michigan State University- Environmental Science

2008 - National University of Health Science

Post graduate training

300 plus hours Diplomat, Rehab American chiropractic Council

McKenzie Mechanical Diagnosis and therapy, A-C

Dynamic Neuromuscular Stabilization, DNS, Clinical A-C, Certified Exercise Trainer

Functional Movement Systems I and II

Movnat certified trainer

Selective Functional Movement Assessment

Goals for today

- Modern concepts in tendinopathy intervention
- Differentiation of spine vs. hip complaint
- Red flags for LE complaints
- Effectively and efficiently diagnose and prescribe rehab exercises
- Learn functional tests for the lower extremity
- Learn prognostic factors for spine, hip and knee pain
- Algorithm of introducing rehab to patients
- How to implement an active/rehab into a busy practice
- Take home simple and effective exercises
- Algorithm to work from on developing your own rehab protocols

Outline for the day

- Hour 1: Definitions to get everyone on the same page
- Process of exam and adding in functional exams
- Clinical audit process
- Hour 2 and 3: Pathologies of the hip Rx
- Rehab tests and exercise
- Hour 4: Case study to bring it all together
- Go through a demonstration of CMT, Manual therapy, exercise in real time.
- Complete in 12 -15 minutes.

Why Physical Rehab?

Chiropractors are the best suited to be first line practitioners for musculoskeletal care

- Focused on the spine and nervous system.

 - Proximal stability leads to distal mobility

 - Retrain and interact with the CNS

- Focused on conservative management- chiropractic adjusting, nutrition and exercise.

Healthcare 3.0

- Patient centered care

- Doctor treats with the best evidence

- Patients and Doctor form a team

- Chiropractors can lead this!

- Movement primary care

Definitions

Isotonic movements:

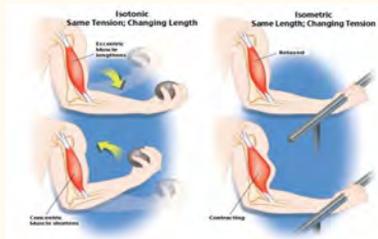
Isotonic: equal + tone, throughout the movement. Contraction is equal through out movement but joint angle changes. Example: squat, pushup, bicep curl

Can be either: Concentric : contraction with shortening

Eccentric, aka negatives: Contraction while elongating

Isometric: Equal tone with no change in joint angle. Static position.

Isotonic and isometric



Planes of Movement

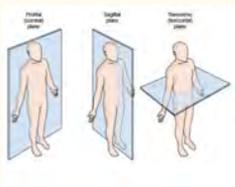
Sagittal: divides the body left and right. Forward and backward movements

Frontal: divides body front and back

Move side to side

Transverse: divide body upper and lower

Involve twisting



Ipsilateral and Contralateral movement

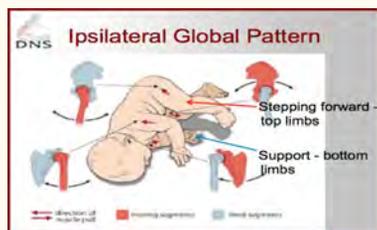
Ipsilateral: joints on the same side.

Examples: rolling, swing

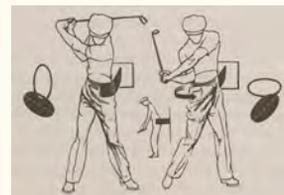
Contralateral: Opposite joints at same

Examples: walking, crawling

Ipsilateral movement



Ipsilateral movement



Contralateral movement



Closed Chain and Open chain

Closed Kinetic chain exercises: Distal segment fixed: arm or leg stay fixed to the ground

Example: push up, squat,

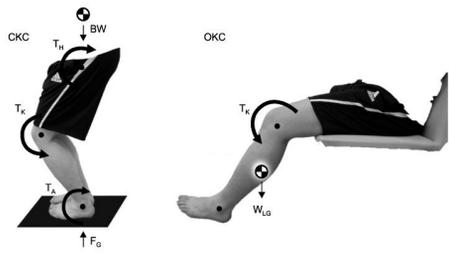
Switches the traditional actions of muscle: insertion static and origin moves toward

Open Kinetic chain exercise: distal segment mobile : arm or leg are free to move

Bench press, hamstring curl

Traditional actions of muscles: origin static and insertion moves toward

OKC and CKC



Core?!

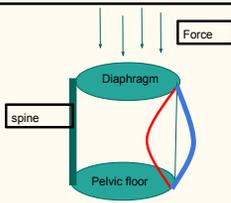
Hollow: draw belly button toward the spine; Paul Hodges

Brace: Eccentrically contract abdomen, prepare for a punch. Stuart McGill

IAP: Intra abdominal pressure, Pavel Kolar

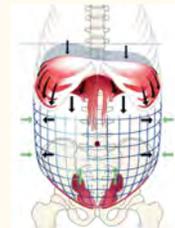
Overall, Proximal stability leads to Distal mobility

Core Cylinder

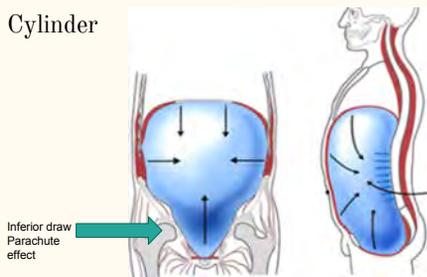


Breathing

Think cylindrical



Cylinder



Inferior draw
Parachute
effect



Triple Flexion

Hip flexion
Knee flexion
Ankle flexion

Diaphragmatic breathing

Allows for diaphragm and pelvic floor to be parallel

Move time

Going to take 15 minutes

Movement prep, a guide through some of the movements we will cover

Get ups - how to get to and from the floor

Bracing, hollowing, IAP

Tripod of the foot

Hip movement, 3 planes

Squat

Hip vs. Lower back

	Lower back	Hip
Subjective	Pain in posterior hip, diffuse across back and into the hip, diurnal pain	"C" hip pain or pin point pain, anterior hip pain/agon Pinch, has to lean back when sitting, hurts to walk or over flex the hip
Objective	Kemps, SLR, Slump, pain with lumbar flexion and extension	Hip scour, Hip "pop", FADIR Loss of internal rotation, isometric better? Butterfly sit up
Treatment	CMT spine, breathing/cylinder, hip	CMT spine and hip, Breathing/cylinder, Hip

HIP vs. Spine pain distribution



<http://hippainrelief.org/tag/hip-pain-both-sides/>

Wells Criteria

R/O DVT

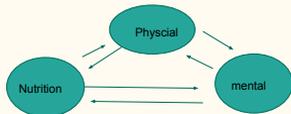
Modified Wells Criteria
Clinical symptoms of DVT: 3
Other diagnosis less likely than PE: 3
Heart rate >100 beats/min: 1.5
Immobilization or surgery <4 weeks: 1.5
Previous DVT or PE: 1.5
Hemoptysis: 1
Malignancy: 1
CLINICAL PROBABILITY ASSESSMENT
High: >6 (41%)
Moderate: 2-6 (16%)
Low: <2 (0.5-2.7%)

Capacity of Resilience

Stress has impact on system.

When doing an exam, treatment or exercise we can over do it.

Take breaks and dont rush treatment. We have more opportunities



Pain Science... ish

Our view of the injury can change the patients view.

Don'ts
Be catastrophic

Use the words like deteriorating,
decaying

Focus on pain

Treat an image

Do's
Be straightforward

Use positive language

Focus on function

Treat the person

Gift of an Injury

Take this injury and turn it into opportunity

Focus on the fundamentals of a sport or activity

Look toward the function long term, 1 year, 10 years, 30 years.

Correct the movement and figure out a plan for long term

Empower the patient to take control

Generalities of Tendinopathy

Presentation:

History of overuse or load recently

Pain is point variable 1-2 fingers width

Hurts to weight bear

Change direction painful

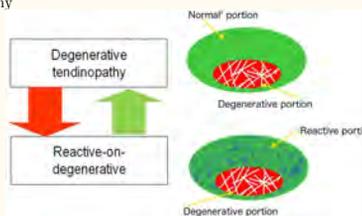
Moderate to severe pain

Swelling

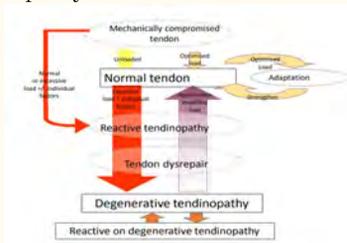
Tendon pathology

Continuum model of tendinopathy

1. Reactive
 - a. Young 15-25yrs old
 - b. Uncommon painful
2. Degenerative
 - a. Older than 30-60 yrs old
 - b. Rarely present clinically
3. Reactive on degenerative
 - a. Older 30 plus yrs old
 - b. Common in practice-painful



Tendinopathy- Cook et. al.



Tendoninopathy

Pathology of tendinopathy

• Normal tendon

- Regular collagen fibres
- Inconspicuous ground substance
- Spindle shaped tenocytes
- Minimal vascularity & nerves



• Abnormal tendon

- Disorganised & altered collagen Type II
- Abundant ground substance
- Activated cells & hypercellular
- Increased vessels & nerves



Tendinopathy Treatment

During the reactive-degenerative stage: Tape, Adjust, biofreeze, Nutrition

These are not very resilient, can be aggravated by exercise

Isometric exercises 45sec hold x5 with 2 minutes in between, 2-3 x daily

Start affecting other parts of the chain

Take away painful events and movements.

Rest is NOT best.

Tendinopathy treatment

Once the pain has reduced add in isotonic movements: eccentric and concentric

Evaluation: as load increases pain should decrease

If you load to early, the patient will let you know

Rule of thumb is 3-4/10VAS during exercise and no worse the next day

Last, Get patient ready for sport or athletic endeavor



Patellar tendinopathy

Slant board decline squats,
Hold 45sec x 5, rest 2 min

Exercises

Low oblique sit with variation: Glute Med

Isometric

Concentric

Eccentric

Variation



Low oblique sit

Glute Tendinopathy

Exercise with band

Glute bridge:

No band

With band

Lateral Band walks



Exercise

Kettlebell swing/Deadlift

Tripod of the foot isometric holds

Variation with speed and weight

Posterior tib/Patella tendon/Glute Med

Triangle position of the foot



1st metatarsal

5th metatarsal

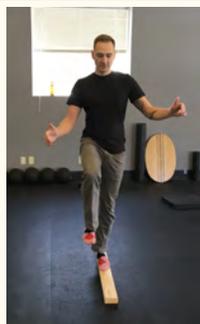
Calcaneous

Increase surface area
Increase ground reactive forces
Better position



Extend the toes and Separate

Increase Surface Area



Tib posterior
Foot training



Skill work

Break into pairs or groups:
Each person gives 5 reps x 2 sets

Low oblique sit

Glute bridge

Tripod foot with squat

Squat variation: iso holds, decline, counter weight, on 2 x 4

Case Study

29 year old man presents with lower back and occasional hip pain. 6/10VAS, worse with bending forward, ADL - cant put on pants and socks without pain

Pain started after back squatting, during his warm up lifts, 400plus pounds

Unremarkable family, past medical history or current history and social history

Prior care Chiropractic and physical therapy

Case study - physical exam

LE Neuro intact, negative nerve tension.

Lumbar spine: Moderate loss of flexion, pain upon rising,

MDT: Repetitive extension- decrease better

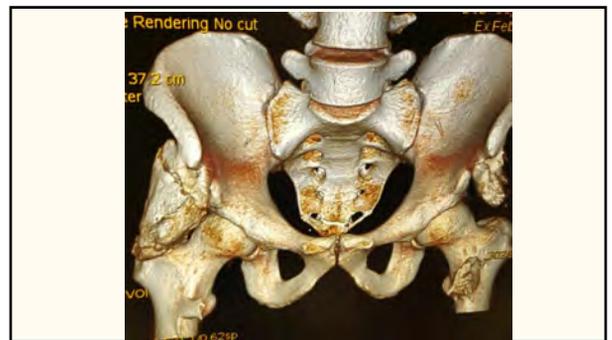
Flexion intolerant non deformity lower back pain

Squat: loss of hip excursion, forward flexion, pain at bottom

Hip Scouring: severe loss of Flexion bilaterally, FADIR postive bilaterally

Abdominal cylinder; diastasis recti 3 fingers width, valleys/hollowing lower walls

Imaging





Femoral acetabular impingement-FAI

Active patient 20-40 yrs old, mostly

“C” shaped pain

Pinching in the hip with flexion activities

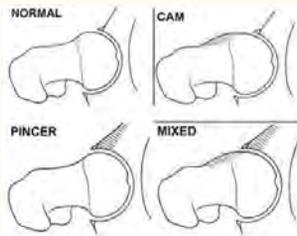
“Cant do ____ anymore”; splits, hockey skating push off, running

Flexion pain

Hard time sitting for prolonged times

FAI

Light bulb shaped is ideal

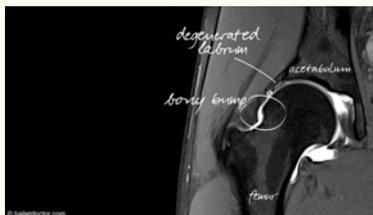


<https://mikereinholt.com/femoroacetabular-impingement-etiology-diagnosis-and-treatment-of-fai/>

X-ray



MRI



© ballistdoctor.com

<http://ballistdoctor.com/hip-impingement>

Management

Conservative management:

Reduce the repetitive stress through the hip in flexion and frontal plane movement

Soft tissue external rotators, adductors, quads

Adjustment lumbar and pelvis

Distraction of the hip in office and at home

Exercise in office and at home

Management

Patient education:

Breaks on hip every 15-20 minutes: leaning back in chair

Stay away from provocative movements

Takes time!

Exercises are necessary short term and long term

Surgical correction

If you ask a surgeon, these all need to be surgically corrected to be preserved.

They are saving people from developing OA

My view, The pathological movement needs to be corrected either way.

“Take the hammer away”

HIP test

FADIR: Flexion, Adduction, Internal rotation

Listen/feel for pop on the way back down:

Labral tear



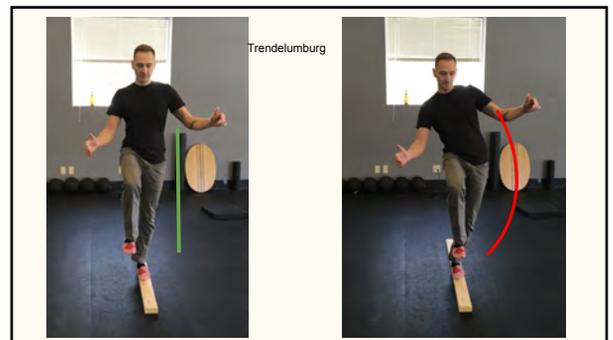
<https://pmc.ncbi.nlm.nih.gov/articles/PMC4174111/>

Hip Scouring



<http://www.aspetar.com/journal/viewarticle.aspx?id=192>

Single leg glute bridge test



Rehab start

Sagittal plane stability:

Triple flexion

Bear stance

Glute bridge

Hip flexibility:

Bear



Triple Flexion



Prone raise up



Skills Work

Tests:

Hip scour

FADIR

Glute bridge test

Exercises:

Bear holds x 10sec hold x 3

Triple flexion x 10sec hold x 2

Prone raise up x 10sec x 2

Functional Exam

Ankle dorsiflexion in half kneeling

Veles/body shift weight screen

Active straight leg raise

Active Straight Leg Raise (ASLR) Vleemings

Pass: able to move through motion without pain and pelvis twists

Fail: pain in SI/low back, excessive tilting in pelvis



Vele's test (body weight shift)

Pass:
foot grabs the floor
Able to lean from the ankle

Fail:
No activation in the foot
Leans from torso

Ankle Dorsiflexion screen

Pass:
able to clear one fist

Fail:
Unable to clear one fist

Skills work

Vele's P:F

Ankle in half kneeling P:F

ASLR P:F

Transverse plane

Glute bridge with external rotation

Low oblique sit

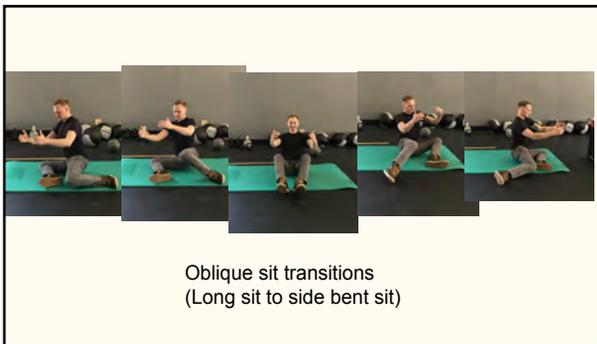
High oblique sit

Oblique sit transition

Oblique sit to standing

Glute bridge with external rotation





Skills Work

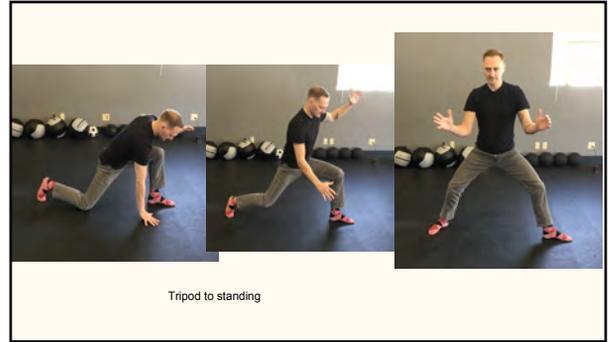
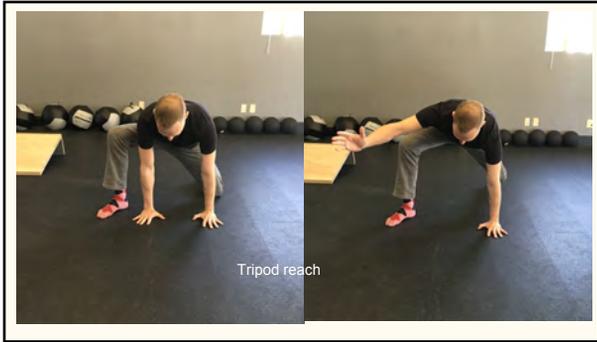
Low oblique sit x 10 x 2 Oblique transitions x 10 x 2

High oblique sit x 10 x 2

Oblique sit/bent side sit

X 10



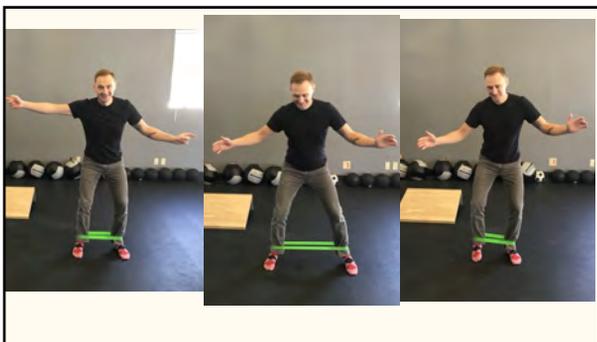


Skills Work

Half kneeling sit backx 10 x 2

Tripod reach x 10 x 2

Tripod to standing X 10



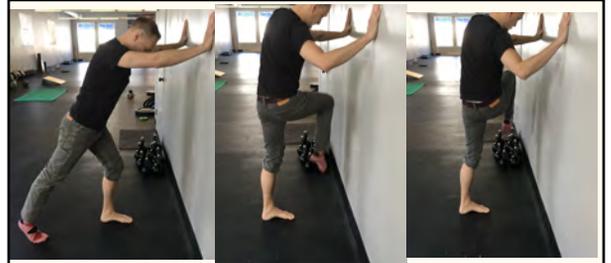
Skills Work

Lateral band walks

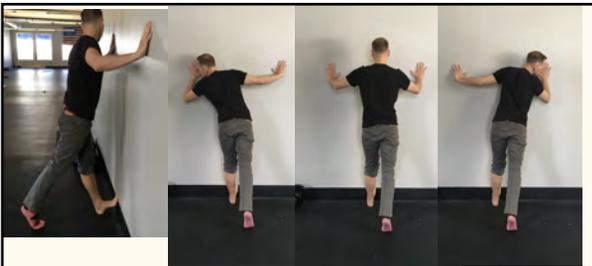
Knee x 15 x 2

Ankle x 15 x 2

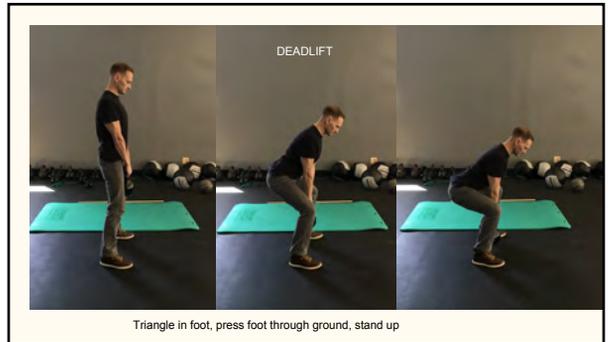
Single leg stance with movement
(Hip Airplanes)



Leg swings for foot supination



Triplanar Calf stretch



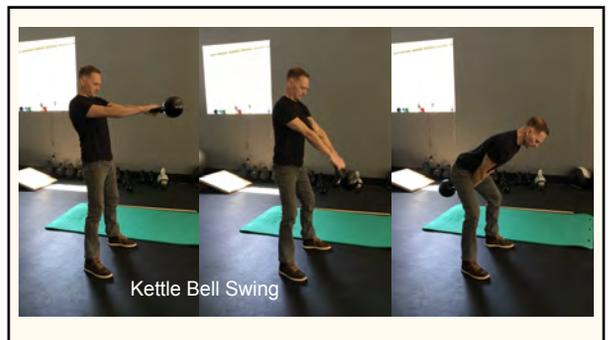
Triangle in foot, press foot through ground, stand up

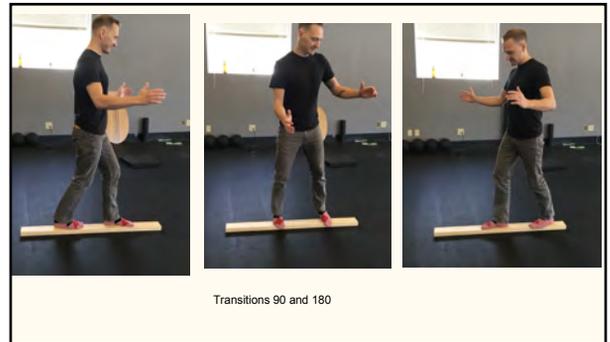
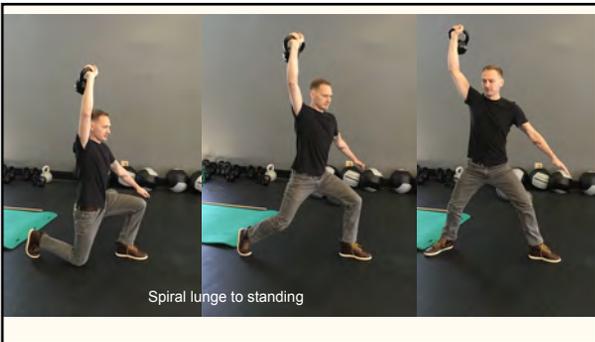
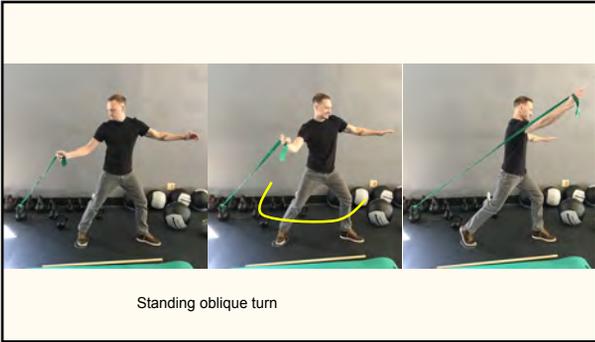
Skills work

Leg swing for foot supination x 10

Triplanar Calf stretch x 10 each plane

Dead lift x 10





Rehab - Home exercise program

Mobility vs. Stability start

Initial rehab phase: one Sagittal plane stability exercise and one mobility exercise

Second phase: add in challenge to sagittal plane, start transverse exercise

Keep progressing challenge: Movement, resistance, weight, environment

During this time it's about practice reps at home: 2 minutes x 4 x per day

RETRAINING THE BRAIN

Third phase: Hypertrophy, strength and endurance

1- 2 stability exercises and 1-2 mobility exercises as a warm up to their day and workouts

3 x per week: higher end workouts

Fourth stage: patient continues to "warm up" exercises -

Find an exercise program patient likes- i call this graduation

Self test at home as well

Live Case

Any volunteers for evaluation and treatment?

Wrap up

Proximal stability leads to distal mobility

If patient comes in with hip, knee or ankle focus on the developing breathing and support then go down the chain

Push the patient to the most challenging exercise they can do somewhat well

Rehab is practice so every day can be a little different, focus on better not perfect

Add progressions as you see fit

bibliography

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