

#COVID_OPS

TRAINING AROUND PAIN AND INJURIES

*DON'T FOCUS ON THE
PROBLEM, FIND THE
SOLUTION*

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DISCLAIMER

- I am NOT a medical professional, and this is NOT a medical presentation. Thus, should NOT be used for diagnosis and/or treating injuries discussed.
 - I am not qualified/certified to diagnose, treat, or advise specific diagnosed medical conditions
- Just a strength coach talking to strength coaches
- Please consult with your physician and/or rehabilitative staff prior to implementing anything found or discussed in this presentation.

SOME CONTEXT



- Please recognize that I work under reasonably unique circumstances; including high training frequency/contact hours w/ my athletes.
- My athletes are also inherently injured, so some of my applications are a bit unorthodox by virtue.
- My work is typically focused on post-op, most of which is well after surgery.

EXAMINING BASICS





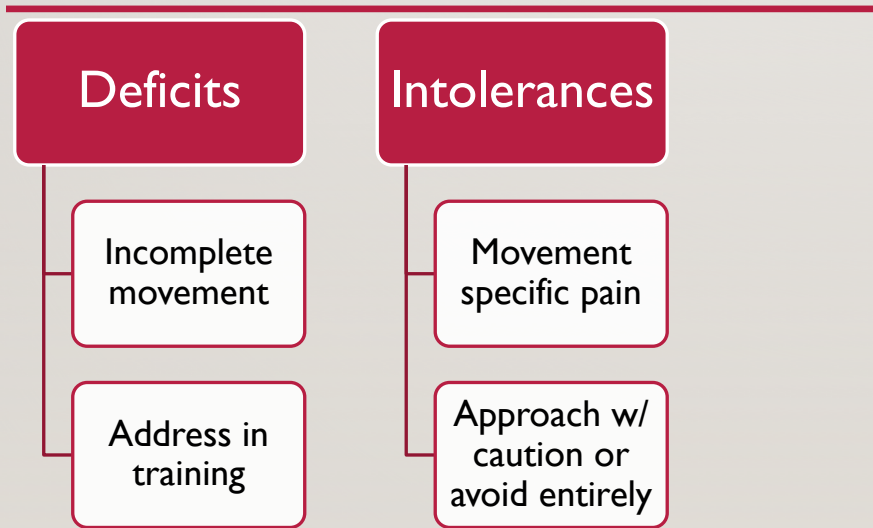
Image via: NOVA Active Rehab

SOME TERMS & DEFINITIONS



- **Discomfort**: Fatigue-based, undertrained.
 - Work through in training
- **Pain**: Mechanical disruption, impacts movement.
 - Avoid in training
- **Injury**: Diagnosable, tangible (to some extent)
 - Follow guidelines of Doc/PT
- **Conventional Rehab**: A technical and specific process that should be conducted by certified bodies such as physical therapists and athletic trainers.
- ❖ **Restorative Strength**: Using strength training as a means to further rehabilitate injured sites with an emphasis on restoring foundational strength levels.

CLASSIFYING MOVEMENT LIMITATIONS



- **Deficits**: Insufficient strength and/or incomplete movement patterns
 - **Examples**: End range hip flexion of 80°, incomplete upward rotation of scapula
 - Should be emphasized and directly addressed in training
- **Intolerance**: Pain induced by specific movement patterns
 - Can also be dependent on position, stance, and/or unilateral
 - **Examples**: Trunk flexion, overhead flexion, big toe extension
 - Should be approached cautiously, and not agitated in training
- **Your Goal**:
 - Be proficient in distinguishing between the two (Much of this is identified in the assessment)
 - Address and progress the limitations safely and effectively

COMMON INJURIES TO WORK AROUND

- **Shoulder injuries**

- Impingement/tendonitis/bursitis
- SLAP tear
- Cuff tear

- **Back injuries**

- Non-specific low-back pain (NSLBP)
- Disc injuries (bulging, compression, herniation, spondy)
- Surgeries (fusion, discectomy, implants)

- **Hip Injuries**

- Impingement/FAI
- Labrum tear
- Arthritis

- **Knee injuries**

- Tendonitis/bursitis
- Ligament tear
- Arthritis/Cartilage (meniscus)

- **Ankle/foot injuries**

- Achilles tendinopathy/rupture
- Chronic sprains/Plantar fasciitis
- Toe injuries

- **Head/Cognitive Injuries**

- Vestibular impairments
- Motor control
- Disrupted neuromuscular patterns

STRUCTURES AND TISSUES

- **Tendons**

- Respond best to load
- Aggravated most by speed of movement
- Elastic energy stores (stiffness & compliance)

- **Ligaments**

- Respond best to full range movements
- Progressive load tolerance
- Resistance to torque/shearing forces

- **Muscles**

- Respond best to load, full range
- Aggravated by load capacity; can be position specific
- Stress vs. strain, pliability vs. contractility

- **Bones**

- Respond best to load
- Aggravated by force impact
- Density and tolerance

- **Nerves**

- Respond best to speed and complexity
- Aggravated by system shock
- Think capacity and responsiveness

- **Fascia**

- Respond best to force and dynamics
- Aggravated by numerous factors
- Think movement flow and continuity

HORMONAL RESPONSE TO EXERCISE

Chart via: unmc.edu

Hormone	Stimulant for Release	Target Tissue	Response
Epinephrine	Moderate to intense exercise, stress, hypotension	Skeletal muscle	↑ Glycogenolysis (breakdown of glycogen), vasoconstriction
Norepinephrine	Moderate to intense exercise, hypoglycemia	Adipose tissue, liver	↑ lipolysis (breakdown of fat), ↑ heart rate, ↑ glycogenolysis
Growth Hormone (GH)	Exercise, hypoglycemia	Skeletal tissue, bone, adipose tissue, liver	Stimulation of growth, FFA mobilization, ↑ gluconeogenesis, ↓ glucose uptake
Testosterone	↑ FSH, ↑ LH, exercise (?), stress	Skeletal muscle, bone	Protein synthesis, sperm production, sex drive
Estrogen	↑ FSH, ↑ LH, light to moderate exercise	Skeletal muscle, adipose tissue	Inhibition of glucose uptake, fat deposition
Cortisol	↑ ACTH, intense prolonged exercise	Skeletal muscle, adipose tissue, liver	↑ Gluconeogenesis, ↑ protein synthesis, ↓ glucose uptake
Insulin-like growth factor (IGF-1)	↑ Growth hormone	Almost all cells	Stimulation of growth

FACTORS CONTRIBUTING TO PAIN AND INJURY

1. Basic anthropometrics and genetics

- Longer limbs, also limb ratios (including to torso)
- Bone densities, tendon insertions, nervous system function, etc.

2. General exposure to risk and physical demand

- Wear & tear and "Battle scars"

3. General health & wellness

- Hard to be bulletproof when you eat/sleep like shit

4. Strength ratio & balance

- Consider biotensegrity model

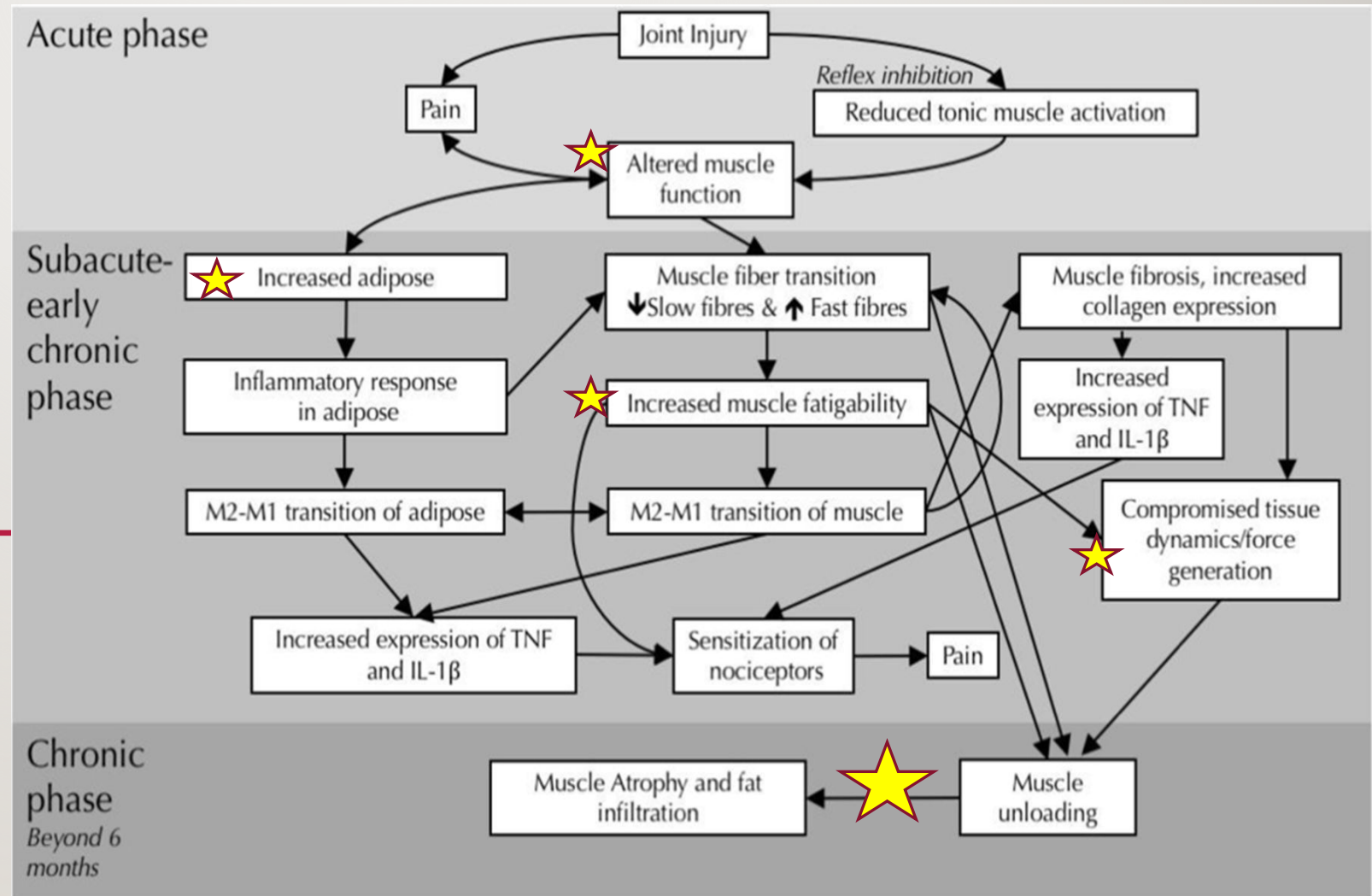
5. Tissue quality

- Look good, *feel* good, play good

6. Literally countless variables; focus on what you can control

JOINT INJURY REFLEX CYCLE

Chart via:
Medicalexhibits.com



PREDICTORS & SEMI-PREDICTORS OF INJURY

- **Predictors**

- I. Injury history
- II. Task/sport demand and exposure

- **Semi-Predictors**

- I. Resting/dynamic postures
- II. Tissue quality
 - Including fascia
 - Too soft vs. too stiff
- III. Active vs. Passive ROM
 - Having access to ROM you can't own/control
- IV. Intolerances and deficiencies

PLAYING OUR PART

- **Can we definitively prevent injury occurrence?**
 - No
- **Can we reduce the likelihood of sustaining injury?**
 - Damn straight
 - Do the best you can with the resources you have and the time you're allotted.
 - Studying for a test doesn't ensure you'll pass, but it damn sure puts you in a better position to do so.

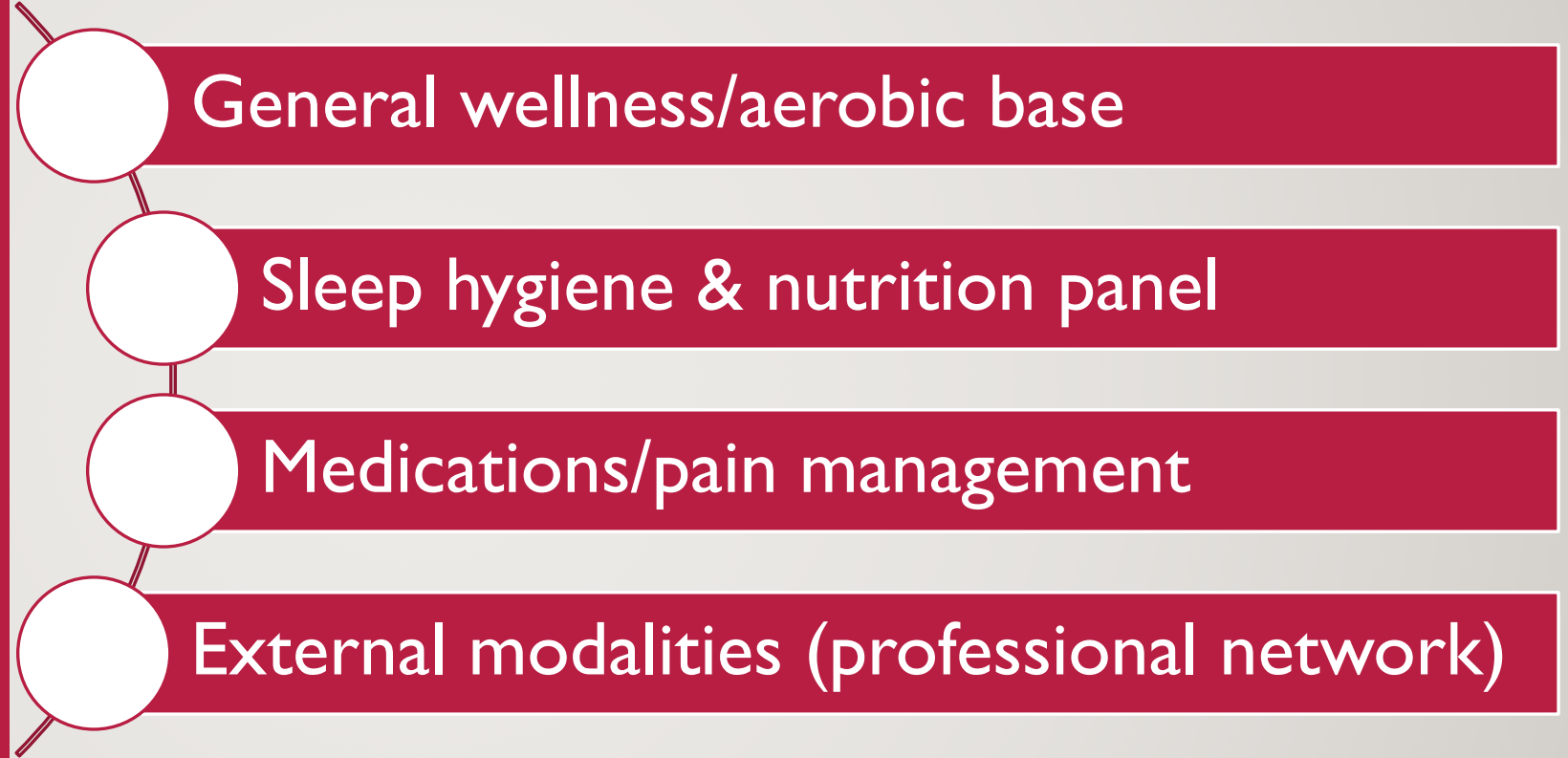
PRELIMINARY CONSIDERATIONS



BIG PICTURE

- **If it causes pain, stay off it (“First, do no harm”)**
 - Our goal is to get them out of pain. There is no “pushing through”
 - Don’t confuse pain with discomfort
- **Know your timeline, consider theoretical norms**
 - Early phase rehab: 0-6 weeks
 - Rehab-conventional: 2-10 weeks
 - Restorative strength: Beyond 10 weeks (missing factor for most)
 - Theoretical norms (i.e. 130° of hip flexion) are good to use as loose guidelines to monitor progress, but don’t live by them
- **Monitor daily pain levels (subjective or otherwise)**
- **Know your boundaries, know your scope. MUST know your anatomy.**
- **Keep the athlete’s goals in mind**
 - You’re always working towards something

VARIABLES
INFLUENCING
PAIN AND
INJURIES

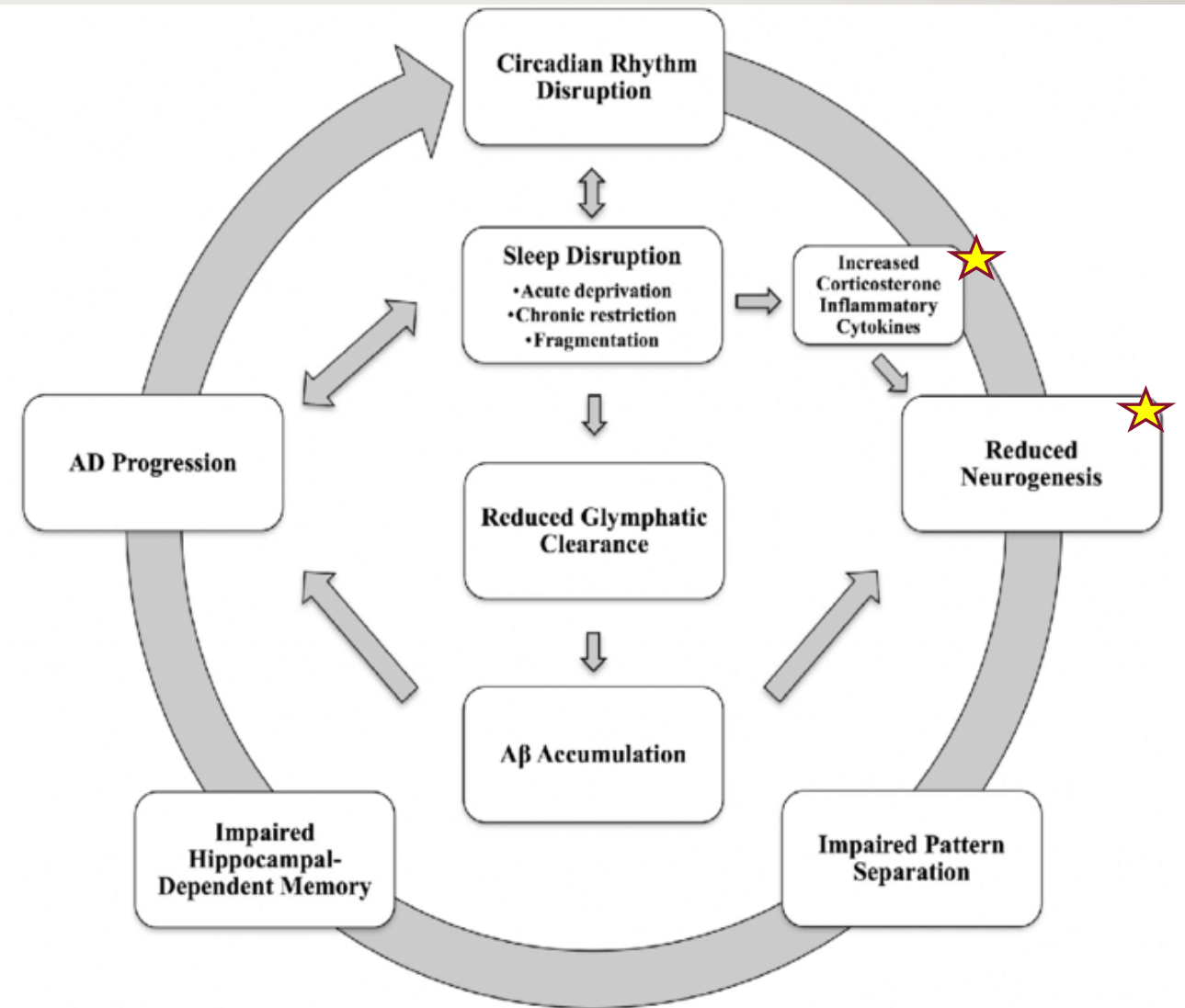


GENERAL WELLNESS & AEROBIC BASE

- **Aerobic baseline**
 - RHR < 60 bpm (Boyle)
 - HRV and heart rate return
 - Blood pressure (consider Valsalva)
 - Stroke volume & Work capacity
- **General health and wellness**
 - High level athlete does not equal high level health
 - Relationship/marital stress
 - Stress management and social wellness
 - Alcohol and narcotic use

DISRUPTION TO CIRCADIAN RHYTHM

Image via: Science Direct

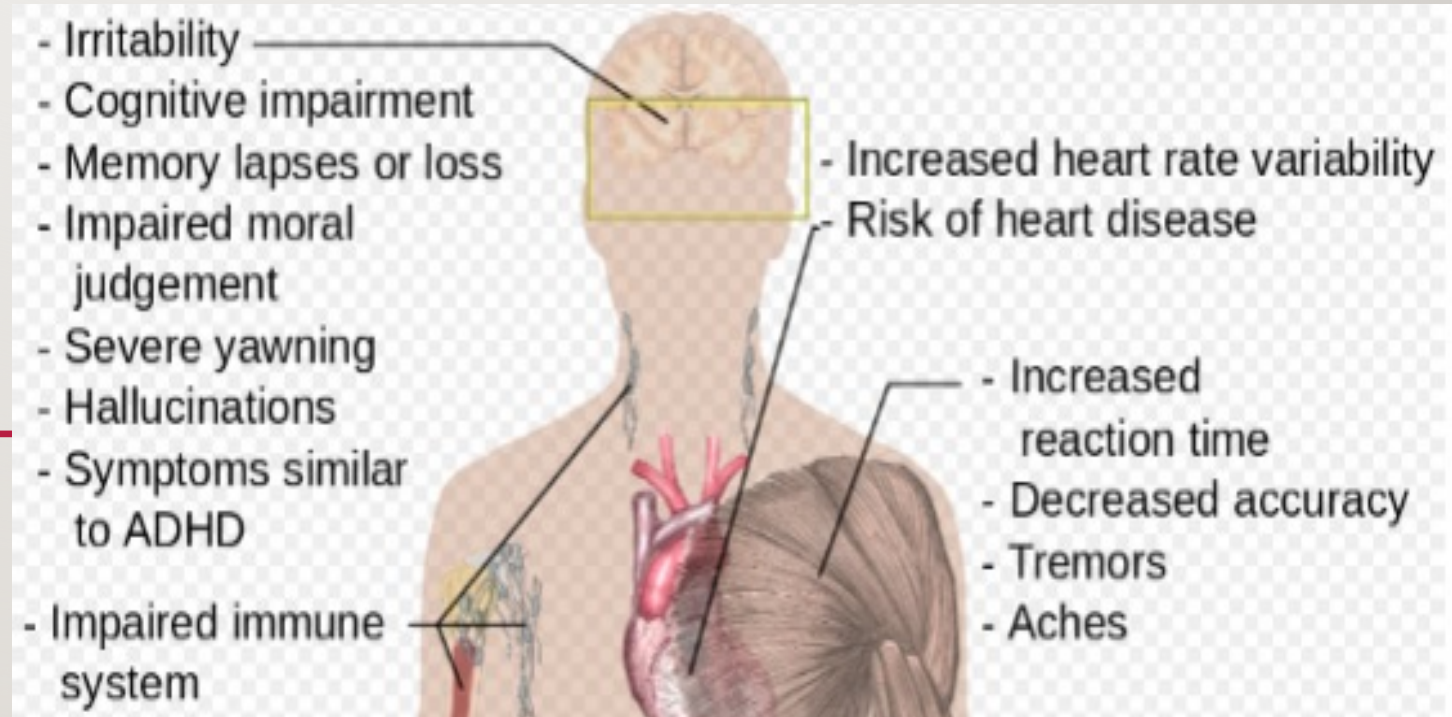


SLEEP HYGIENE AND NUTRITION PANEL

- **Sleep Hygiene and Routine**
 - Less than 7 hrs./night (prolonged) can be detrimental to health
 - Blue light exposure
 - Establishing basic but consistent nightly routine is step 1
- **Nutrition Panel**
 - Don't assume high level athletes are healthy and well
 - Can't out train a bad diet
 - Does the nutrition intake meet the training demand?
- **Hydration**
 - 1-1.5 L/day
 - Micronutrient circulation
 - Tissue quality

EFFECTS OF SLEEP DEPRIVATION

Image via:Wikimedia
Commons (accessed via reddit)



EFFECTS OF RX ON EX

Chart via: ACSM

Drug Class	Examples Drugs Brand (Generic)	Heart Rate	Blood Pressure	Notes and Considerations
Diuretics	Hydrodiuril (hydrochlorothiazide)	↔	↓	
Beta-blockers	Tenormin (atenolol) Lopressor (metoprolol)	↓	↓	HR reductions are 10 to 30 BPM on average
Calcium-channel blockers	Procardia (nifedipine) Cardizem (diltiazem)	↓↔	↓	Effect on HR depends on class of calcium-channel blocker used
ACE inhibitors	Prinivil (lisinopril)	↔	↓	
Lipid medications	Lipitor (atorvastatin), Zocor (simvastatin)	↔	↔	Notable exception is nicotinic acid, which may decrease BP
Analgesic agents	Advil (ibuprofen), Deltasone (prednisone), Celebrex (celecoxib)	↔	↔	
Anticholinergic agents	Spiriva (tiotropium), Atrovent (ipratropium)	↑	↔	
Beta-agonists	Norepinephrine, amphetamine	↑↔	↑↓↔	Effects depend on formulation, dose, and length of use
Vasodilators	Nitrostat (nitroglycerin)	↑↔	↓	
Antiarrhythmic agents	Betapace (sotalol), Lanoxin (digoxin)	↓	↓↔	
Antidepressants	Paxil (paroxetine), Prozac (fluoxetine)	↑↔	↓↔	
Alcohol		↔	↑↔	Potential increase in BP is linked to chronic use
Caffeine		↑↔	↑↔	Acutely may increase HR and BP; chronically has little impact on HR and BP
Nicotine		↑↔	↑	
Antihistamines	Zyrtec (cetirizine), Benadryl (diphenhydramine)	↔	↔	
Hypothyroid agents	Synthroid (levothyroxine)	↔	↓↔	Decreased BP occurs in about half of patients
Weight loss agents	Alli or Xenical (orlistat), Qsymia (phentermine/topiramate)	↑↔	↑↔	Increased HR and BP occur with the use of weight loss agents that are stimulants

EXTERNAL MODALITIES

- **External modalities/referring out**
 - Develop your professional network
 - Is there a demand?
- **Some common examples**
 - Soft tissue therapy (deep tissue massage, dry needling, cupping)
 - Physical therapy/athletic training staff
 - Chiropractic
 - Nutritionist
 - Cardiologist

GROUND ZERO



RESTORATIVE STRENGTH

- **Restorative strength**: Address/improve the areas of weakness & deficiencies, without compromising strengths or performance.
 - Has kind of become my "niche" so to speak
 - A delicate balance in some cases
- Band accommodation
 - Assist/unload/feed movement patterns
(<https://youtu.be/oPKFHZP39wM>)
- Foot position/stance
- Hand grip/position
- Basic to complex spectrum (think LAYERS)
- Building robustness/durability (think RESILIENCY)

Building off your Assessment

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graph LR; A[Building off your Assessment] --- B[Intake Interview: Injury & training history]; A --- C[Static Assessment: Identifying loose structure and relationships]; A --- D[Table Assessment: Identifying boundaries, intolerances & deficiencies]; A --- E[Dynamic Assessment: Observing how the athlete moves organically (how everything seams together)]; A --- F[Planning your Approach: Putting together actionable steps for tangible improvement.]
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Intake Interview: Injury & training history

Static Assessment: Identifying loose structure and relationships

Table Assessment: Identifying boundaries, intolerances & deficiencies

Dynamic Assessment: Observing how the athlete moves organically (how everything seams together)

Planning your Approach: Putting together actionable steps for tangible improvement.

~PLANNING THE APPROACH~

- Sport specific training = Demands of sport + weaknesses and deficiencies identified
- THE ATHLETE LITERALLY GIVES YOU THE ANSWERS TO THE TEST!!
 - Deficiencies vs intolerances
 - Attack what's weak, avoid what's injured
 - Start with general, work to specific
 - Start with basic, work to complex

~SOME COMMON ITEMS FOR ME~

Primary Items to Address:	
SLAP repair	<ul style="list-style-type: none">-Restoring full active flexion ROM-OH shoulder stability & strength-Clean up accompanying scapular movement-Restore (humeral) internal/external rotation.
Lumbar compressions	<ul style="list-style-type: none">-Decreasing chronic low-back pain-Expanding movement capacity-Improving core strength (emphasis on anterior & lateral) and durability.-Improve strength/function of psoas
Ulnar nerve pain	<ul style="list-style-type: none">-Decreasing chronic elbow pain.-Improve hand/grip strength & endurance.-Work dexterity (up to tolerance)-Soft tissue where needed
Disrupted gait, poor resting/working posture	<ul style="list-style-type: none">-Reduce presence of muscular guarding during gait.-Clean up foot pattern (significant medial drop) by strengthening lower leg/hip-Address non-functional asymmetries where needed.
General motor control, vestibular & proprioceptive function	<ul style="list-style-type: none">-Include cognitive task work with gradient complexity in warm-up.-Improve movement capacity spectrum by including variety of primitive patterns.-Include vestibular/proprioceptive drills throughout week.

~DIRECT PLANNING~

Assessment Observation	Training Strategy
Arm <u>drop</u> in shoulder → Likely result of immobilization from SLAP → Excessive hand internal rotation likely due to reattachment being overly taught	-Work to elevate right shoulder girdle by strengthening upper trap -Strengthen external rotators (cuff muscles) to amend excessive internal rotation
Elevation of right side of rib cage → Likely due to muscular guarding for injured shoulder	-Include soft tissue work on internal rotators (pec minor/lat) and strengthen ipsilateral oblique muscles to reset rib cage position
<u>OH</u> flexion deficit in right arm → Right side has ~3/4 ROM compared to left, can get to end-range passively w/o pain	-Introduce OH Movement concepts in weeks 1 & 2, add external load as progress is shown. -Would likely benefit from perturbations and oscillatory methods.
Posture during OH flexion → Forward head posture + rib flare + anterior pelvic tilt + hyperextended knees → Could be natural resting posture that's been exacerbated by injury/lack of activity.	-Strengthen the serratus & anterior core muscles, heavy emphasis on posture mechanics on movement. -Strengthen neck retractors, soft tissue deep cervical flexors, be conscious of cueing head position during movement.
Excessive overpronation during SL balance → Could be consequential of plantar fasciitis history, or weak intrinsic foot muscles	-Soft tissue work on arches (up to tolerance) and work to strengthen foot muscles -Will likely do most training w/o shoes

~BENEFITS OF SL WORK~

- Triplanar stability (hip)
- Improved socket congruency
- Unilateral hip function (think about SIJ)
- Improved intrinsic foot strength

VIDEO COMPILATION
OF SL WORK

<https://youtu.be/yKzTNRg0-LM>

~BENEFITS OF SA WORK~

- Allows joint to work for itself
- Highly beneficial for ribcage
- Increased demand for core/pillar
- Bracing stability mechanics

VIDEO COMP OF SA
WORK

<https://youtu.be/JGcVWkcF3eEg>

~BENEFITS OF CONTRALATERAL WORK~

- Increased demand for motor control
- Increased demand for fascial slings
 - Think about LBP stability
- Demand for proprioception and coordination

VIDEO COMPILATION
OF CONTRALATERAL
WORK

https://youtu.be/o9CsKjf_pSTw

~BENEFITS OF OSCILLATORY WORK~

- Increased neuromuscular demand
- Intermuscular coordination
 - Motor unit synchronization
 - Inhibition/disinhibition
- Intramuscular coordination
 - Rate coding

VIDEO COMPILATION
OF OSCILLATORY
WORK

<https://youtu.be/d5IOM-WC5s4>

~BENEFITS OF OFFSET WORK~

- Increased neuromuscular demand
- Increased demand for core
 - “Only as strong as weakest link”
- Multiplanar stimulus

VIDEO COMPILATION
OF OFFSET WORK

[https://youtu.be/zNpAn0
VSA-M](https://youtu.be/zNpAn0VSA-M)

MODIFYING MOVEMENTS



MODIFYING MOVEMENTS

- **Remove what doesn't fit**
 - No exercise or movement is inherent, reiterate “what can they do and what do they **NEED**”
- **Path of motion first, range of motion second**
 - Own what you have, build from there
- **Create stability before you find it**
 - The body will find a way, we want the right way
- **Create necessary boundaries and barriers**
 - Points of contact/stability
 - Give them what they need
- **Don't be afraid to get crafty**
 - Your job as the coach is to put your athletes in the best position to succeed.

EXAMPLE I: MODIFYING THE BACK SQUAT

- **Common injuries precluding athletes from back squats**
 - Spinal injury/surgery (intolerant to axial compression); or trunk flexion intolerance
 - Shoulder injuries- inability to externally rotate to support barbell
 - Hip injuries- flexion intolerance, groin/adductor injuries
 - Knee injuries- ACL or meniscus?...There's a difference in protocol
 - Ankles/feet- inability to dorsiflex or stabilize the foot
- **Simple adjustments**
 - Change the bar position (i.e. going to a front squat or high vs. low bar)
 - Change the implement (i.e. switching to safety bar, dumbbell, belt squat)
 - Change stance/set-up (i.e. wider/narrower, split squat, box squat, Hatfield, band assisted squat)
 - Modify ROM (including elevating heels)
- **Some things I've noticed**
 - Spinal injury history = no back squats
 - Most shoulder injuries can be accommodated by switching to safety bar/Hatfield
 - Hip injuries can be difficult and highly variable (ROM matters)
 - For ACL injuries, avoid high load partial squats; for meniscus, avoid heavy deep ROM
 - Dorsiflexion impairment can have sweeping effects, start with heel lift

EXAMPLE 1: MODIFYING THE BACK SQUAT

Common Items to Observe & Address

- **Increased trunk flexion**
 - Increases demand on erectors, and hip flexors but reduces demand for knee flexion.
- **More upright torso**
 - Increases demand on knee flexion but spares lumbar and hips.
- **Wider foot position**
 - Reduces demand for hip IR and knee flexion
 - Increases demand for quads and glutes
- **Foot rotation**
 - Increased rotation decreases demand for dorsiflexion

**Back Squat
Modality Video**

<https://youtu.be/hiSAiHl4eyk>

EXAMPLE 2: MODIFYING THE BENCH PRESS

- **Common injuries precluding athletes from bench press**
 - Spinal injury/surgery (i.e. intolerant to lumbar extension)
 - Shoulder injuries- major limiting joint for bench press
 - SLAP tear- excessive humeral extension and anterior glide, lacking stability
 - Cuff tears- limited external rotation, over dominant traps!
 - Elbow/wrist/hand- elbows and wrists can be tricky...
- **Simple adjustments**
 - Change the hand position (i.e. going to wider or narrower grip)
 - Change the implement (i.e. switching to Swiss bar, dumbbells)
 - Change stance/set-up (i.e. floor press, Thompson fat pad, band unloaded)
 - Modify ROM (going to a block style set-up)
- **Some things I've noticed**
 - For spinal injuries, elevating feet alleviates most issues
 - MOST (not all) SLAP and cuff tears = no barbell bench press
 - Most shoulder injuries can be accommodated by switching to dumbbells
 - Block bench is good option to prevent excessive anterior humeral glide and hyperextension
 - Elbows/wrists can be relieved by dumbbells, but sometimes this is a true limiting factor
 - Very few know how to utilize lats for pressing action**

EXAMPLE 2: MODIFYING THE BENCH PRESS

Common Items to Observe & Address

- **Increased trunk flexion**
 - Increases demand on erectors, and hip flexors but reduces demand for knee flexion.
- **More upright torso**
 - Increases demand on knee flexion but spares lumbar and hips.
- **Wider foot position**
 - Reduces demand for hip IR and knee flexion
 - Increases demand for quads and glutes
- **Foot rotation**
 - Increased rotation decreases demand for dorsiflexion and hip ER
 - Decreases demand on hip internal rotators

**Press Modality
Video**

<https://youtu.be/EV6wH47qB-k>

EXAMPLE 3: MODIFYING THE DEADLIFT

- **Common injuries precluding athletes from deadlifts**
 - Spinal injury/surgery (i.e. intolerant to lumbar flexion or thoracic injuries)
 - Hip injuries (i.e. groin/adductor tear, glute tear, or quad/hamstring injuries)
 - Knee injuries (i.e. ligament tear, patellar tendinopathy, cartilage decrements)
- **Simple adjustments**
 - Change the surface (i.e. pulling from blocks or elevated surface)
 - Change the implement (i.e. switching to Hex bar, suspended dumbbell/kettlebell)
 - Change stance/set-up (i.e. wider vs narrower stance, modifying torso position)
- **Some things I've noticed**
 - For MOST (not all) spinal injuries, barbell deadlift from the floor is a no-go
 - Elevating the surface cleans up a lot of issues
 - Switching to hex bar has cleaned up a lot of issues (for my population, at least)
 - Reduced ROM is likely best option for knees
 - Torso inclination (or lack thereof) is major variable for hip and low back population

EXAMPLE 3: MODIFYING THE DEADLIFT

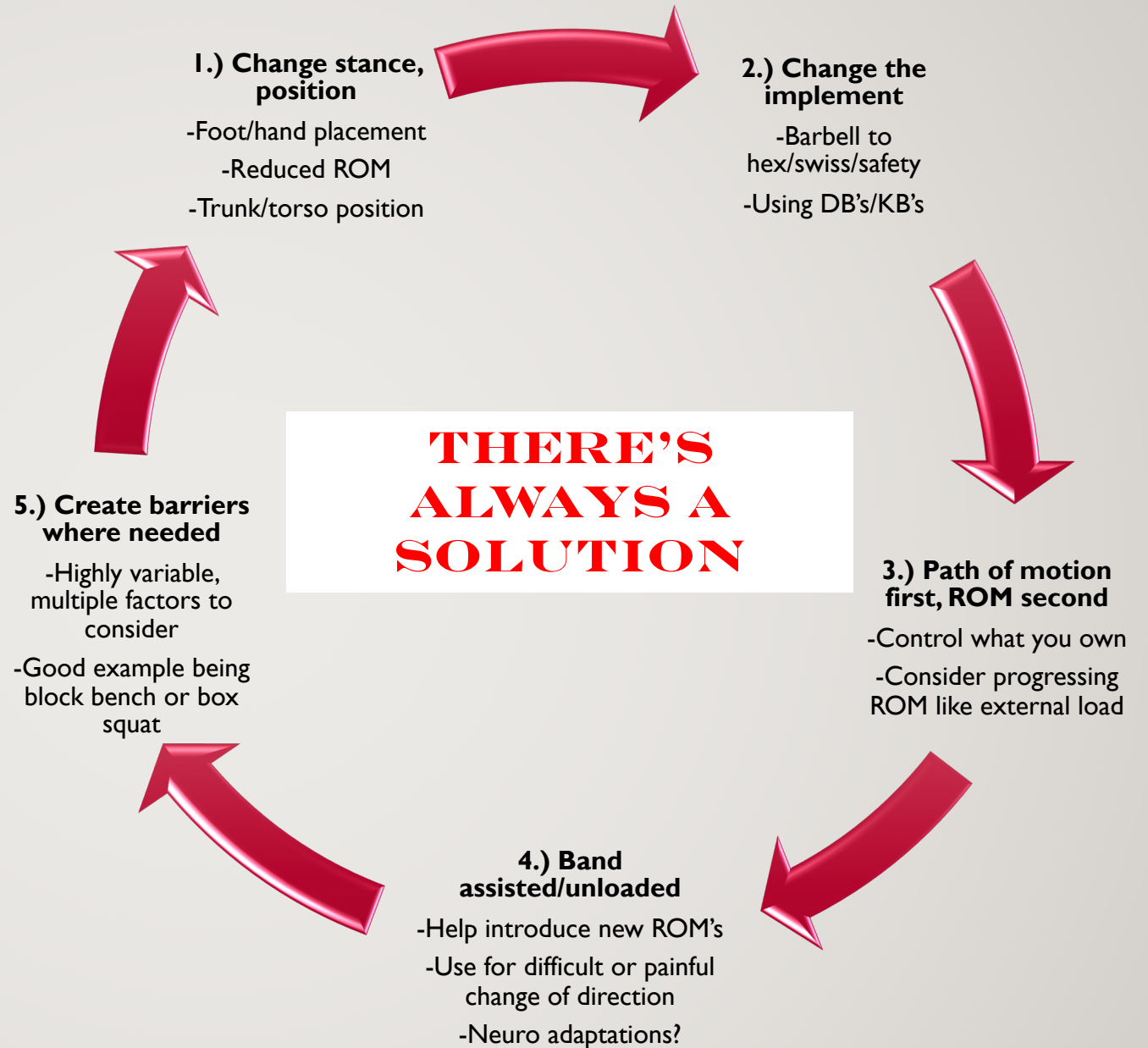
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 - Reduces demand for hip IR and knee flexion
 - Increases demand for quads and glutes
- **Foot rotation**
 - Increased rotation decreases demand for dorsiflexion
 - Decreases demand on adductors

Deadlift Modality Video

<https://youtu.be/ZSeC8OaTDTY>

SO WHAT DO
WE NOTICE...



STRATEGIES FOR IMPROVEMENT



Strategies for Improvement

Specifically address the items of concern; then think proximal to distal

Train above and below, consider agonist/antagonist relationships

Active vs. Passive ROM: Don't seek to increase ROM, work to close difference between the two

- 1.) Isolated/independent strength
- 2.) Global/integrated strength
- 3.) Adding layers to movement

Work to eliminate non-functional asymmetries and gross compensatory patterns

SPECIFICALLY
ADDRESS THE
ITEMS OF
CONCERN;
THEN THINK
PROXIMAL TO
DISTAL

- **Prioritize their priorities (keeping the goal the goal)**
 - If someone comes to you with an elbow injury, treat the elbow!
 - You must demonstrate interest and emphasis
- **Proximal to distal**
 - Consider the nervous system
 - All human movement involves the spinal cord
- **Avoid chasing pain**
 - Paralysis by analysis

TRAIN ABOVE AND BELOW, CONSIDER AGONIST/ ANTAGONIST RELATIONSHIPS

- **Above and below**
 - In some ways, this builds from proximal-to-distal theory
- **Agonist/antagonist relationship**
 - Sherrington's Law of reciprocal inhibition (not always so simple!)
 - Locked long vs locked short
- **Shoulder example**
 - Consider tension of anterior neck muscles, and effect that has on collarbone position, which then affects the shoulder joint itself
 - Consider the laxity of the elbow, and if limitations could be correlated to shoulder function
 - Lat/trap balance (BIG ONE!)
 - Bicep/triceps balance

ACTIVE VS. PASSIVE ROM

- **What's the goal here?**
 - The preliminary goal is **NOT** to increase ROM, which can be damaging for some athletes
 - The goal **IS** to close the gap between active and passive ranges
 - Smaller gap = less likely to sustain injury (*according to logic*)
 - Once the gap is narrowed, then we can work to increase total ROM
- **Common example**
 - Hip internal rotation: Right: 15° (passive) 5° (active) Left: 20° (passive) 15° (active)
 - Instead of trying to increase total passive ROM (which according to theoretical norms would be needed), work to close the gap on the right hip first.
 - Once established, then look to increase internal rotation on both hips to meet theoretical values (~30°)
 - Take note of how this affects hip external rotation, flexion, and extension

STAGES OF PROGRESSING MOVEMENT

1. Isolated/Independent Strength

- Identify what's independently weak through manual muscle testing during assessment
- Work to develop foundational localized strength
- Here we're thinking basic, foundational strength applications (single-joint, uniplanar, up to tolerance)

2. Global/Integrated Strength

- Once independent strength has been attained, challenge the system in a more complete fashion (i.e. going from a quad extension to partial squat)
- Be sure to monitor any compensation patterns or aberrant movement

3. Layering Movement

- Once integrated strength is established, look to challenge the system in a more complex/demanding nature. This can include a host of variables, but my preferred options are:
 - Adding tempos
 - Blending cardinal planes (offset band)
 - Adding perturbations, oscillatory loading, and combination movements

WORK TO ELIMINATE NON- FUNCTIONAL ASYMMETRIES AND COMPENSATORY PATTERNS

- **Functional vs. Non-Functional Asymmetries**
 - EVERYONE has muscular imbalances... These are not inherently items to “fix” or address
 - **Functional Asymmetry**: A noticeable muscular difference bilaterally, used to create competitive advantage in sport/duty. (i.e. shoulder difference in a college baseball pitcher)
 - **Non-Functional Asymmetry**: An egregious imbalance bilaterally that does not provide competitive advantage in sport. (i.e. 12 mm difference in L/R hip height).
 - Big part of the driving force for my application of core training
- **Compensatory Patterns**
 - Another one that can be tricky... a big misnomer in my realm is protective tension (i.e. guarding the scaps with the traps)
 - Investigate what doesn't look right, but don't assume everything is problematic

BRINGING IT ALL TOGETHER



GENERAL GUIDELINES

AREA OF CONCERN	INCLUDE	AVOID
Shoulder ~Impingement~ ~SLAP~ ~CUFF~	<ul style="list-style-type: none"> -Independent strength for area -Oscillatory and perturbation work -Restoring scapular ROM and scap:humeral rhythm -Improve inner back strength -Restore humeral ext. rotation 	<ul style="list-style-type: none"> -OH flexion beyond tolerance -Deep ranges of humeral extension -Contributing to established compensatory patterns (i.e. traps guarding scaps)
Spine ~NSLBP~ ~Disk herniation~ ~Surgical procedures~	<ul style="list-style-type: none"> -Improve anterior core strength -Increase multiplanar capacity -Hamstring strength/ extensibility -Breathing mechanics/function 	<ul style="list-style-type: none"> -Compressive axial loading -Excessive trunk flexion/extension -Prone position (case specific) -Heavy/prolonged isometric loading
Hips ~Impingement/FAI~ ~Labrum tear~ ~Groin/adductor strain/tear~	<ul style="list-style-type: none"> -SL movements to improve unilateral hip function -Improve glute strength (*frontal plane) -Hamstring/quad balance -Don't forget about adductors! 	<ul style="list-style-type: none"> -Deep ranges of hip flexion (particularly under load) -Contributing to bad or faulty patterns (i.e. lateral shift, unilateral hike) -Anything inducing pain

GENERAL GUIDELINES

AREA OF CONCERN	INCLUDE	AVOID
Knees ~Tendonitis (quad, patellar, ITB)~ ~Ligament sprains/tears~ ~Degenerative cartilage~	- Single leg work for triplanar stability; think about screw-home mechanism - Appropriate balance of quad:ham - Strengthening the quad muscles w/ variation - Strengthen lateral glute muscles - Eccentrically strengthen hamstrings	- Flexion angles that induce pain <40 for ACL >90 for meniscus/cartilage - Repetitive hi force/ground contact “jogging” - Deeper angles of dorsiflexion under velocity
Ankles/Feet ~Achilles strain/rupture~ ~Plantar fasciitis~ ~Toe injury (toe turf)~	- As much work out of shoes as possible (nothing w/ force impact) - Soft tissue work on plantar/calf - Isometric foot strength (closing gap, floating heel) - Increase controlled dorsi. under load	- For achilles rupture, be very mindful of load & velocity of movement - Excessive movements requiring big toe extension - DO NOT IRRITATE PLANTAR!
Chronic/Global ~No specific diagnosis, but not right~ ~Generally don't move well~ ~Just... fat & out of shape...~	- A shit ton of variety - Anything that helps subjective pain! Don't buy the backlash on this, nothing wrong w/ placebo - Things that reduce the intimidation factor of training	- Anything that induces pain - Anything that validates fear or intimidation, demotes self confidence - Setting athlete up for failure

MAIN TAKEAWAY POINTS

- Don't focus on the problem, find the solution
 - Can very much be a trial and error process
 - Micro progressions and constant goal setting
- Restorative strength
 - Rehab + performance training
 - Finding the weak links
- Consider multiple factors needed
 - All systems are in play and need to be considered
 - Don't be afraid to network/refer out
- Wellness is essential
 - Consider aerobic base
 - Multiple stressors, one pool
 - Lacking good health will sig perturb rehab timeline
- Everything starts with the assessment
 - Let them show you what they need
- Wide spectrum of movement and stimulus
 - Different tissues/systems respond differently
- Modify what's needed, scrap what doesn't fit
 - Ok to think outside of box

THANK YOU FOR YOUR TIME! I
HOPE YOU WERE ABLE TO GET
SOMETHING OUT OF THIS.

PLEASE BE SMART, AND STAY
SAFE DURING THESE TIMES OF
UNCERTAINTY

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