Hypermobility 111: Cervical Instability

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- If you want to learn more about anatomy and diagnostic testing there is a recorded lecture available on my website.
- Slide handouts and recording available at: https://webspace.clarkson.edu/~lrussek/hsd.html

Who Am I?

- Professor Emeritus, Physical Therapy Department, Clarkson University
- Retired PT, St. Lawrence Health System, Potsdam NY
  - Clinical specialties: hypermobility, fibromyalgia, headaches, temporomandibular disorders
- Member: Ehlers-Danlos Society Medical and Scientific Board
- Chair: The Allied Health Working Group of the International Consortium of Ehlers-Danlos Syndromes and Hypermobility Spectrum Disorders
- Frequent presenter to professional and patient groups at national and international conferences
- Author of multiple review and research articles on hypermobility
- Author: “Pain Mechanisms in HSD” in Di Bon, *The Integral Movement Method for Hypermobility Management*
- Author: “Chronic Pain” chapter in *Physical Rehabilitation* textbook for PT students
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I do not have any conflicts of interest to report

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Hypermobility Lecture Series

- HSD 101: Basics of HSD/hEDS and self-care
- 9/24/21 - HSD 102: POTS and POTS self-care, basics of MCAS
- HSD 103: Pain management in HSD/hEDS
- HSD 104: Safe exercise selection and progression with HSD/hEDS
- HSD 104 part 2: How to Modify Exercises for HSD & POTS – nuts and bolts.
- HSD 105: NEW: Posture and joint protection
- HSD 106: Gut issues in HSD/hEDS, POTS, MCAS
- HSD 107: Fatigue in HSD/hEDS and POTS
- HSD 108: Headaches, migraines, and TMJ pain in HSD, POTS and MCAS
- HSD 109: Breathing dysfunctions in HSD
- HSD 110: Lumbar instability
- HSD 111: Cervical instability
- HSD 112: Activating the vagus nerve to manage HSD, POTS and MCAS
- HSD 113: The role of fascia
- HSD 114: Hospitalization and Surgery in HSD, POTS, MCAS
- HSD 115: Functional Neurological Disorder
- **HSD 116: *NEW* Bleeding disorders in HSD**

I will refer to these if you want more info

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Relevant Handouts Available

I will refer to these if you want more info

https://webspace.clarkson.edu/~lrussek/research.html

- **Cervical Instability:**
  - Upper cervical Instability. (UCI). Patient handout. Full text of UCI article.
  - A very comprehensive patient guide to EDS cervical instability by EDSawareness.
- **Self-Care Strategies**
  - Headache Trigger Points. Many headaches are caused by trigger points from overactive muscles trying to stabilize the neck.
  - Temporomandibular Disorder (TMD).TMD, or TMJ problems, are common in HSD, and particularly with cervical instability.
  - Self-Care Toolbox. A checklist to help you optimize your self-care toolbox.
  - Breathing. Breathing incorrectly can increase cervical instability, pain sensitivity, headaches, & jaw pain
  - Posture. Good posture decreases strain on muscles and joints, and can prevent many problems.
  - Joint Protection Strategies Learning to protect your joints and muscles is the first step towards healthier and stronger joints.
  - Sleep Hygiene and Positioning. Sleep posture and sleep hygiene strategies.
- **Pain Management**
  - Pain flare management plan - PDF version. Create a flare management plan so you know what works when you have a flare.
    Free chronic pain management apps for teens
  - Pain Sensitization: Nociplastic pain. Explains pain mechanisms, including nociplastic pain.

DISCLAIMER

The information in this presentation is for general purposes, only, and may or may not apply to your situation.
Check with your health care provider
before starting any new exercises or treatments,
to ensure that they are appropriate and safe for YOU.

I cannot diagnose you or provide personal medical recommendations, and this lecture should not be used for those purposes.

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Objectives

At the end of today's session, participants should be able to:

1. List signs and symptoms of cervical instability
   - Focus will be on upper cervical instability, which is often more severe
2. Identify things you can do to minimize cervical instability
3. Recognize when conservative care (PT and self-care) can manage cervical instability, and when you might need to see a neurologist or neurosurgeon

If you are interested in the anatomy and diagnostic testing for UCI, please see Part 1, recording on my website

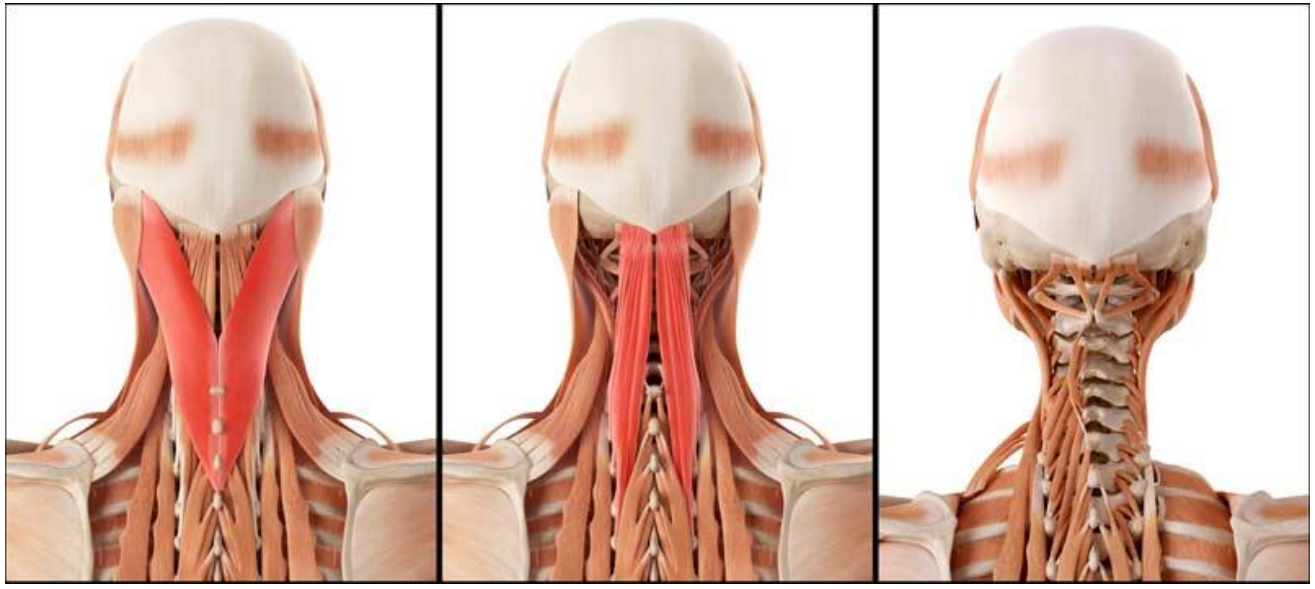
Understanding Instability

What Is Cervical Instability?

- Inability to control spinal movement within the 'neutral zone.'
- Cervical stability is normally a combination of:
  - Passive structures, such as the disc, facet joints and ligaments
  - Muscles acting on or affecting the spine
  - Neurological system (brain and nerves) that controls the muscles
- People with hypermobility have stretchy passive structures.
- **BUT, what makes the spine unstable is failure of the muscles and nervous system to provide control.**
- **The difference for people with HSD is that they are more vulnerable to instability and they don't need an injury to cause instability; inactivity can cause instability in HSD.**

Different Muscles Have Different Jobs

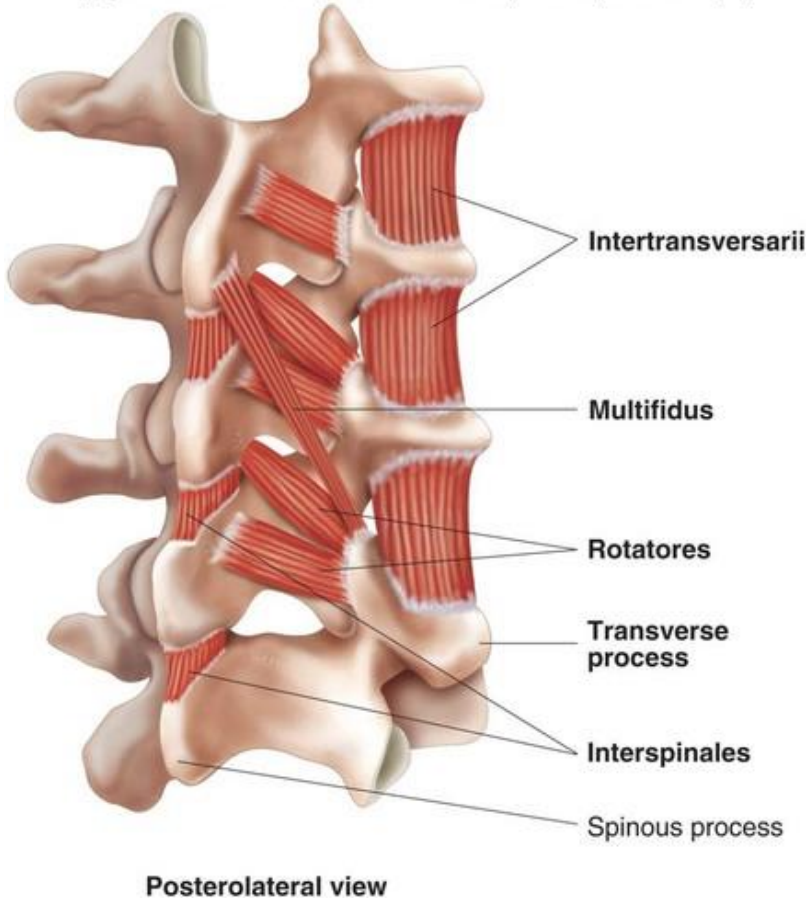
- Local stabilizers
  - e.g., multifidi, deep neck flexors
  - Are inhibited by pain
  - Weakness → instability
- Global stabilizers
  - e.g., semispinalis
  - Primary job is to control movement
  - Often become weak and long
- Global mobilizers
  - e.g., sternocleidomastoid, upper trapezius, splenius
  - Respond to pain by going into spasm
  - Tightness in these muscles causes imbalances elsewhere



global mobilizer | global stabilizer | local stabilizers

(Gibbons, 2001)

Body Awareness Role of Deep Muscles



Posterolateral view

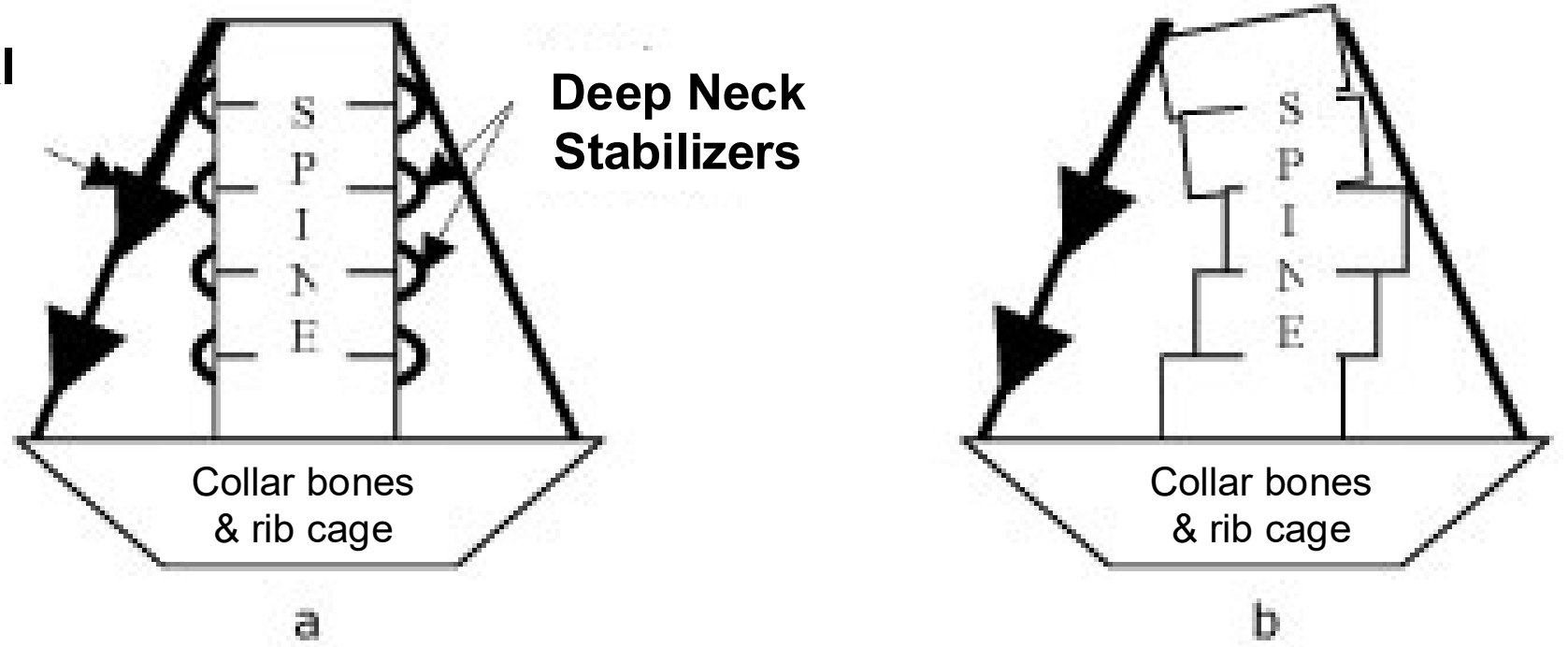
- Deep stabilizing muscles provide position and movement awareness in the spine
  - Deep muscles have more position sensing nerves than other muscles
- People with HSD/hEDS often have poor body awareness
- Treatment often needs to start with restoring this body awareness

- Russo, 2018

https://brentbrookbush.com/articles/anatomy-articles/muscular-anatomy/rotatores-interspinales-and-intertransversarii/

Core Stabilization Concept

Superficial Neck Muscles



- The deep neck stabilizers hold vertebrae in alignment, and sense position.
- Instability occurs when the short, deep, stabilizing muscles are not effective.
- The long, superficial muscles try to stabilize, but actually make instability worse.
  - Superficial muscles are overactive from chest breathing, stress, poor posture.
  - Superficial muscles often cause pain, but are not the primary cause of the problem.

(picture from https://www.physio-pedia.com/images/d/dd/Ms_systems.jpg)

Is It Cervical Instability?

The next few slides are in my Upper Cervical Instability handout

Not all neck problems are due to instability!

For instability, the following 3 criteria should be met:

1. Signs & symptoms of cervical instability (looks like cervical instability)
   - *(signs and symptoms consistent with cervical instability)*
2. Symptoms are affected by neck movement or position (caused by the neck)
   - *(related to the neck movement, not due to other causes)*
3. Symptoms are irritable (easily provoked) and slow to calm down
   - *(not just due to the neck, but due to neck instability)*

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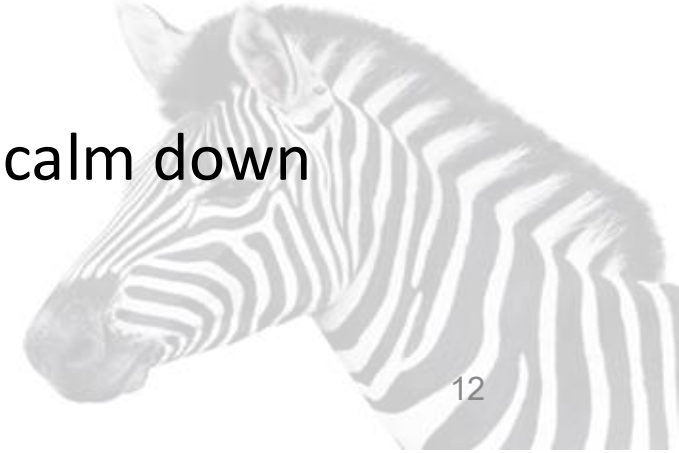

Musculoskeletal Signs & Symptoms of Cervical Instability

	Com-mon	Diag-nosti c
Heavy/bobble head, feel like you need to support or brace your head to decrease symptoms		X
Fearful about beginning or controlling neck movement or travel in vehicle		X
Lump in throat, trouble swallowing		X
Consistent clicking or clunking in the neck associated with neck movement *		X
Cervical sensorimotor symptoms such as tinnitus, dizziness *		X
Suboccipital headaches *	X	
Yoke/coat-hanger distribution pain *	X	
Neck tension, muscle spasm *	X	
Brain fog	X	
Inconsistent or poor response to treatment for the neck	X	
Sleep disturbance, snoring, sleep apnea	X	

Pain, alone, may indicate a neck problem, but is not a good indicator of cervical instability

* Also typical of lower cervical spine instability

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Neurological Signs & Symptoms of Cervical Instability

	Com-mon	Diag-nosti c
Seizure-like events, diagnosis of 'non-epileptic seizures' or 'pseudo seizures'		X
Fainting not associated with dysautonomia (e.g., provoked by neck motion, or without POTS dizziness)		X
Lump in throat, choking, trouble swallowing, voice changes		X
Symptoms of dysautonomia (especially if not responding to standard treatment), persistent anxiety, functional GI dysfunction, poor temperature regulation, heat intolerance, presyncope	X	X
'Boat rocking' instability, feeling like you are on a wobbly boat (not due to musculoskeletal issues)		X
Ataxia: Poor coordination (not due to joint instability) *		X
Facial tingling/numbness		X
Pulling sensation in face, head, teeth, tongue (muscle contraction, not just pain)		X
Vision changes- trouble with convergence, double vision, aura (teichopsia)		X
Dystonia: involuntary muscle contractions causing involuntary movements or postures *		X
Intermittent numbness or tingling in the limbs, not associated with local issues *		X
Sleep disturbance, snoring, sleep apnea	X	
Cognitive changes, difficulty thinking		X

* S&S of lower cervical spine instability

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Aggravated by Neck Position/Movement

- Increased symptoms with neck motion into or when held in flexion, extension, and/or rotation; especially increased neurological symptoms
- Fearful of neck extension (e.g., washing hair, going to hairdresser)
- Increased symptoms when leaning forward, looking down, or forward head posture, e.g., using computer
- Increased symptoms when upright with neck unsupported
- Decreased symptoms when neck in neutral or wearing a neck brace
- Apprehension, anxiety, or fear of neck being touched

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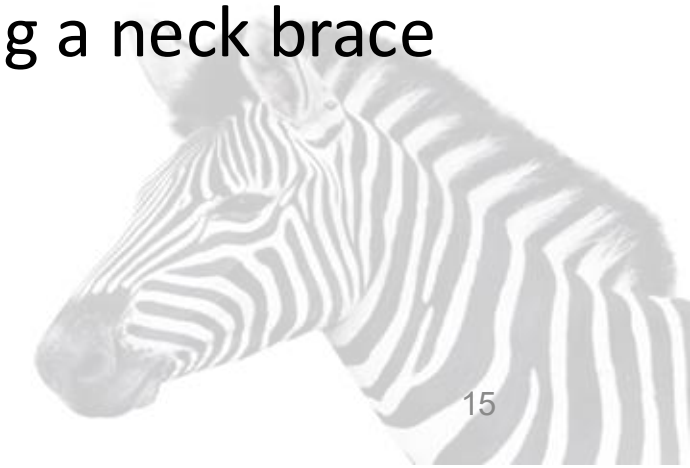

Signs & Symptoms Easily Flared (Irritable)

- **Condition is easily flared:**
  - Flares disproportionate to provocation. e.g., aggravated by minor movements, traveling in car/bus, unstable postures.
  - Fainting or seizure-like episodes from neck extension or rotation.
- **Takes a long time to calm after flare:**
  - Provoked UCI symptoms take excessive time to settle to pre-flare state:
    - e.g., >24 hours for pain or >several hours for neurological signs
  - Regularly need to wear a cervical collar or lie down to ease symptoms after a flare
  - Inability to tolerate being upright for >24 hours after flare

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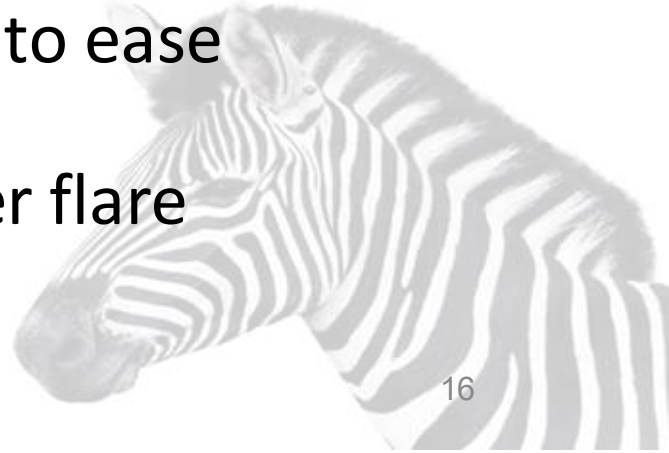

Indications that UCI may be Severe

- Poor tolerance to any time vertical (sitting standing) not POTS-like
- Bed bound due to cervical symptoms
- Need to use a walker or wheelchair due to moderate or intermittently severe problems with coordination/balance rather than pain/weakness
- Extreme cervical spine guarding with fear of movement because severe symptoms are so easily provoked
- Choking episodes, trouble swallowing, voice changes
- Profound visual disturbances
- Severe nausea with any neck movement, not due to vestibular issues

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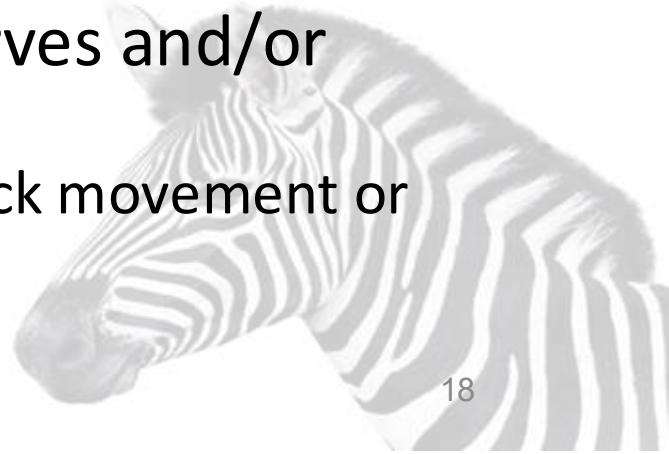
Functional Neurological Disorder (FND)

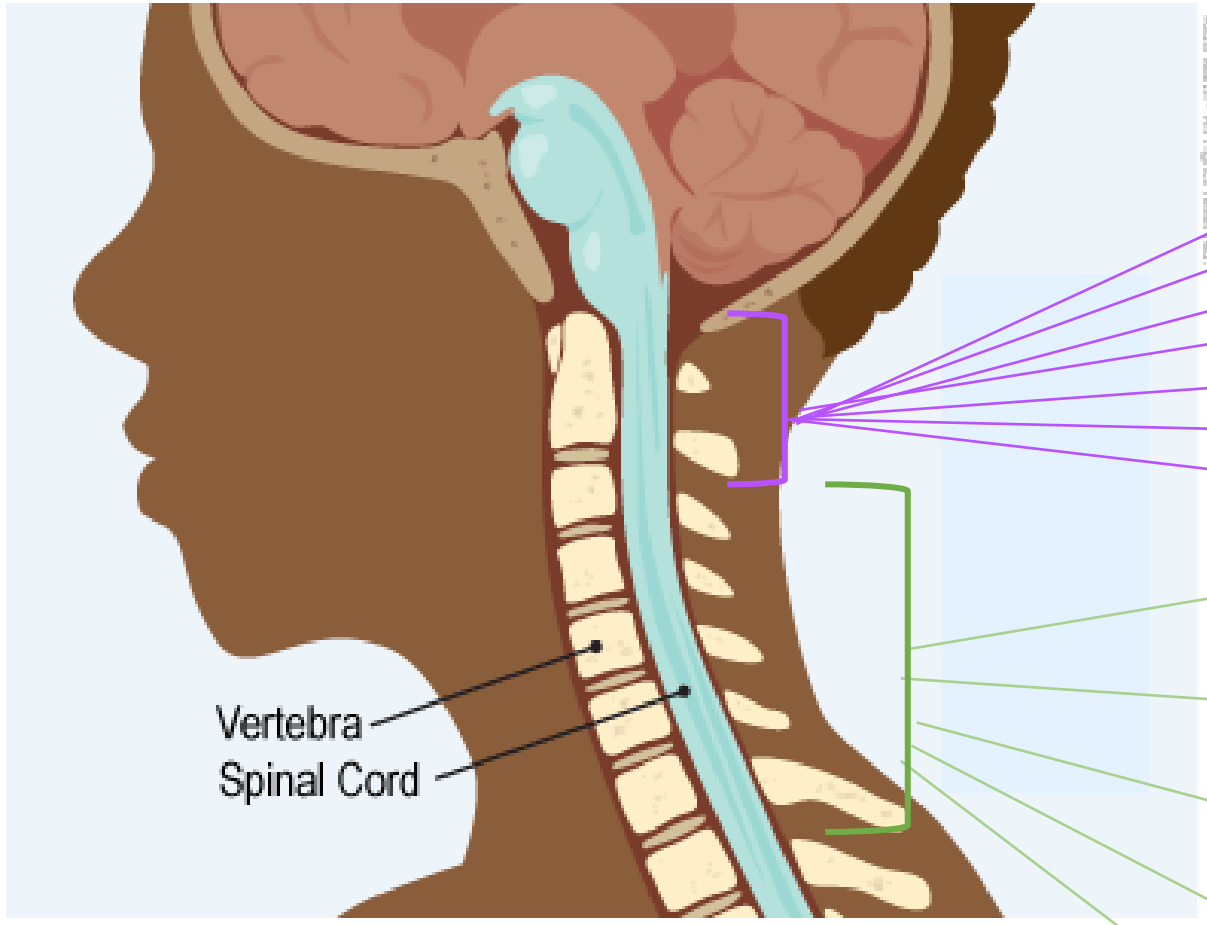
HSD 115: FND

- FND and UCI can look a lot alike, and often get misdiagnosed.
  - People with EDS may have both, so should be tested for both if they present with weird neurological problems.
- FND is a 'software' problem where nervous system is not functioning correctly.
  - If your neurological problems change based on what instructions you have been given (e.g., "try to walk normally" vs. "don't spill this cup of water while you walk"), if your seizures last more than 2-3 minutes, suspect FND.
- UCI is a 'hardware' problem where compression of nerves and/or spinal cord or brainstem causes malfunction.
  - If your neurological problems change primarily based on neck movement or alignment (upright vs. lying down), suspect UCI.



Potential Sources of Problems

See Recorded Part 1 for anatomy and diagnostic testing



- Cord/brainstem compression
- Cranial nerve compression
- CSF blockage, Chiari
- Vertebral or carotid artery occlusion
- C1-C2 spinal nerves
- Joint capsules
- Trigger points and muscle spasm

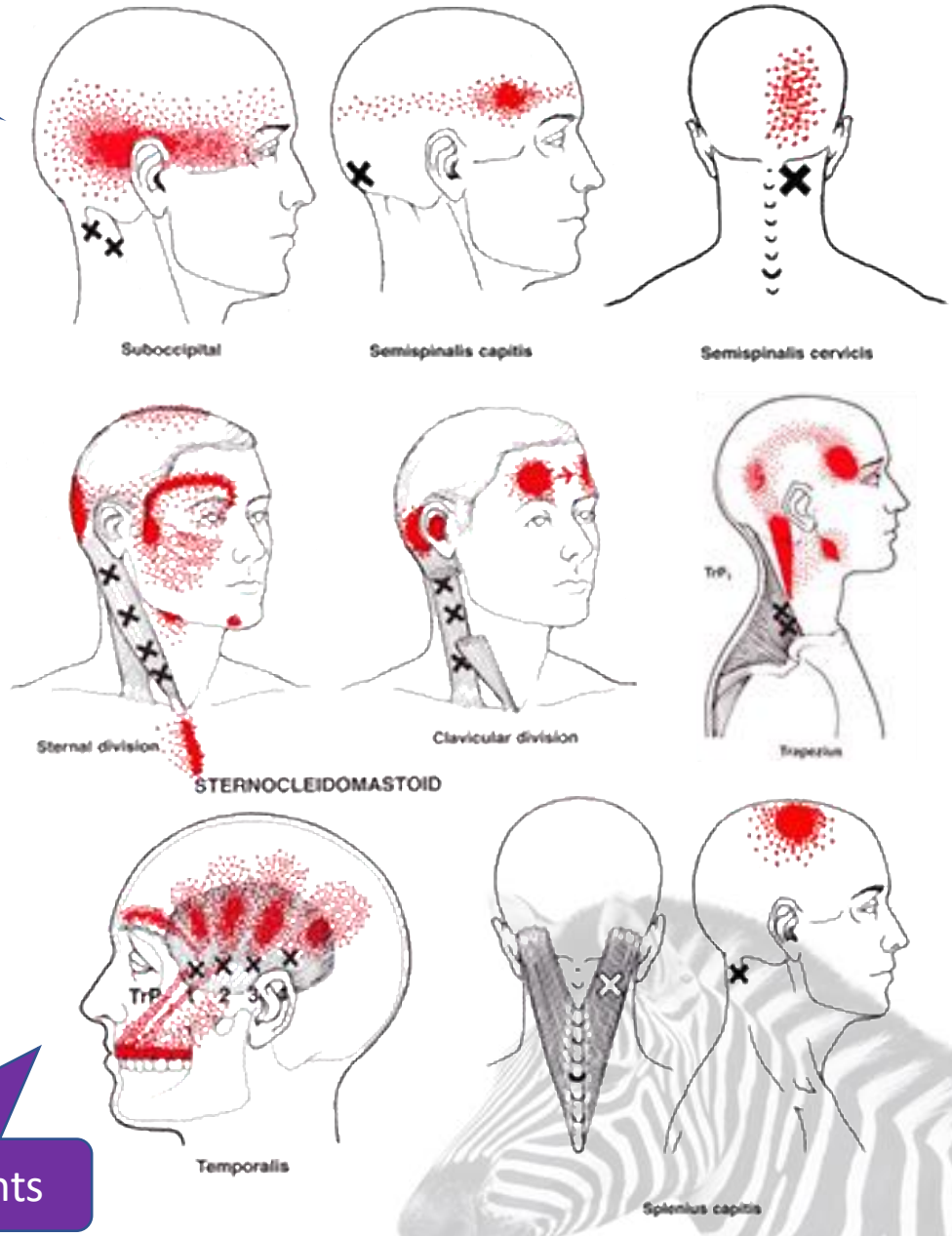
- Cord compression
- CSF blockage
- Spinal nerves C3-C8
- Joint capsule, meniscoids
- Trigger points and muscle spasm

Musculoskeletal
Vascular
CNS

(CFS=cerebrospinal fluid)

Trigger Points (TrP)

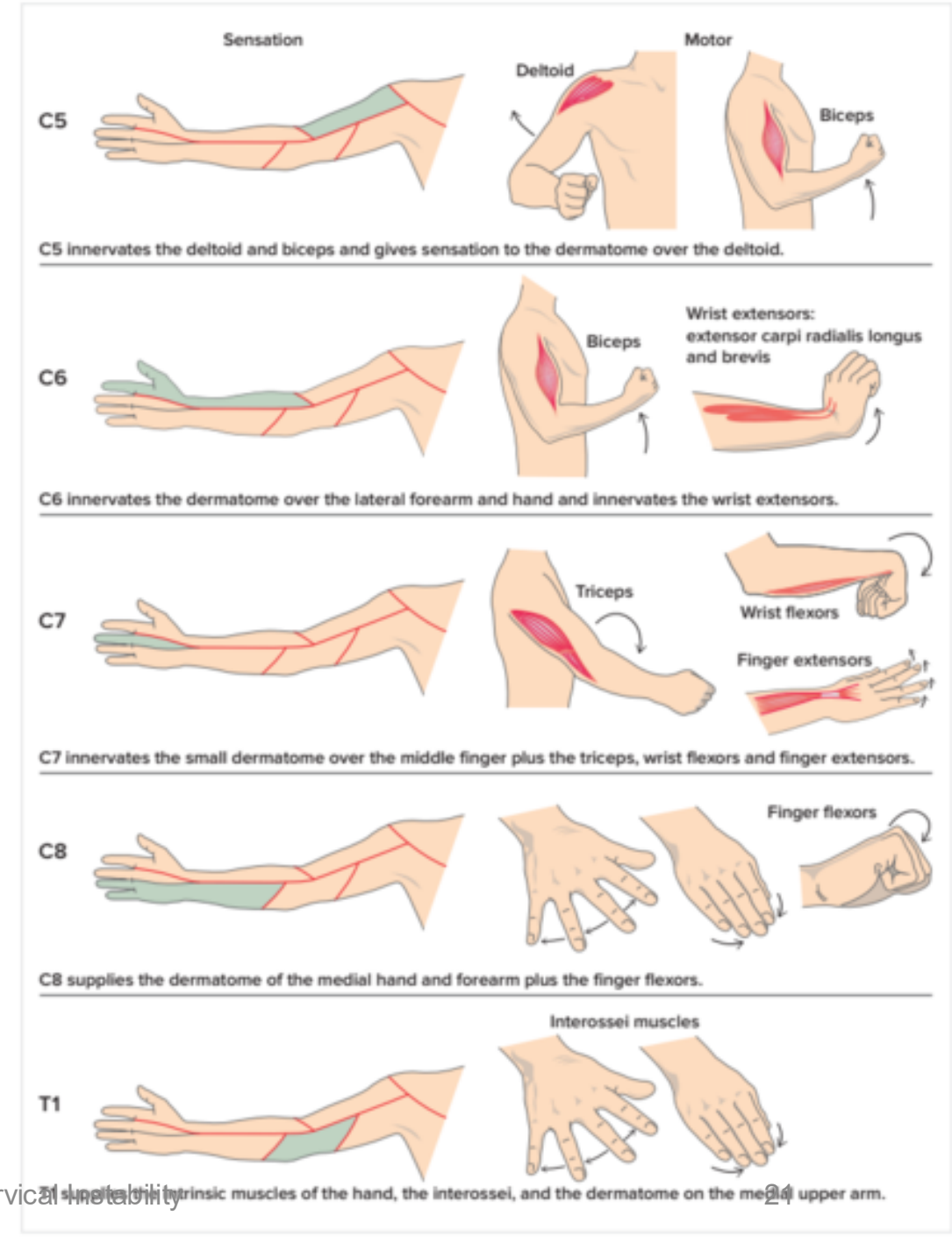
- Neck and head pain may be due to TrP in overworked muscles
- Typically found in the superficial muscles
- Common in even mild or lower cervical instability
- Created when superficial muscles are overworked because of:
  - Unstable joints
  - Poor posture (including sleep)
  - Poor body awareness (proprioception)
  - Weak/inactive deep neck stabilizing muscles

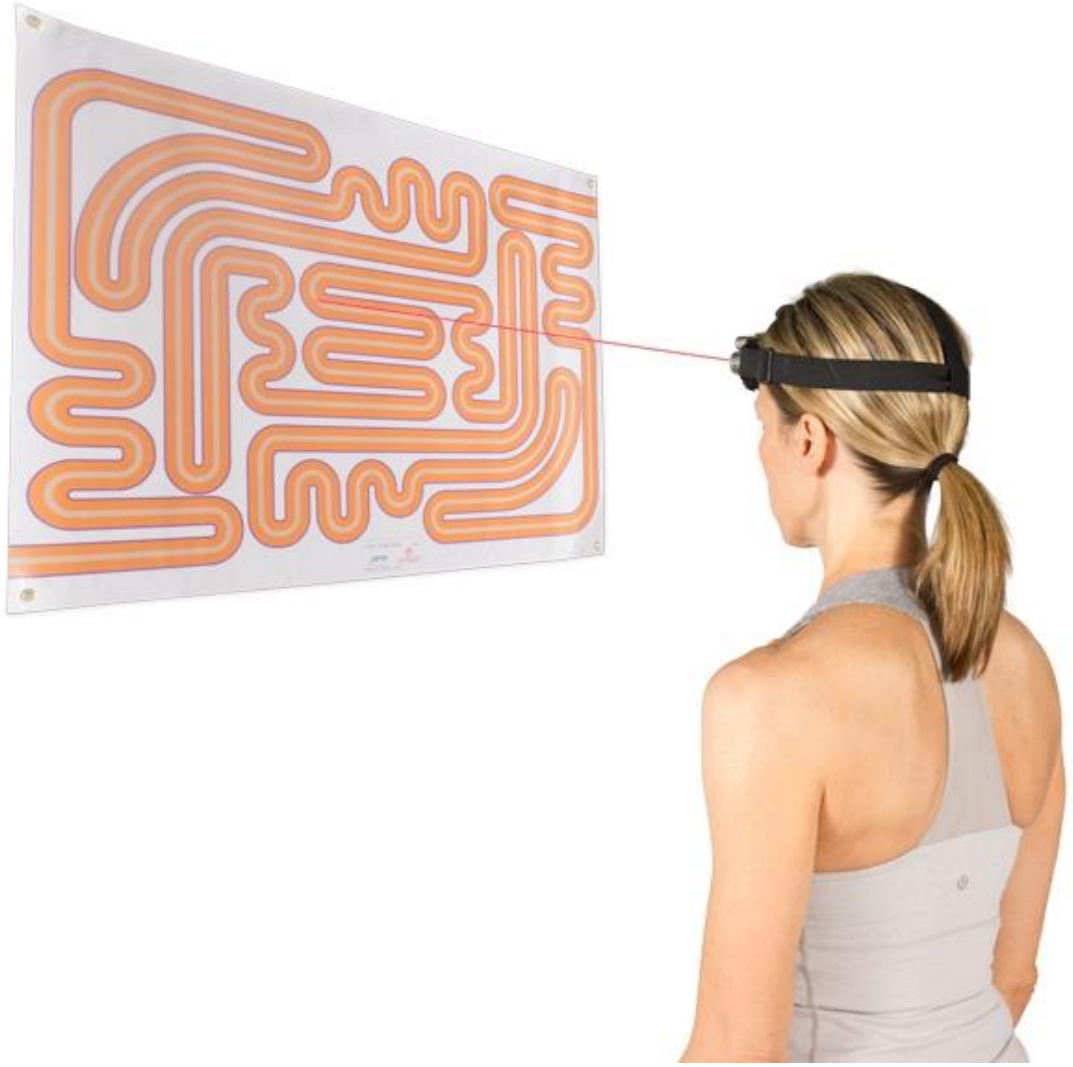


Headache Trigger Points

Radiculopathy due to Lower Cervical Instability

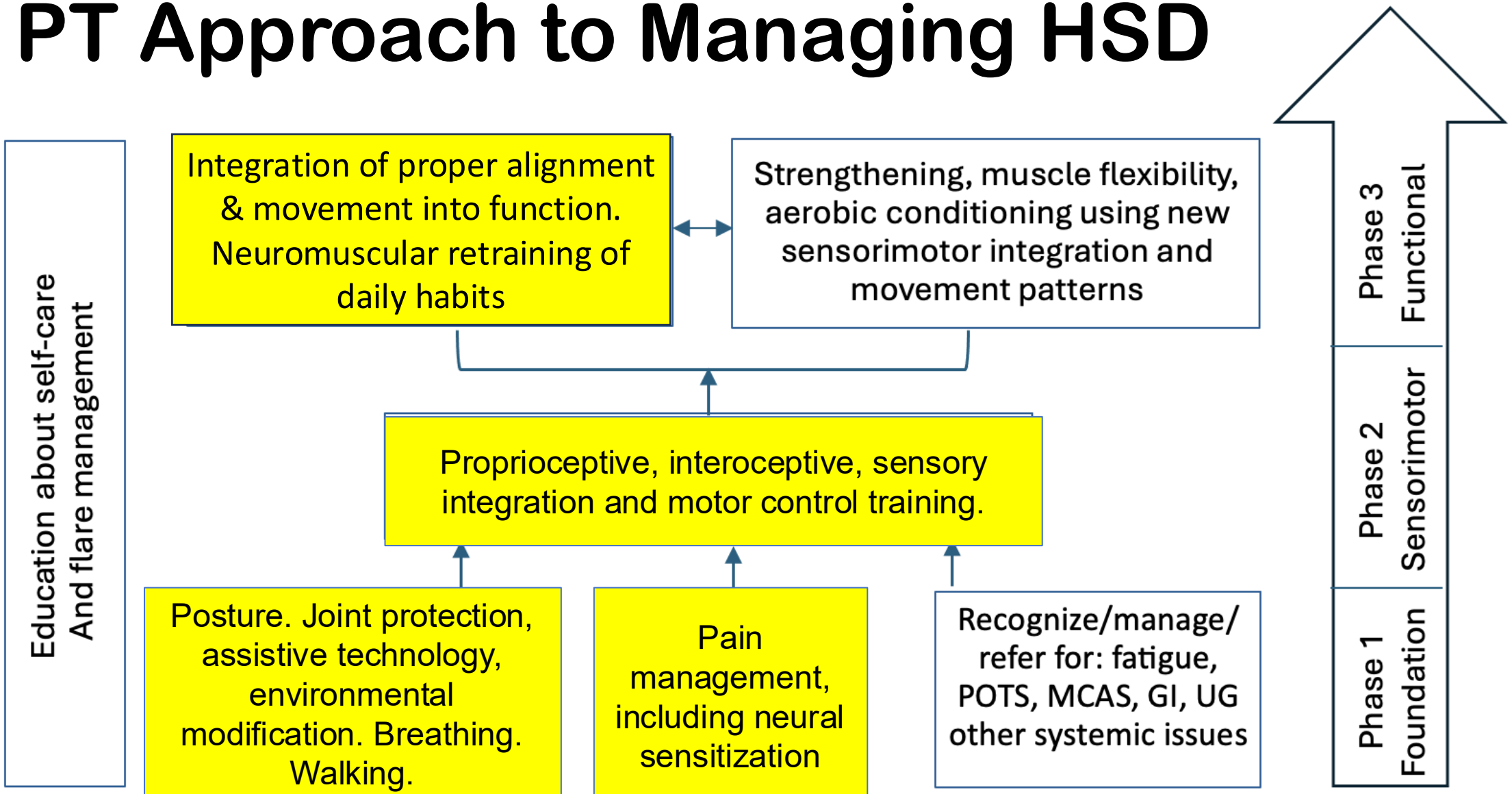
- Lower cervical instability can cause spinal cord compression with some of the neurological issues described above (abnormal reflexes, ataxia, poor coordination, etc.)
- Instability in the lower cervical spine (C3-C7) can also compress spinal nerves
- Pain is typically 'radicular' – i.e., radiating down the arm
- May have numbness in specific regions, and weakness of specific muscles
- May be aggravated by poor posture
- May be relieved lying down, or by neck traction
  - (note: neck traction can be harmful for people with HSD, so only use if cleared by HSD-knowledgeable PT)





Managing Cervical Instability

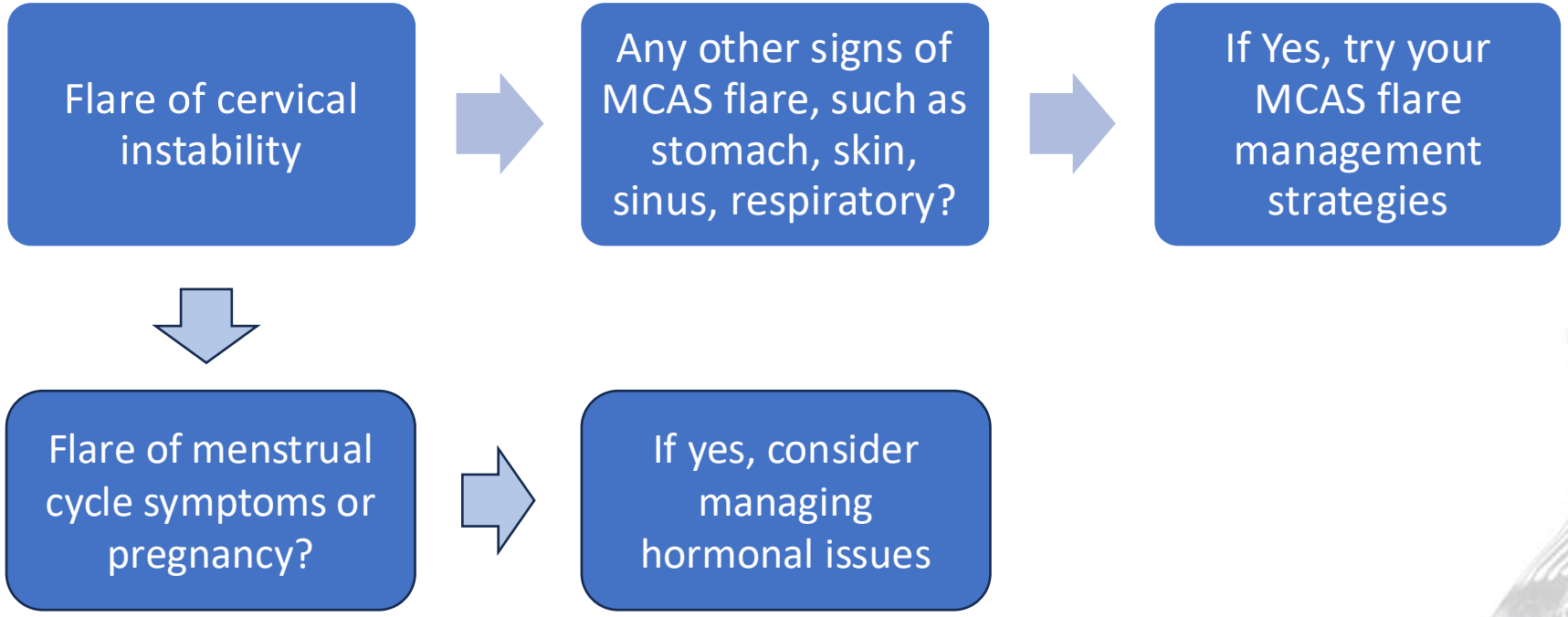
PT Approach to Managing HSD



Managing Comorbidities

HSD102: POTS & MCAS

- MCAS (Mast Cell Activation Syndrome) and hormonal fluctuations may increase instability, in general, including in the neck.



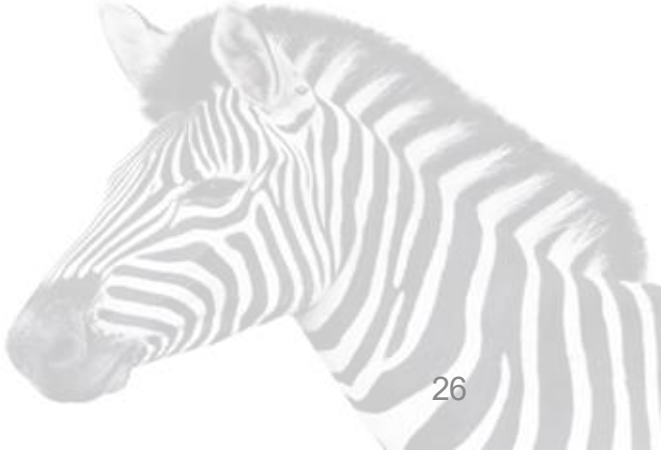
Managing Pain & Pain/Sensitivity

HSD103: Pain

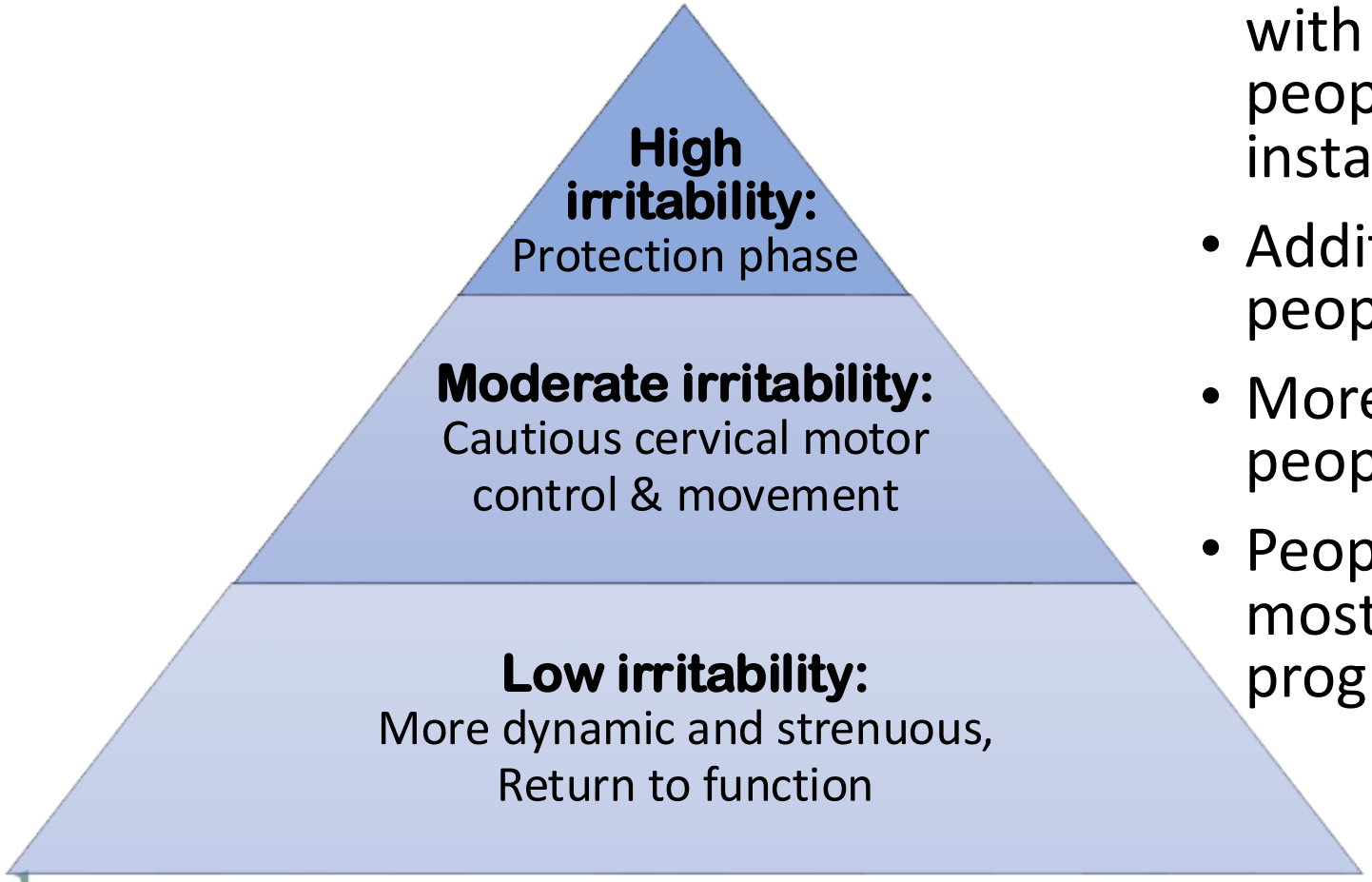
Pain Sensitization

- Physiological quieting strategies: slow breathing, meditation, etc.
- Physical self care strategies: TENS (electrical stimulation), vagus nerve activation, etc.
- Cognitive approaches: pain neuroscience education, cognitive behavioral therapy, coping, etc.
- Medications

Self-Care Toolbox



Tiered Management of UCI



- Some treatments OK for EVERYONE with cervical instability, even people with severe and irritable instability
- Additional treatments OK for most people with moderate instability
- More aggressive treatment OK for people with mild instability
- People hopefully progress from most irritable to least irritable, but progress is not unidirectional

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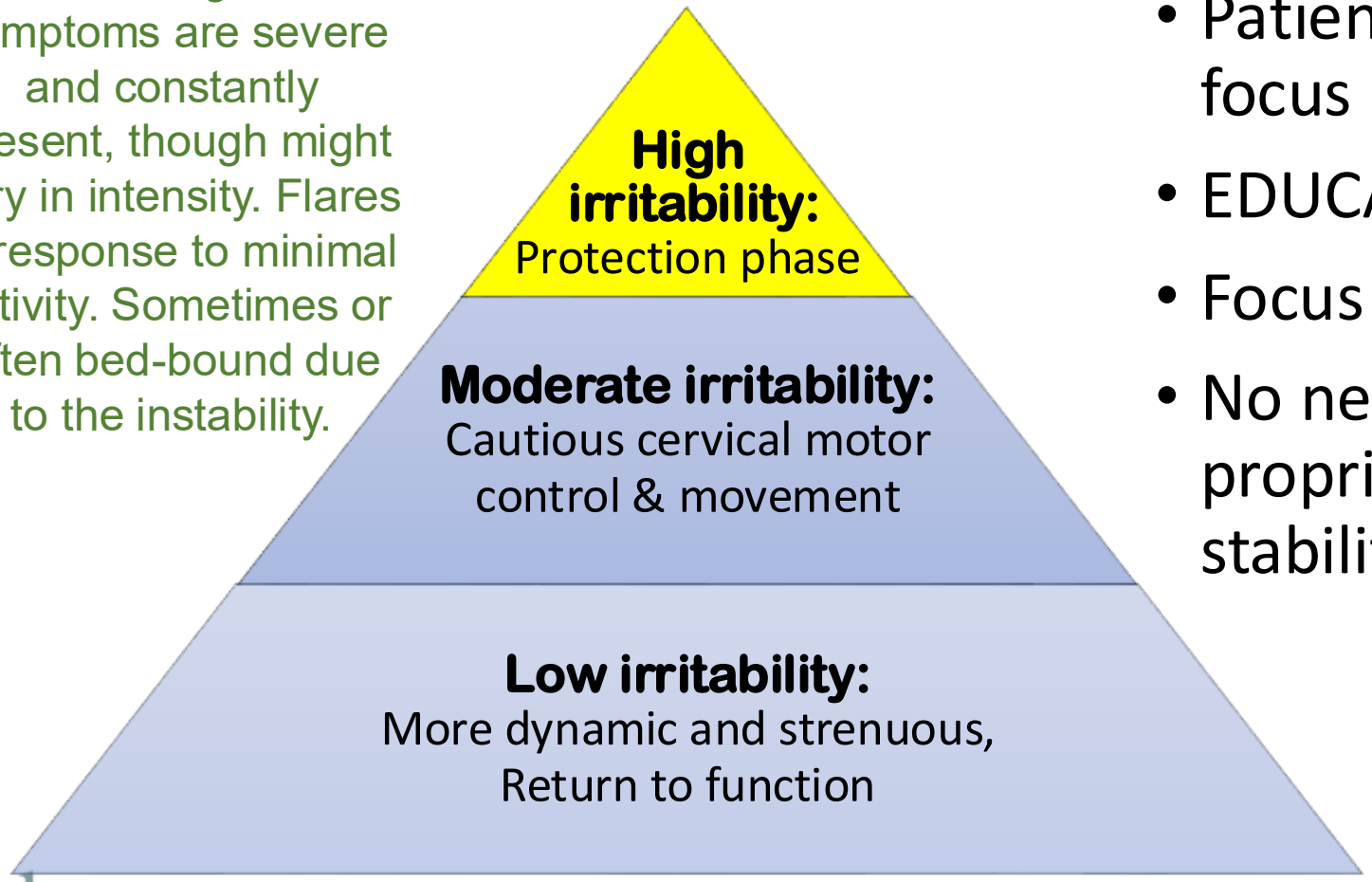
Severe/Irritable Cervical Instability

Neurological symptoms are severe and constantly present, though might vary in intensity. Flares in response to minimal activity. Sometimes or often bed-bound due to the instability.



- Patients with high irritability focus on safety and protection.
- EDUCATION & SELF-CARE
- Focus away from the neck.
- No neck movement; neck proprioception focuses on stability in neutral.

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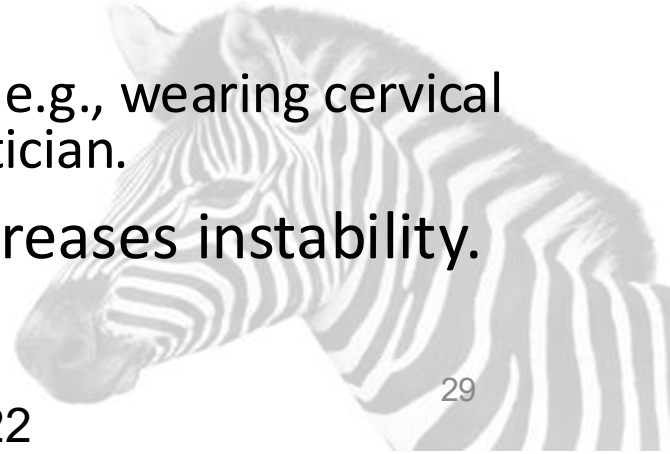
Treatment for Severe Instability

- Conservative treatment is helpful, even if waiting for neurosurgical consult.
- Learn self-care strategies:
  - Postural training sitting, standing, sleeping; use of body supports
  - Body mechanics, functional training, pain management, diaphragmatic breathing
  - Creating a pain self-management 'tool-box' such as TENS, topicals, heat, ice…
- Manage issues away from the cervical spine:
  - Cautious core training for lumbar spine, pelvic floor, diaphragmatic breathing (e.g., exercises supine with neck supported).
- Learn about neck bracing and precautions:
  - Inform other health care providers about your cervical instability, e.g., wearing cervical collar during shoulder surgery. Caution at hairdresser, dentist, optician.
- No cervical traction! It may feel good at the time, but it increases instability.



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Pain Management as Needed

Pain Managemen

- Pain management and autonomic nervous system calming strategies
  - Pain education, pain self-care strategies, neural calming.
  - Diaphragmatic breathing techniques and/or slow breathing, vagus nerve exercises, and physiological quieting exercises.
  - Ice, heat, topical rubs, TENS
- Gentle soft tissue manual therapy only if safe and tolerated
  - No manipulations! (No low amplitude, high velocity thrusts)
  - Manual therapy for muscles in spasm that are trying to stabilize (typically cervical paraspinals, upper traps, pecs, hip flexors, jaw, may also be additional myofascial restrictions) if tolerated
  - People with high irritability might not tolerate ANY manual therapy!

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Patient Education: General

- Correct spine and lower extremity posture.
  - Neutral spine in supported and unsupported sitting (no forward head).
  - Decrease excessive lumbar arch and forward tipped pelvis.
  - Unlock knees in standing.
- Use orthotics and LE bracing as needed.
  - Relative to activity demands – bed-bound vs. work.
- Body mechanics, functional ergonomics, joint protection.
  - Adapting daily activities, such as sleep, driving/riding, cell-phone, tablet, computer, work activities.
- Autonomic nervous system calming strategies
  - Physiological quieting exercises, manual therapy, self-care "toolbox".
  - Diaphragmatic and/or slow breathing, vagus nerve exercises.
- Fatigue & activity management.

HSD105: Posture & Joint Protection

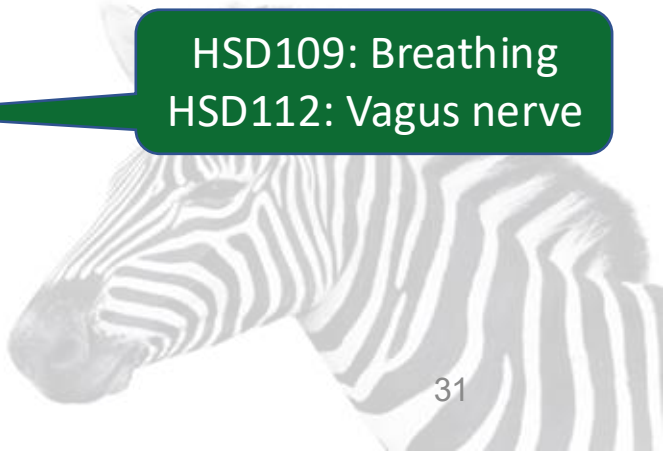
Posture

Joint Protection

HSD109: Breathing
HSD112: Vagus nerve

Breathing

How to Start Exercising

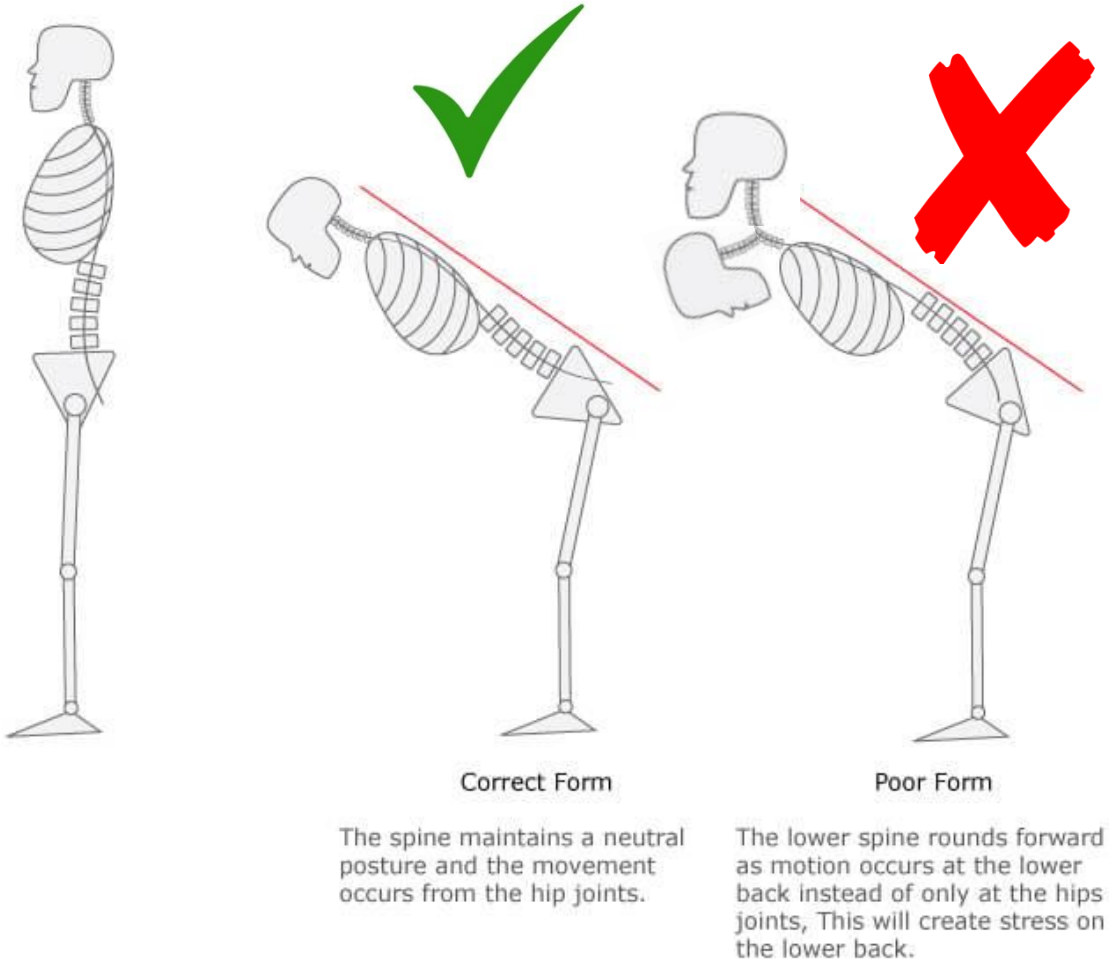


Self-Care for Severe UCI

Upper Cervical Instability

- Keep good neck alignment during functional activities, such as brushing teeth, reaching at the table, leaning forward to eat, etc. Use rigid collar to limit neck movement if needed.
- Belly button rule: Face people you are talking with or directions you need to look. Your nose needs to stay in alignment with the belly button; turn your feet or body to keep alignment.
- Log roll in bed to avoid twisting neck.
- Looking straight into the mirror for things like brushing or drying hair. Never bend into flexion/extension/side/rotate to dry hair. If necessary, use a rigid cervical collar to prevent neck movement.
- Lie down to put in contact lenses to avoid poking head forward.

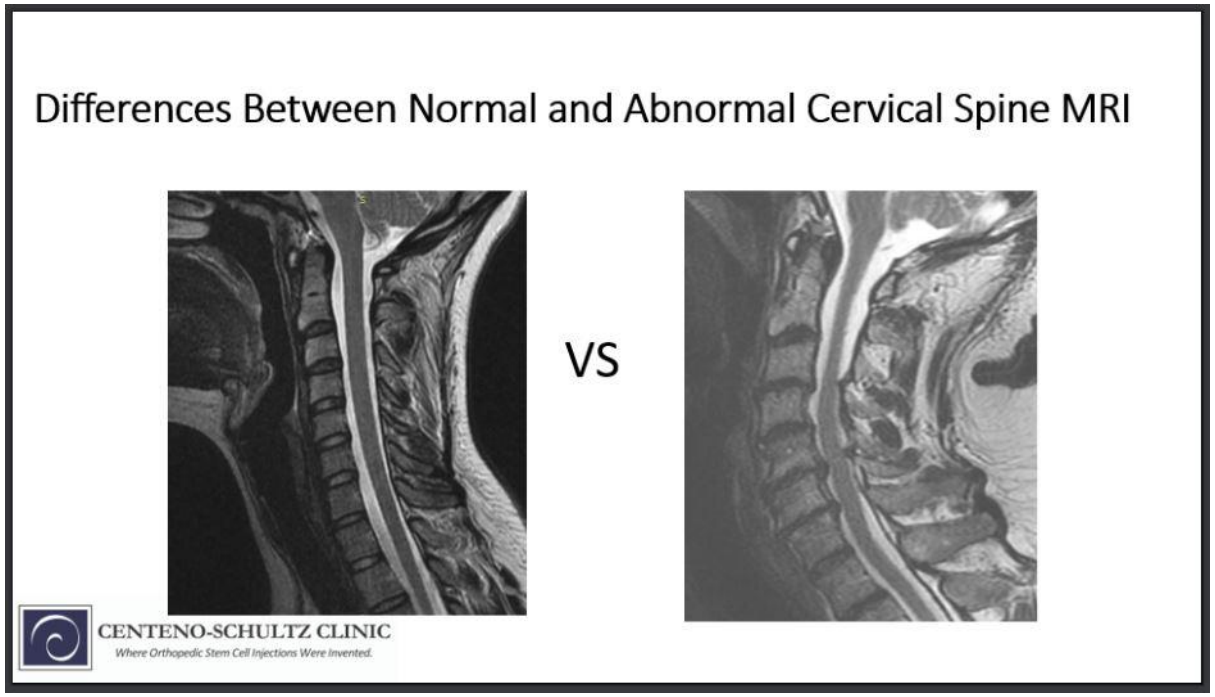
Example of Good Body Mechanics



- Hip Hinge
  - Keep the neck aligned with the spine
  - If you need to bend forward, use a 'hip hinge'
- Don't tip head forward or backward relative to the shoulders

https://www.endurancephysio.net/news/2017/11/10/movement-mechanice-matter-exercise-highlight-hip-hinge

Good Neck Posture!



https://centenoschultz.com/differences-between-a-normal-vs-abnormal-cervical-spine-mri/

https://www.linkedin.com/pulse/what-forward-head-posture-benefits-correcting-tae-kim

X-rays over time of a patient treated for forward head. Time frame not re

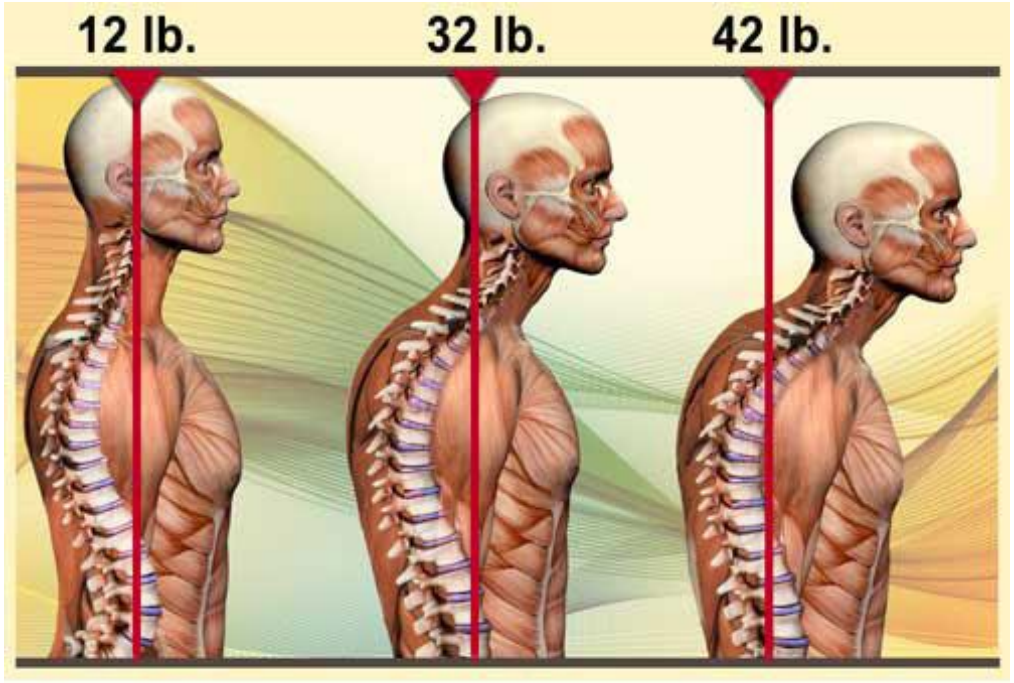
- Improve neck alignment as much as possible, as early as possible
- Forward head can compress the spinal cord, spinal nerves, medulla, carotid arteries and internal jugular veins
- Rotating your head when in forward head posture can compress the vertebral arteries

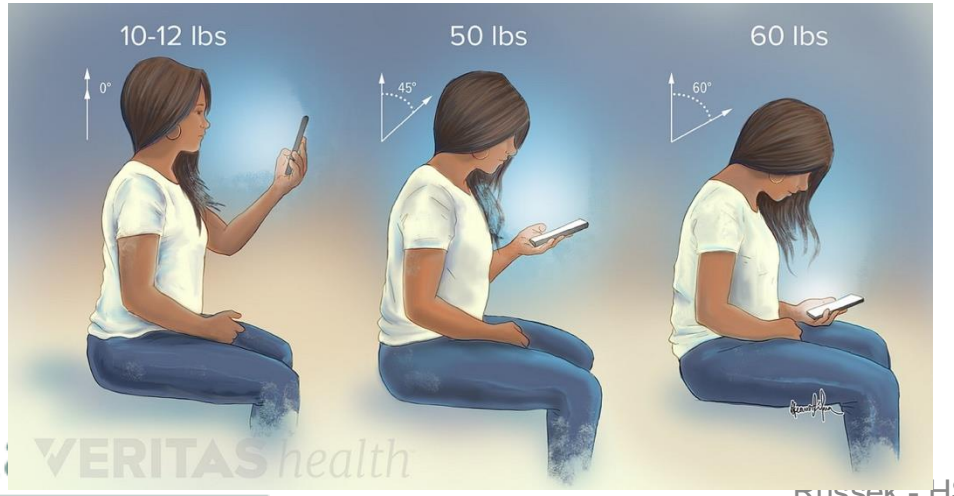
Posture

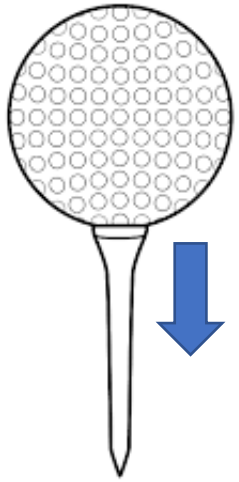
HSD105: Posture & Joint Protection

Posture

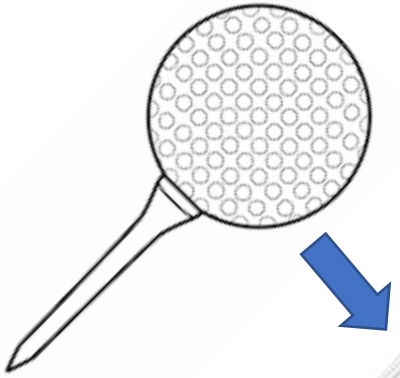
- Poor posture stresses:
  - Joints
  - Muscles
  - Peripheral nerves
  - Spinal cord/brain structures







Good Posture



Bad Posture

HSD105: Posture & Joint Protection

Ideal Posture

- Correct full body posture
  - Self-awareness, biofeedback
  - Posture supports
  - Pillows and positioning for sleep
  - Proper ergonomics
    - Devices to allow better posture
- Improve body awareness & proprioception
- Improve motor control
- Strengthen postural muscles, including upper back

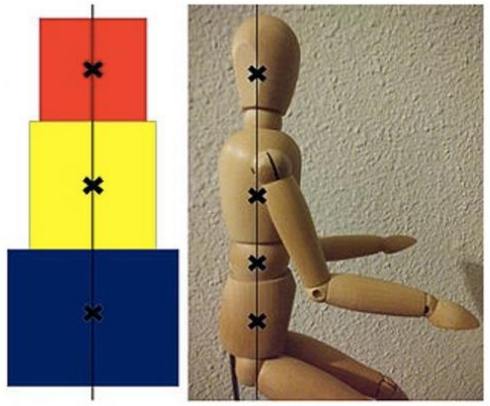


Figure 1. Stacked, aligned posture

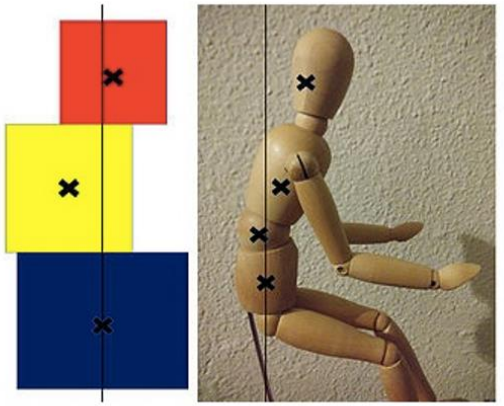
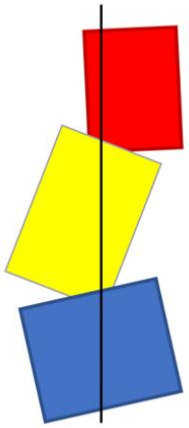


Figure 2. Postural misalignment



Seated 5-Block Alignment.

Recognize Aggravating Positions

Poonam

Tamron

Erika

Thomas

Jared Vagy, MedBridge: The Movement System Syndromes of the Neck

Improve Posture Sit, Stand, Sleep

Mirror glasses

Core Braid Targets Key Points to Naturally Correct Posture and Improve Coordination

Clarkson UNIVERSITY

Neck Braces

- There is no research showing whether neck braces are helpful or how they should be used.
- However, all EDS cervical instability experts feel they can be important for moderate-severe instability
- The following is based on expert opinion.
- Brace options:
  - Thuasne Eclipse Collar – adjustable, solid chin rest.
  - Aspen Vista for more support. (with or without thoracic extension)
  - Aspen Vista or Miami J for a long-necked patient, or for short wide neck.
- Soft collar with built up front support might also help

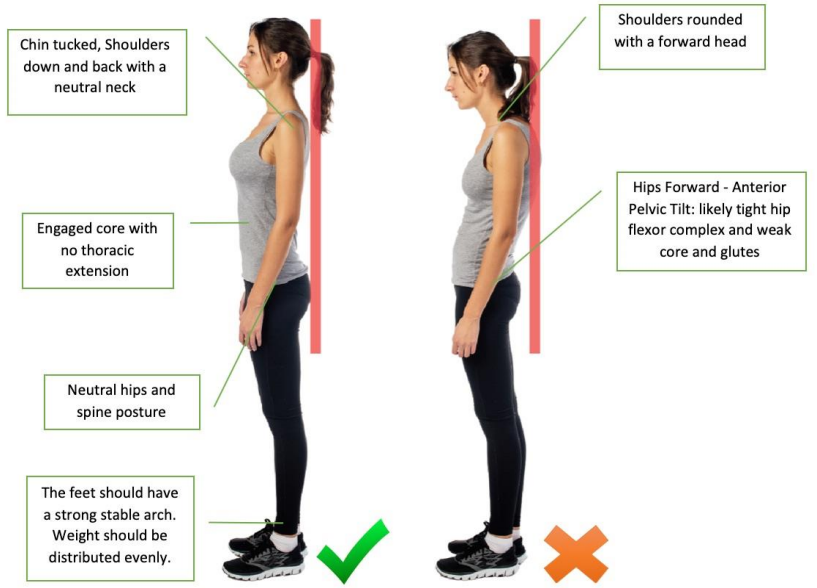
Russek, 2022

Neck Braces

- How much should the neck brace be worn?
- Unknown – there are multiple different views on how to use.
  - Use for 10-15 min when you feel bobble-headed or when traveling. But don't wear more than 10-15 minutes other than travel.
  - Up to 4 hrs/day.
  - Okay to wear neck brace at/all night if patients tolerate it.
  - Dr. Henderson recommends wearing the cervical brace 24/7 for several weeks to allow irritated tissues to calm down. With isometric strengthening. But he may see more involved patients on path to surgery.
- You should probably maintain strength when wearing a collar by doing isometrics in the collar, 5 min, several times a day.

Russek, 2022

Full Body Motor Control

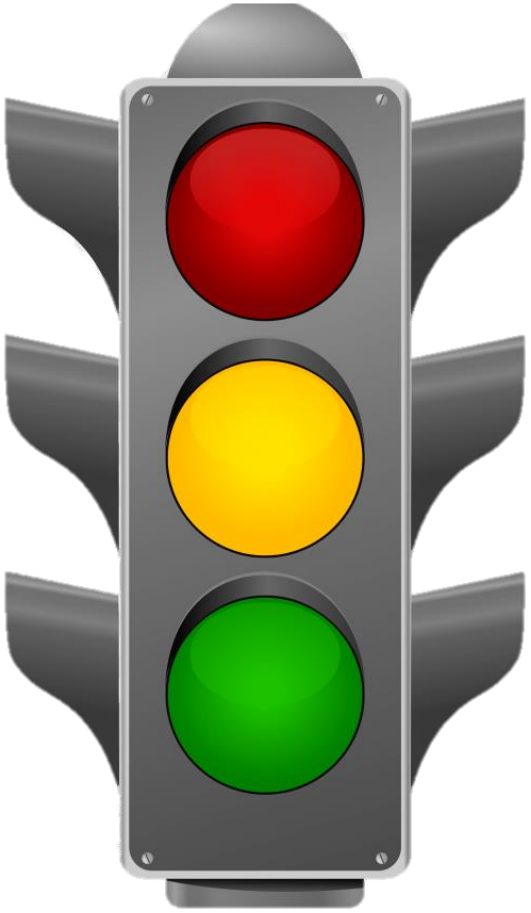


- Stabilize the base upon which the neck functions
  - Stabilize hips, low back, shoulders
- Correct any alignment problems, from the foot up
  - E.g., foot orthotics, hip strength, pelvic alignment, low back stability, etc.
- Lumbar motor control training with pressure biofeedback improves effectiveness of neck motor control training, improves deep neck flexor endurance, decreases neck pain and disability in patients with chronic neck pain. (Khosrokiani, 2022)
- Learn to walk more smoothly, with less rotation and side-to-side sway.
  - May need to fix knee hyperextension or foot pronation (flat foot).
  - Exercise examples:
    - Walking in front of mirror for symmetry and alignment
    - Using head laser when walking, try to keep laser on target

“Pull Yourself Together”

- People with HSD are like these push toys with the tension released (bottom picture)
- We need to “Pull ourselves together” so the joints are held in better alignment (top picture)
- This creates a slight, healthy stiffness in the joints (not rigid tension)

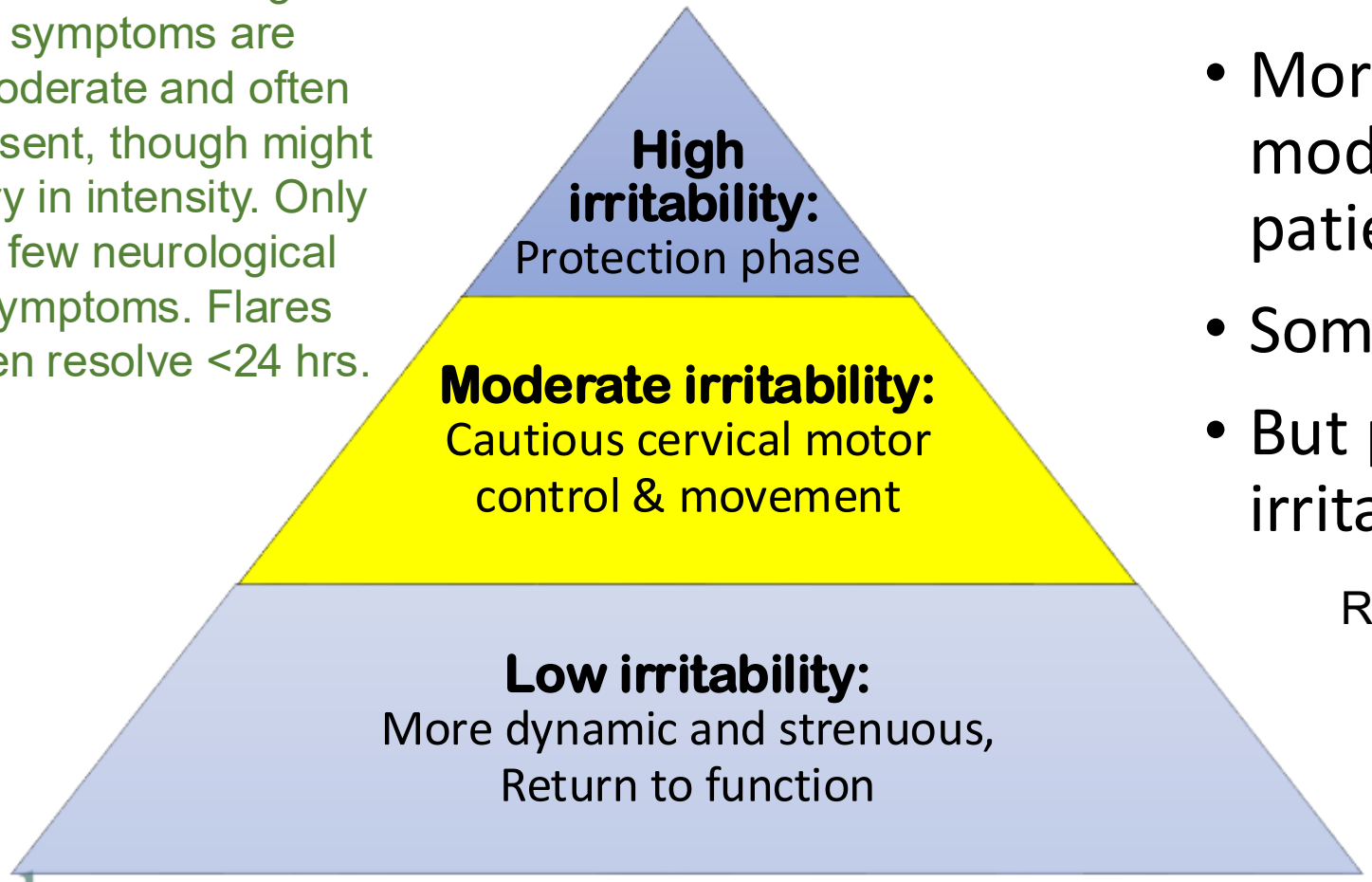
"Ready, Set, Go"



- Planning and preparation can protect your body
- "**Ready**": Correct your posture and alignment so you are ready to move.
- "**Set**": Activate your stabilizing muscles so they are set to stabilize joints.
- "**Go**": Now, go ahead and move!

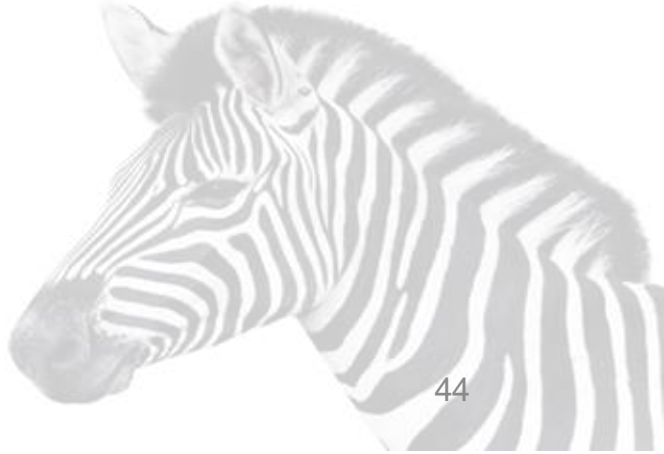
Moderate Cervical Instability

Non-disabling symptoms are moderate and often present, though might vary in intensity. Only a few neurological symptoms. Flares often resolve <24 hrs.



- More interventions are safe with moderate and low irritability patients.
- Some neck motion tolerated.
- But patients may flare to high irritability.

Russek, 2022



Management of Moderate Irritability

- All of the education and posture as noted, above
- Proprioception and motor control training, often starting away from cervical spine (e.g., lumbar, thoracic, pelvic floor, hip)
- Intermittent neck brace might be helpful for some people. Use as needed when neck is fatigued or in functional activities.
- Advanced manual therapy techniques – *only if properly EDS trained*
  - Soft tissue therapy, especially to relax overactive superficial muscles
  - Dry needling may be helpful for muscles in spasm, especially UT and occiput
  - Do NOT allow your neck to be manipulated ("cracked"). While there are chiropractors who can do this safely, there are serious risks associated with it
- Note: although patients may feel better with neck traction, traction is not considered safe for people with cervical instability.

Russek, 2022

Lumbar Proprioceptive Training

- Some high irritability patients may tolerate this as the neck is stabilized in neutral.
- Pelvic neutral and lumbar stability are important to support the cervical spine in proper alignment.
- Pressure biofeedback improves motor learning.

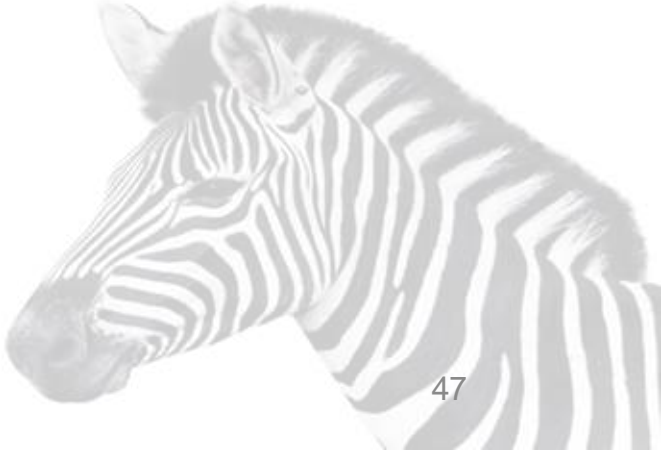
(Ashfaq, 2021; Lohse, 2014; Leech, 2022)

Original photo, Chalela Physical Therapy Institute for EDS & CCI/Cervical Instabilities

Motor Control Before Strengthening

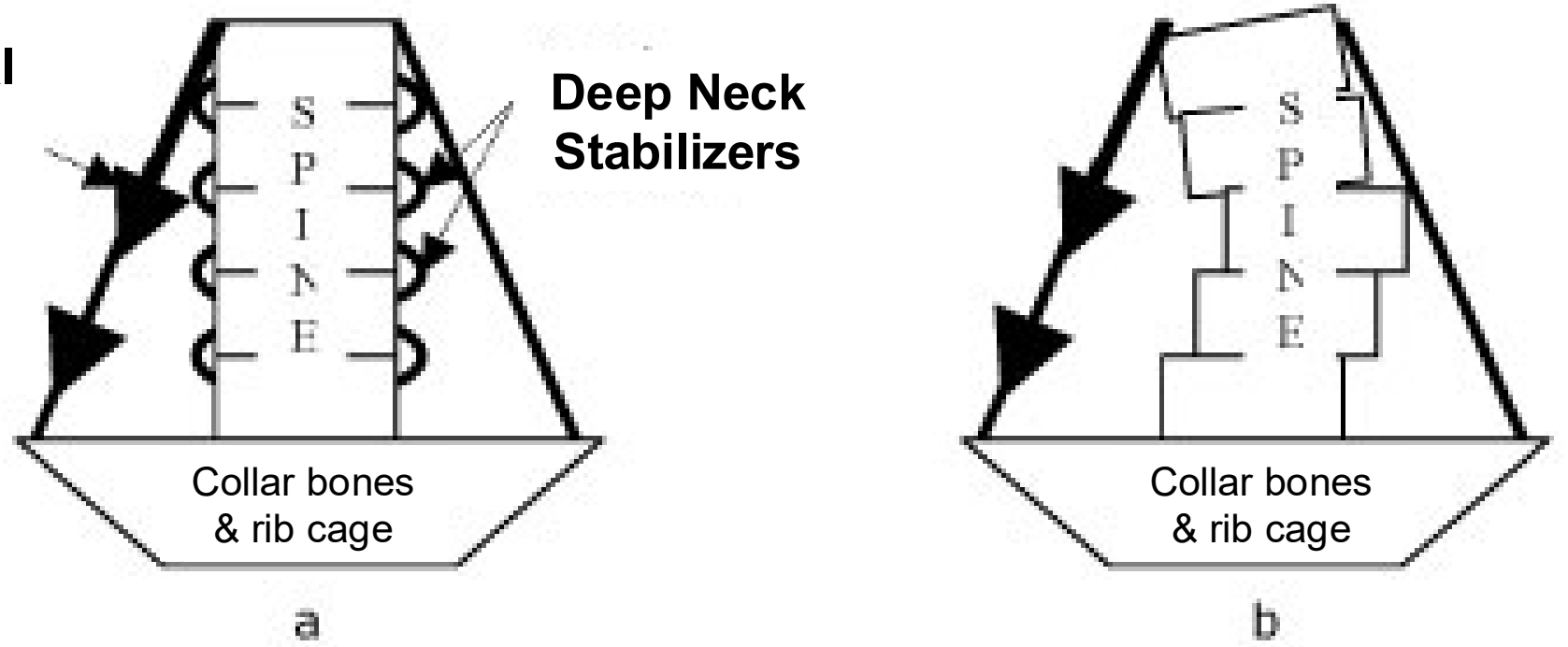
- Motor control is about using the correct muscle, at the correct time, and the correct intensity
- Stabilizing muscles often ‘shut down’ when there is pain, and they often don’t come back
- Start by isolating stabilizing muscles AT LOW LOAD
  - At higher intensity muscle activation, the wrong muscles may activate
- Then learn to control small and slow movement, gradually increasing range
- Finally integrate into function

O’Sullivan, 2000



Core Stabilization Concept

Superficial Neck Muscles



- Instability occurs when the short, deep, stabilizing muscles are not effective
- Need to learn to activate stabilizing muscles FIRST, before other muscles
- Gentle muscle engagement (e.g., 1-2/10 effort) preferentially activates stabilizing muscles

(picture from https://www.physio-pedia.com/images/d/dd/Ms_systems.jpg)

Head Laser (Proprioception)

- Requires neutral pelvis and proper spinal and scapulothoracic alignment
- Start with static target practice
  - Then add arm or leg lift
- SMALL range movements in midrange
- Caution! – Avoid
  - Training in poor posture
  - Moving neck if that aggravates pain
  - Large range neck movement

(Espí-López, 2021)

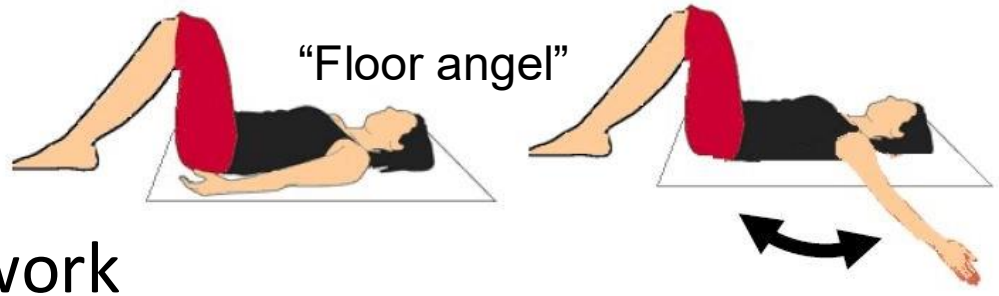
Motion Guidance™ (e.g.: https://youtu.be/SggmqmZhmDU) or SenMoCOR™ on Amazon Lalomo Rechargeable LED Headlamp, Super Bright Head lamp Headlight Flashlight with

Motor Control Training

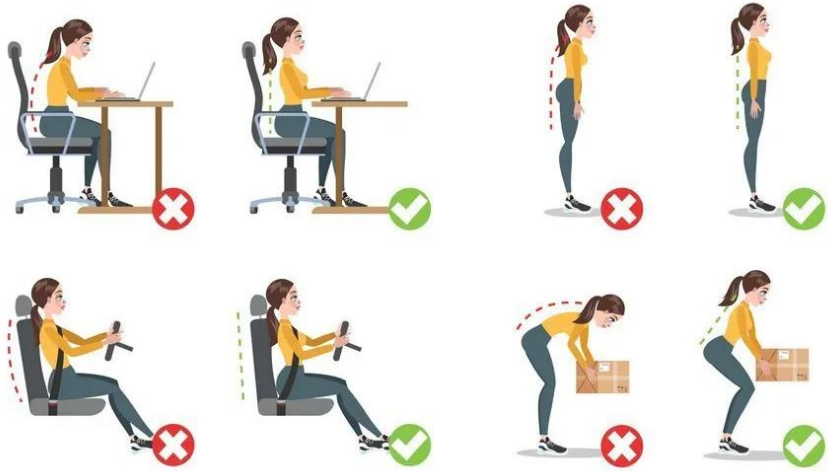
- Start with good spinal alignment
- Learn to engage deep stabilizers in good alignment
  - Gentle isometric (e.g., 2/10 intensity)
  - Slow onset (5 count), 5-count hold, slow release (5 count)
  - Progress isometrics to greater intensity while maintaining good alignment, avoid engaging superficial muscles until low irritability stage
- Light cervical isometrics with head supported supine, then upright
- Gentle axial loading (weight on head) up to 1# (sitting/standing)
- Dynamic strengthening, starting with small motion (e.g., 5-10°)
  - Emphasize keeping good alignment throughout motion
  - Progress to mid range, but not full range

Postural Exercises

- **For upper back & shoulders**
  - ”Brugger”
  - “Floor angel”
  - “Goal post” or “Wall angel”
- **Functional training** to return to activity/work
  - E.g., lifting, bending forward, work ergonomics

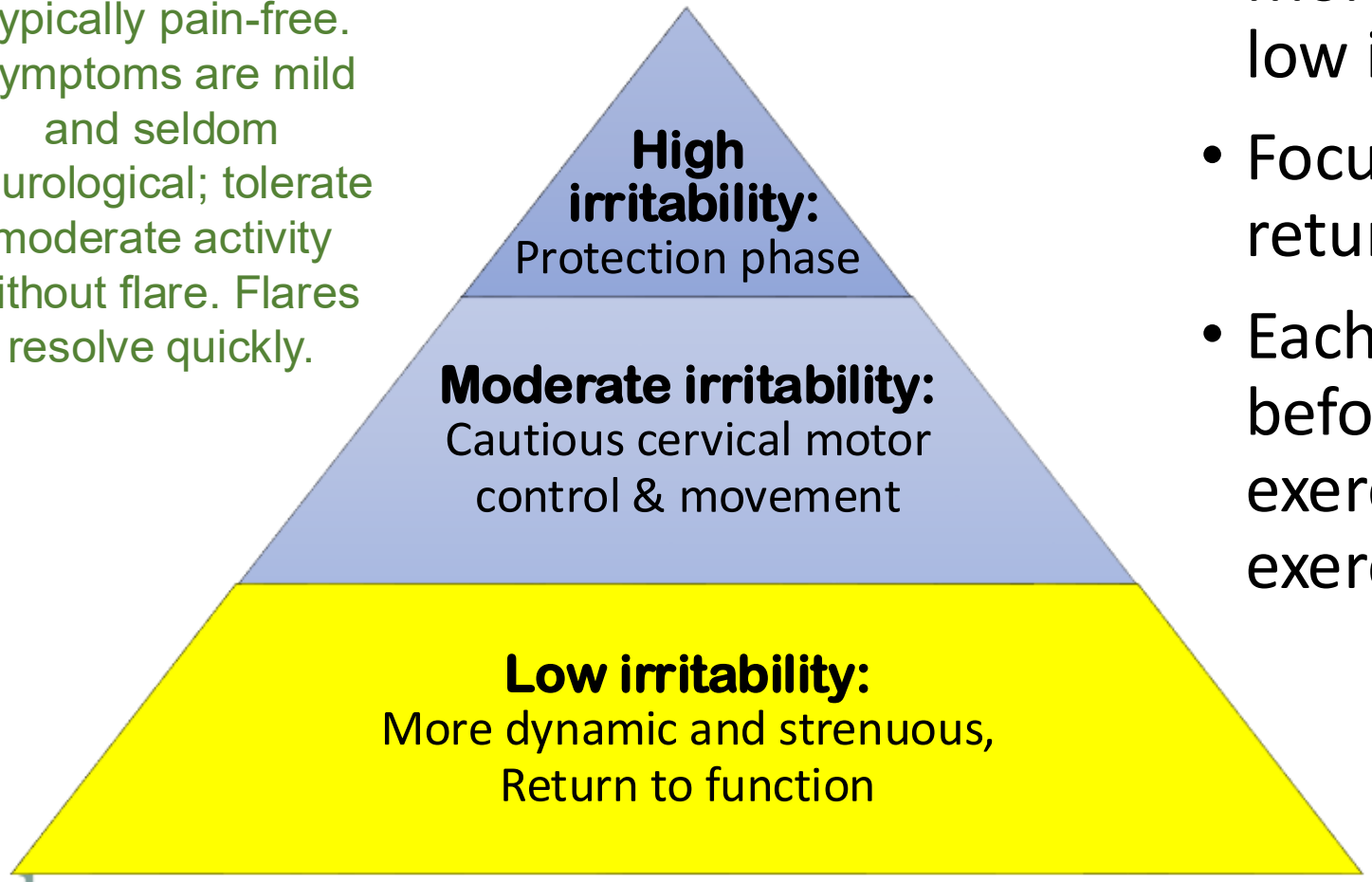


“Goal post”



Mild Cervical Instability

Typically pain-free. Symptoms are mild and seldom neurological; tolerate moderate activity without flare. Flares resolve quickly.

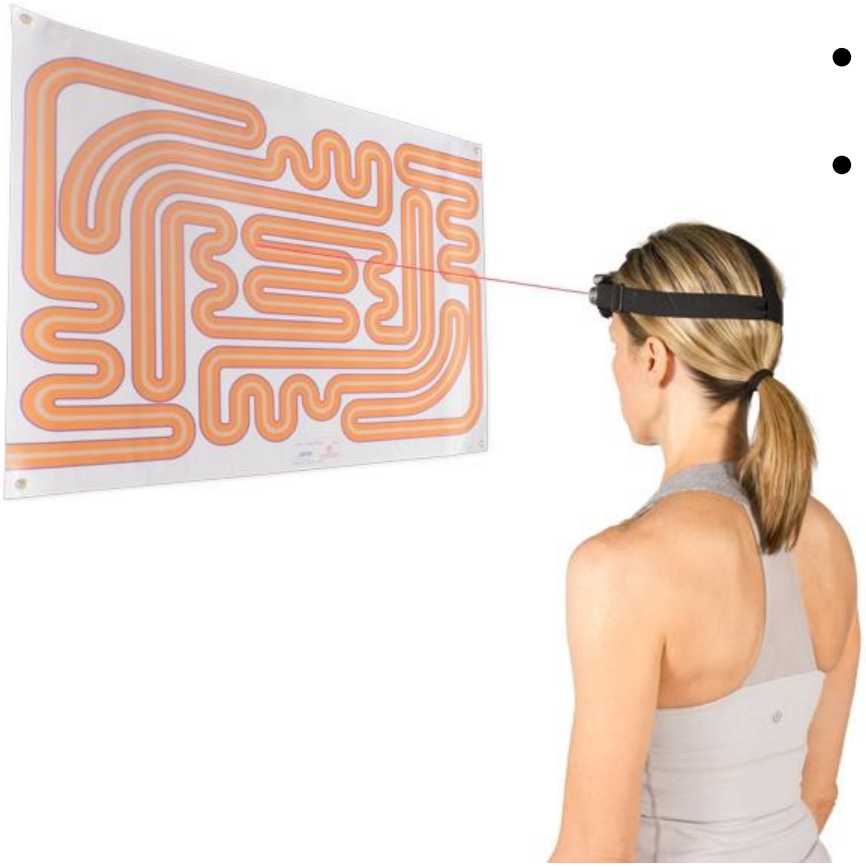


- More interventions are safe with low irritability patients.
- Focus on return to function and return to sport
- Each day, 'test the waters' before doing aggressive exercises by doing gentler exercises

Russek, 2022

Advanced Motor Control Exercises

- Standing laser with larger motions
- Laser mazes
- Unstable surfaces, such as ball on wall



More Advanced Exercises

- **Aggressive strengthening away from neck**
  - More aggressive low back and core
  - More shoulder and shoulder blade strengthening
- **Strengthening** of neck and upper back (Celenay, 2016)
  - Quadruped ± reaching, if the neck is strong enough.
  - Cervical resistance bands
  - Head stabilization with ball on wall
- **Return to work/sport**
  - Impact activities such as jogging/running
  - Gymnastics, acrobatics, dance

Exercises That Might Be Too Difficult

- **Only do exercises that are appropriate for your current fitness level.**
- **Some of these exercises may be too difficult for you.**
- Some people may be able to progress to this level of challenge, while others should not.

When To Refer To Neurosurgeon

- Do not refer/"no concerning features”:
  - UCI likely but no neurological deficits/symptoms and it is not rapidly progressing.
- Watchful waiting with PT/“few concerning features”:
  - Symptoms suggest cervical instability but OK to proceed with conservative management, monitoring for development of Red Flags or failure to respond.
  - We may still treat, even if we refer later on. Even if they end up getting surgery, improved strength and proprioception helps them recover from surgery. (important!)
- Red flags/ ”concerning features”: send for neurosurgeon consult.
  - Increase in abnormal reflexes: hyper-reflexes, clonus, Hoffman’s.
  - History of physical trauma affecting the neck.
  - Rapidly progressing.
  - Unable to tolerate UCI expert manual therapy or exercise directly to the cervical spine.
  - PT may STILL be beneficial for postural training, body mechanics, safe core training for lumbar spine

In Summary…

- Cervical instability may impact many different structures, which can lead to a variety of confusing signs & symptoms.
  - Part 1 of this lecture discusses anatomy, pathology, diagnosis
  - Conservative care is generally similar, whatever structures are affected
- Cervical instability is about neuromuscular control, which **you can change**.
  - Loose joints do not mean instability is inevitable!
  - You can learn body awareness (proprioception); external feedback can help
  - You can learn to re-activate stabilizing muscles, but it is often difficult!
  - It is very important that you do exercises correctly.
    - The exercises need to be appropriate for you, & you need to be using the correct muscles

Resources

- Awesome booklet on cervical instability: EDS cervical instability by EDSawareness.
- The following site has useful information about cervical instability. The site recommends prolotherapy (injections). I can neither support nor criticize prolotherapy. But the site has a lot of good information. https://www.caringmedical.com/conditions/prolotherapy-neck-pain-cervical-instability/
- Neurosurgical EDS specialist MDs
  - Dr. Fraser Henderson (Baltimore, MD): https://www.metropolitanneurosurgery.org/dr-fraser-henderson/
  - Dr. Paulo Bolognese (NYC, NY): https://www.southnassau.org/sn/chiari-eds?srcaud=Main
    - Informative YouTube: https://youtu.be/MsYDA3SXTkg
  - Dr. Sunil Patel (Charleston, SC): https://musc.bcst.md/participant/sunil-patel-m-d
- PTs who specialize in cervical instability
  - Susan Chalela: (Charleston, NC, does telehealth): https://chalelapti.com
  - Wendy Wagner (Chicago, IL, does telehealth): www.wendy4therapy.com
  - Patricia Stott (Aurora, CO): www.elevationwellness.co
  - Heather Purdin (Portland, OR): https://goodhealthphysicaltherapy.com

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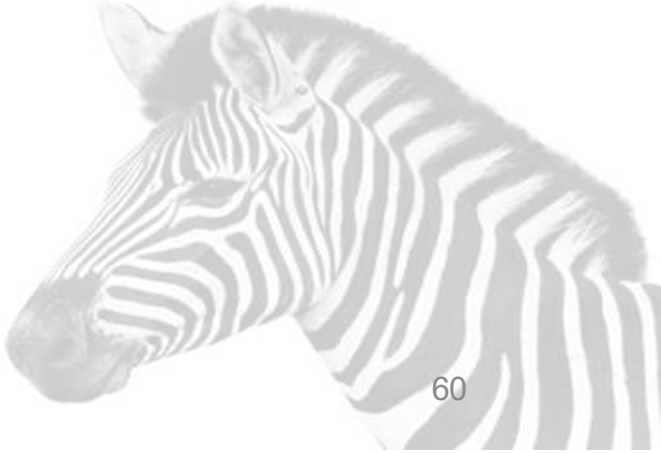
Thank You!



Questions?