Rehabilitating the Concussed Athlete

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Boston Concussion and Brain Injury Seminar

Goals For Today:

- What are concussion *symptoms?*
- How can *I help* in the rehabilitation process?
- What is the *musculoskeletal component* of concussion?
- *Exercise strategies/selections/progressions*

An Epidemic

- Are happening at all levels of sport
- "Subconcussive" blows
- Scary *potential* long term effects - CTE, cognitive decline, affective behavior, neurodegenerative disease
- The developing brain
- Can be life changing - in a bad way

Proper Management

- Identification
- Assessment
- *Stage appropriate* intervention/activity
- *Gradual, goal based progression*
- Concussion history

Concussion Symptoms

- Unconciousness
- Amnesia
- Nausea
- Phono/photosensitivity
- Fatigue
- Altered Sleep Patterns

Concussion Symptoms

- Dizziness/tinnitis
- Visual Disturbances
- Exercise Intolerance
- Headaches
- Cognitive Difficulties
- Changes in Affect

EVERY CONCUSSION IS DIFFERENT

Early Management

- REST - rev down the metabolic demand
- *Decrease stimulation* - no screen time, demanding activities requiring focus, busy environments (visual and auditory), etc.
- Sleep/nap early, but try to normalize sleep patterns asap (e.g. sleep/wake times, etc.)
- Supplements? omega 3s, mag, creatine?
- Appropriate activity - e.g. short walks

"Neuro" vs. "Ortho"

- Fatigue, cognitive issues (sometimes), dizziness, phono/photosensitivity, sleep patterns (sometimes), memory issues, visual issues (sometimes), tinnitis, activity intolerance
- Headaches (often), dizziness/instability (sometimes), poor sleep patterns (with headaches), neck pain, odd referral patterns, TMJ issues, "sneaky" exercise intolerance

Musculoskeletal Dysfunction

- Upper Cervical Injury - facet, ligamentous
- *Upper cervical plexus sensitization*?
- Segmental Stabilizer inhibition, atrophy, fatty infiltration, fiber type ratio changes
- Postural Dysfunction
- Scapular Stabilizer Dysfunction

Practical Concerns

- *Intolerance of Heart Rate Increases* - provokes dizziness, visual dysfunction, headache
- *Vestibular problems* - positional and movement through space - both linear and/or angular

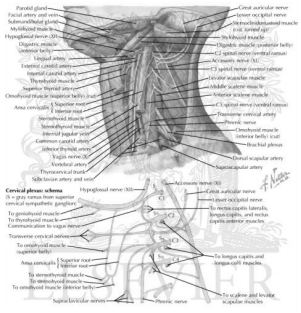
Upper Cervical Injury




Upper Cervical Injury

- C0/1 = 50% of flexion/extension
- C1/2 = 50% of rotation
- With high energy blows there will be a mechanical injury here
- Oftentimes gives facet oriented referral
- Upper cervical plexus sensitization

Upper Cervical Plexus



Upper Cervical Plexus

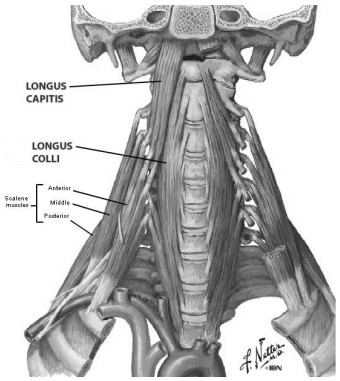
- When brachial or lumbar plexus nerves become sensitized there are somewhat predictable symptoms
- What happens when the upper cervical plexus is sensitized? Vagus contribution? Phrenic nerve? Muscles that control head/neck positioning, eyes lens shape, cranial nerve?

It Is In Your Head (No really!)

- Your skull houses some important organs besides your brain
  - Vestibular Organs
  - Eyes
- Soooooooo..... If you have poor motor control and segmental dysfunction in cspine you'll get *altered afferent input* when you move

Cervical Stabilizers

- Specifically your *deep cervical flexors* - *longus colli and longus capitis* - these are the multfidi and TVA of the craniocervical complex
- Segmental insertions in occiput, and each vertebrae extending downward into the upper thoracic spine
- Kinda important



Cervical Stabilizers

- Several Effects of Head/Nek Injury:
  - Atrophy of said muscles
  - Loss of feed forward function
  - Fatty infiltration of muscle belly
  - Shift in fiber type ratio towards more Type II (not good for postural function)

Postural Dysfunction

- Pre-existing "benign" type postural dysfunction becomes more pertinent
  - *Accentuated spinal curvature* - e.g. at CT junction, upper CC junction extension
  - *Scapular positioning in space* - scapular protraction/rotation dysfunction

Scapular Stabilizers

- Play a large role in stabilizing thoracic spine, shoulder girdle
- Important for posture
- Provides a *stable foundation for craniocervical complex* to function on

Practical Implications

- First - minimal to no neuro symptoms
- Second - restore normal cervical ROM, stabilizer recruitment
- Third - Slow, pseudo-static exercise selection with special considerations
- Fourth - Progression to return to sport
- Fifth - Graded return to sport

Phase One

- Relatively normal sleep patterns
- No abnormal fatigue
- Adequate "resting" period
- Complete/near complete resolution of "neuro" symptoms - dizziness, phono/photosensitivities, memory, processing etc
- Consider number of concussions

Phase Two

- Restore somewhat normal cervical function - esp ROM
  - Ideal - have a baseline screen of cervical ROM characteristics before they ever get injured
- Early stage, gentle cervical stabilizer recruitment - don't over do it
- Minimal to no headaches/cervical symptoms

Phase Three

- Begin *slow and steady!!!*
  - Monitor heart rate responses - start low, *monitor at what point symptoms arise!!*
  - *Move slowly* - minimize vestibular/visual challenge
  - Think about how the head is *moving in space* - think about vertical orientations initially

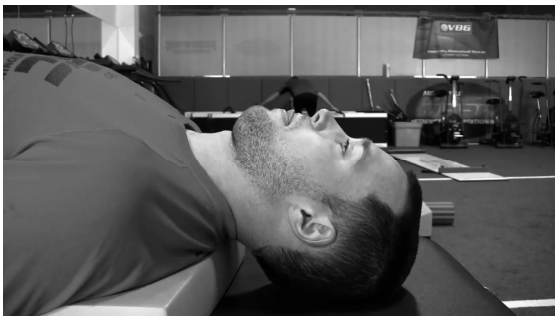
Phase Three

- Low intensity, steady state conditioning, closely monitor symptomatic response
- Low challenge vestibular/visual - think split squat vs. lunge - lunge too much movement of head through space
- Standing vs. Supine/prone exercises - standing row/press vs. dbell variations
- Lots of scap/craniocervical stabilization

Phase Three

- Pay attention to/cue proper head neck positioning with all lifts
- Closed chain exercise - e.g. push ups, scap push ups, scap slides etc.
- *Positional Demand* - sneaky stabilization demand with prone, side, supine positioning
- Careful with warm up - heart rate, vestibular component


MIKE BOYLE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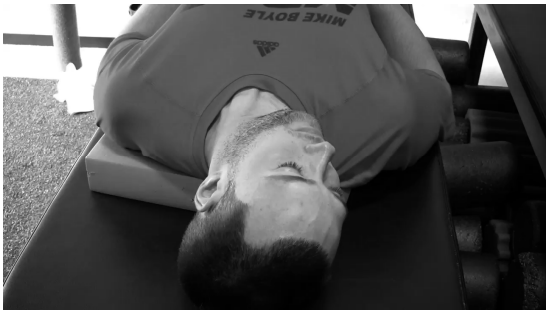
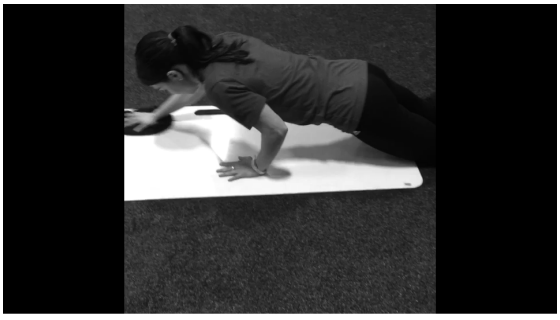


Phase Four

- Ramp up metabolic demand - intervals, higher intensity conditioning, work capacity circuits
- More dynamic, ballistic movements - add plyos, medball variations, moving through space
- Eliminate exercise selection precautions
- Return to normal strength levels



Graded Return to Sport

- Is a big jump - metabolic demands, sport demands, contact, travel, etc.
- Start *non contact*, limit participation by *time and frequency* (e.g. back to back days)
- NO SYMPTOMS ARE ACCEPTABLE
- Final step - multiple bouts of full contact, full schedule practices, lifts, etc.

And That's That

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