The "Power" of Breathing and Single Sport Athlete's Predisposition to Injury

SOUTH JERSEY PHYSICAL THERAPY

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OBJECTIVES

1. Be able to understand **posture and position** from a functional standpoint
2. Be able to understand **zone of apposition** and how it affects **posture and movement**
3. Be able to understand, identify, and screen for **common postural deviations** in your athletes
4. Be able to understand why **single sport specialization** at a young age can *increase injury* risk and *decrease* performance

Disclaimer of Knowledge: The foundations of our approach are derived from Dynamic Neuromuscular Stabilization (DNS) and from the Postural Restoration Institute (PRI). If you would like to learn more, we encourage that you invest your time in taking a DNS and or PRI class.

"If breathing is not normalized, no other movement pattern can be."

- Dr. Karel Lewitt

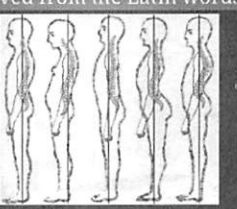
An international authority in manual medicine for more than 5 decades and one the founders of the renowned "Prague School of Manual Medicine & Rehabilitation"

Breathing is the foundation for all other movements

POSTURE

Derived from the Latin words:

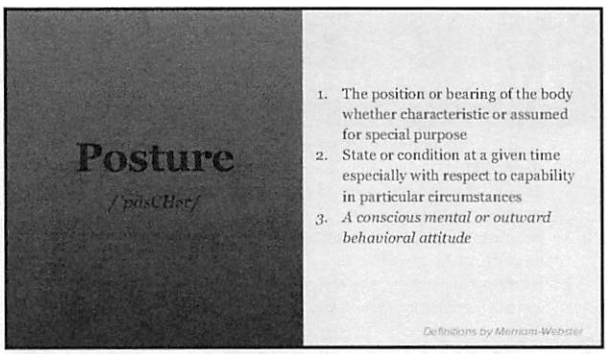
Habitus



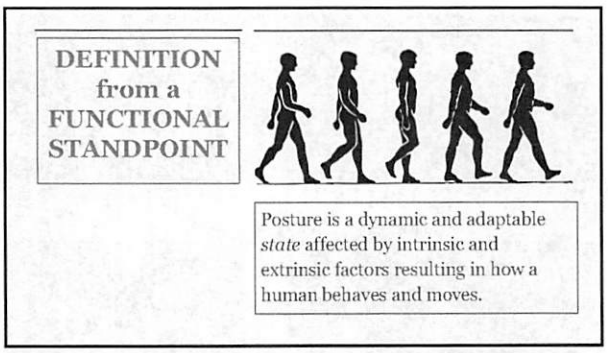
Positio

Status

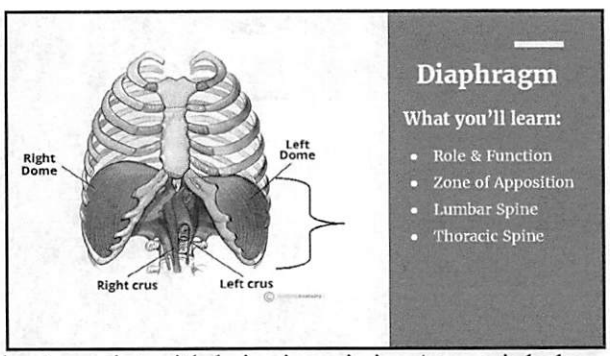
Posture is synonymous with position
Also interesting are the words habitus and status. So lets look at the Webster definition...



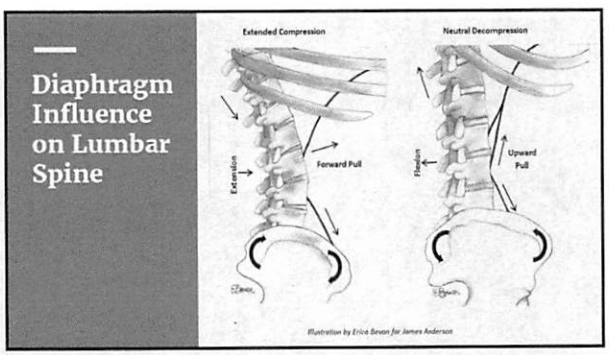
Def 1. Eg: Pitching in baseball: what does end of cocking phase look like. Are joints in good position??
Def 2. Are we exceeding functional capacity. If so posture may fall apart due to fatigue and increased injury risk
Def 3. Confident and feeling down
How do we manipulate posture to get desired out of performance or rehab



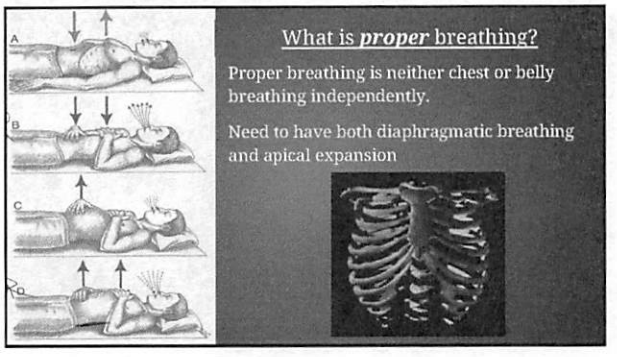
For example: Trying get someone's glutes & core to fire in an anterior pelvic tilt is very difficult & can lead to excessive compensation elsewhere. Changing pelvic position (environment) will allow better glute & core firing
Extrinsic factors: Environment can cause stress & extra need to protect due to context & memory of certain situation (learned response) Changing that context can lead to behavioral changes, improved adaptability & improved training/rehab.



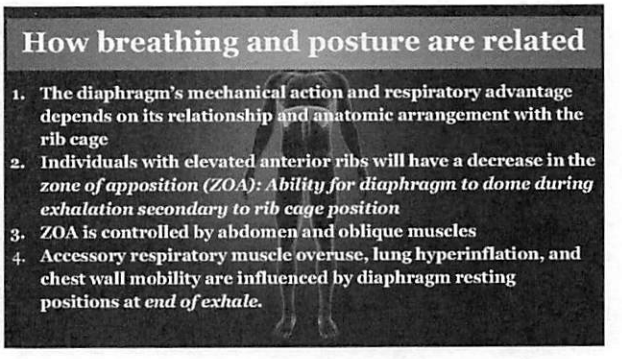
Role: to assist with bringing air in. As we inhale, diaphragm contracts & changes pressure gradient to bring in air. As we exhale, diaphragm should dome back up.
R diaphragm domes easier due to liver, We tend to loose L dome easier. Note ZOA- we will get into that deeper & to keep the word in mind
Attachment lumbar spine= stabilization of lumbar spine



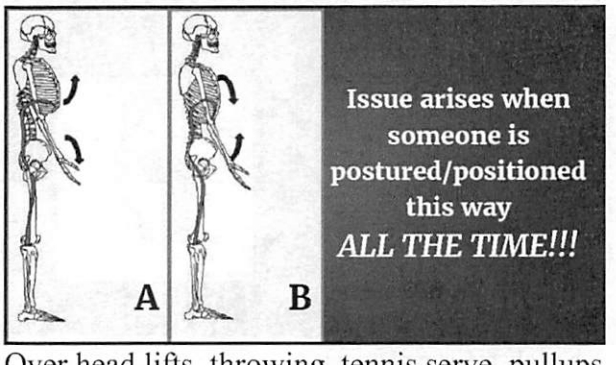
Anterior pelvic tilt-Very prevalent in athletic population
Most of our clients we see that are older and have h/o of lumbar disc disease, stenosis, or arthritis have loss of ZOA and poor core stabilization.



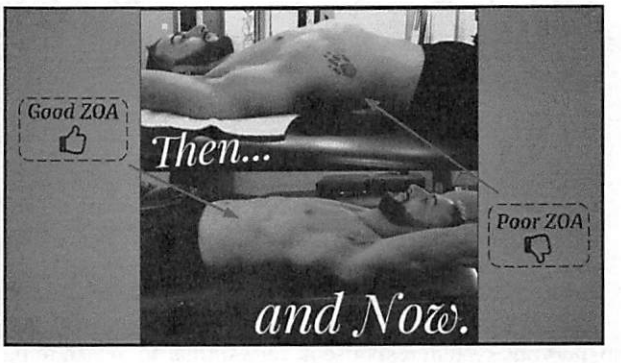
Pics B & D

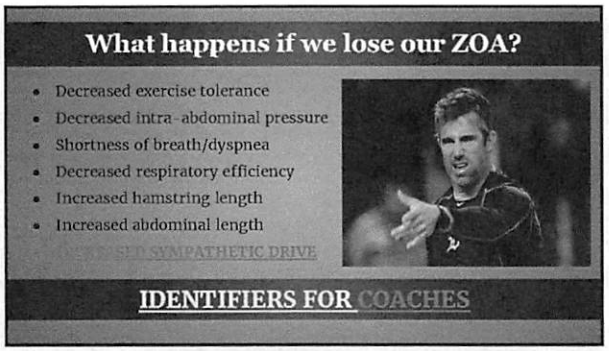


Give group example of proper breathing mechanics/rib cage position at end of exhale. Also get into plank position and show with anterior pelvic tilt and proper position and explain why breathing through helps dome.

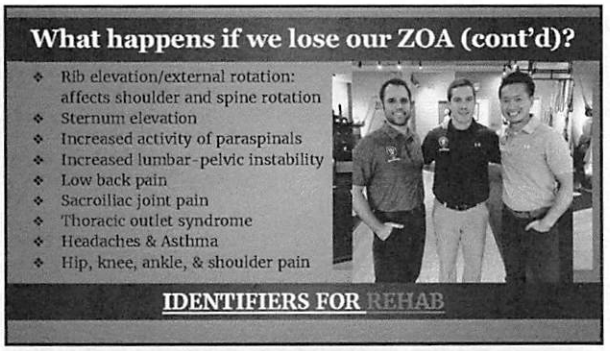


Over head lifts, throwing, tennis serve, pullups need to be able to maintain proper rib position Will lead to shoulder joint instability, hip impingements, excessive gastroc tension/tone. However, thoracic extension is imperative for power & olympic lifting. The issue arises when someone is postured/positioned this way ALL THE TIME: They will have a problem with air flow which will lead to decreased

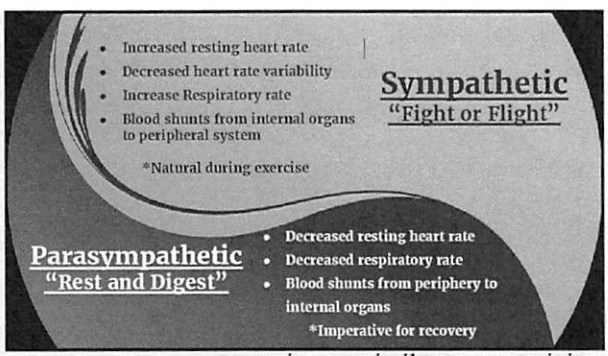




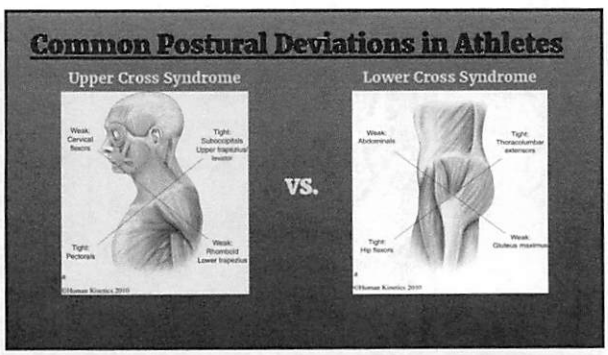
Be able to identify those athletes that seem to be plateauing or declining in performance: Look @ their posture & breathing pattern. If you want to to learn more take a PRI and/or DNS class. Functional movements systems are now also starting to address breathing pattern/quality.



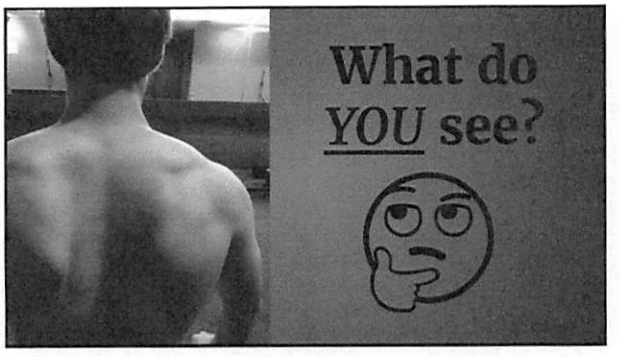
Coaches: find a trustworthy PT to have in your referral system to address theses issues.



Symp. nervous system response is very similar to overtraining symptoms. Athletes need to be able to eb & flow between 2 systems for proper recovery & training response. We often see in our patients with chronic low back pain or athletes that have back pain or multiple locations of pain without obvious trauma. I look for 2 things: movement patterns & breathing/heart rate as well as training schedule. Lack of diaphragm/ZOA effects posture sympathetic drive increases extension & lung hyperinflation. You'll see increased resting heart rate & respiratory rate → lack of recovery/ overtraining. Flexion & breathing help facilitate parasympathetic response → slower heart rate & breathing rate.



Not always symmetrical
Loss off rib cage position
This causes loss of doming of diaphragm & core function which reduces athletic performance
Can be different from side to side
This posture can cause loss of proper mechanics of respiration
W/ this loss of proper joint position/posture we alter our motor control or the way in which we bring in air



Very common w/ loss of thoracic flexion & excessive extension
Now we're gonna get into how we as rehab address these bad postures

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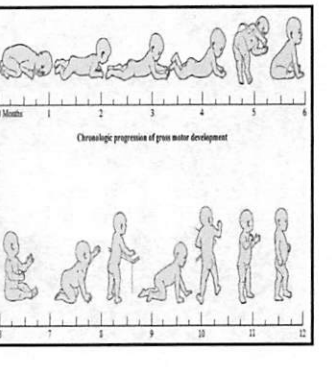
How does one "fix" abnormal breathing?

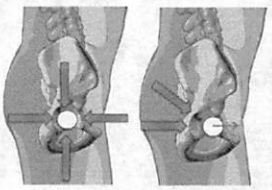
EVOLUTION OF STABILIZATION & POSTURAL CONTROL

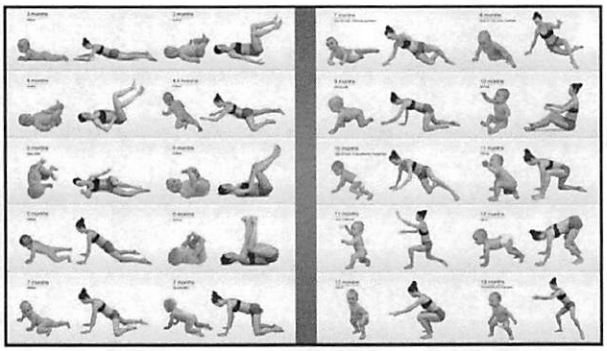
- ***Developmental Kinesiology*** **and** ***Reflex Locomotion***
  - **Blue-print of building stabilization**
  - **Good movement patterns**
- **All joints have a position of ideal alignment for each movement or position**



JOINT CENTRATION

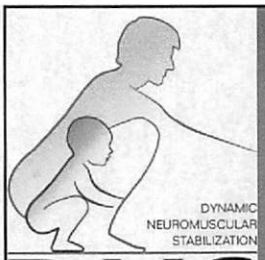
- *Joint centration* is the position of greatest inter-osseous contact between the bones/joints
- Point where there is an ideal balance of muscle tension pull that act upon that joint
- Allows for optimal load transfer and maximum muscle pull to create stabilized movement





Tie into ribs; imperative to proper motor control and breathing

"You have to learn how to crawl before you learn to walk"



DYNAMIC NEUROMUSCULAR STABILIZATION

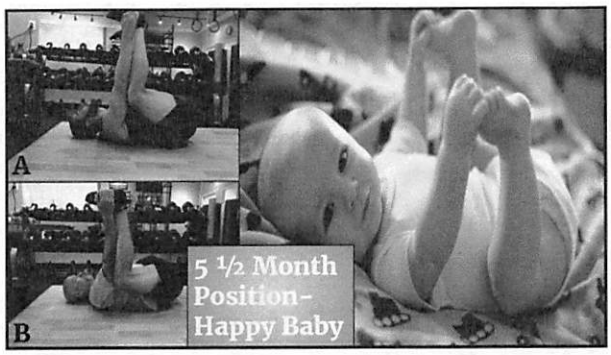
DNS

Motor Control for Life

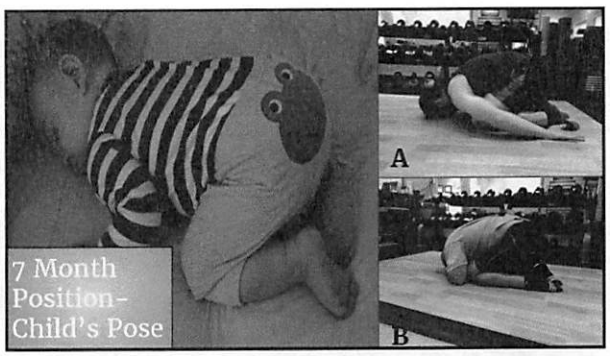
As soon as the baby is born, it has to master 1° movement pattern:
CRYING → BREATHING

Key Milestones:
(Building Blocks)

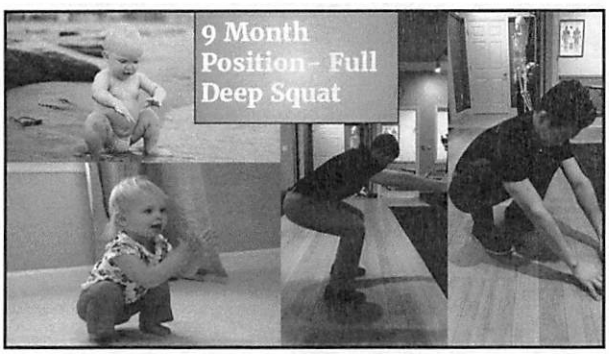
5 ½ months
7 month position
9 month position

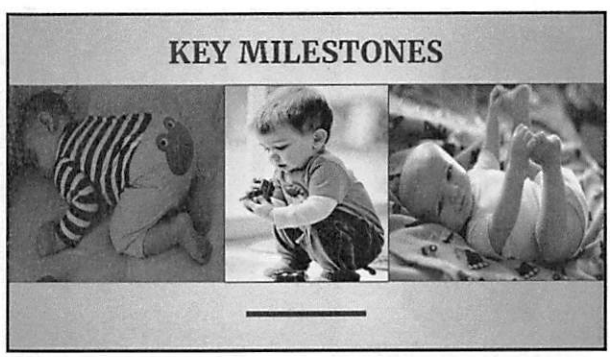


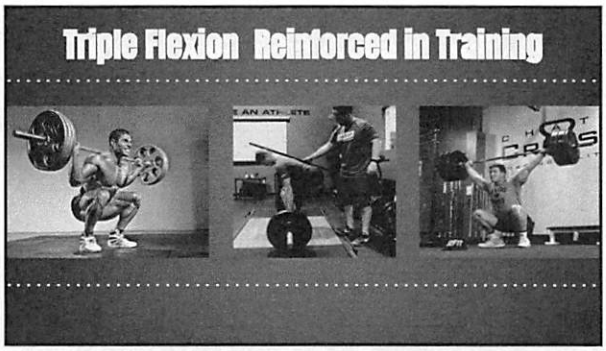
Happy Baby Position: (breathing and big diaphragm breathe)
The start of interfascial connections to major bony attachment points which build the outside canister for IAP.
5 Points of contact: Occipital Protuberance, Apex of Scapulae bilateral, and sacroiliac joints



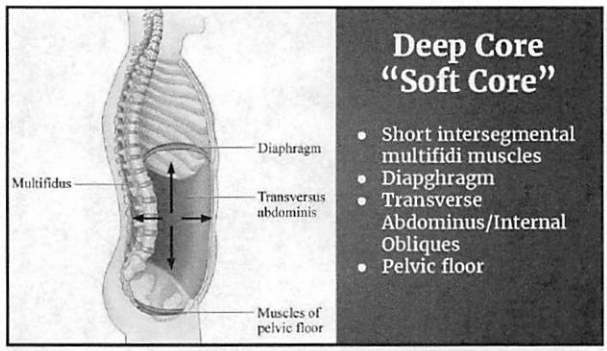
Primal Rocking: scapular loading, formation of deep acetabular hip joint sockets
Triple flexion of hips, deep knee flexion, & ankle DF/PF(developmental position dependant), centration of the shoulder blade, thorax, & neck



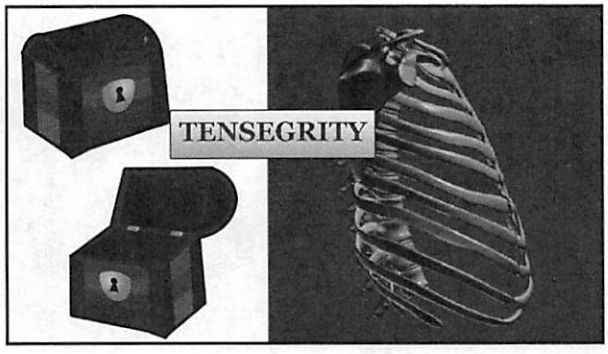




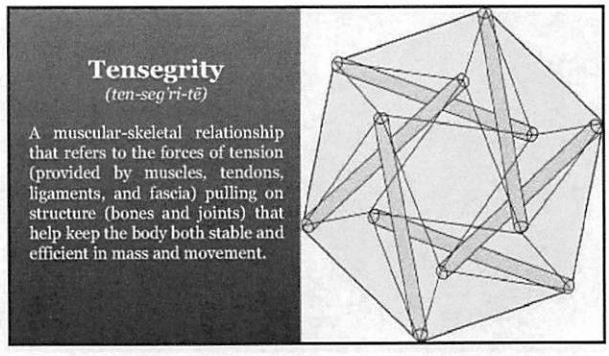
Why are these particular positions important. Building blocks of movement!



Closing the lid to the canister

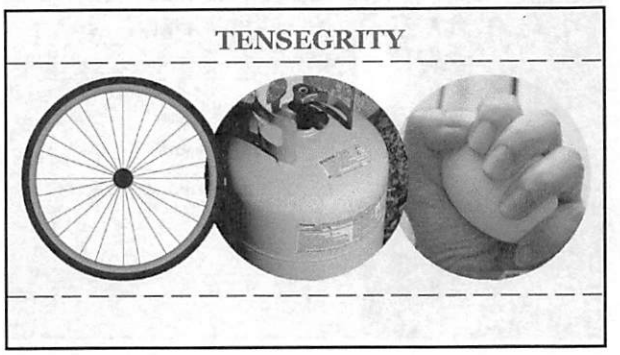


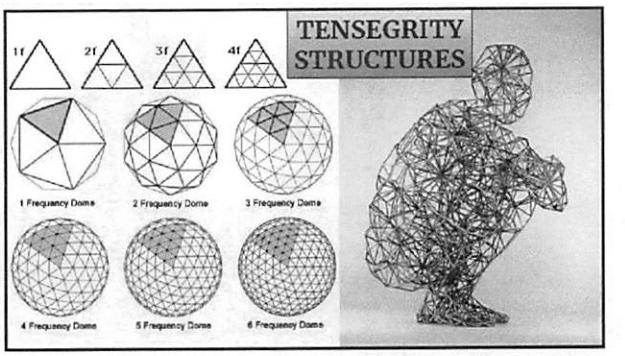
Achieving Tensegrity
3 milestones developed achieves deep core → tensegrity



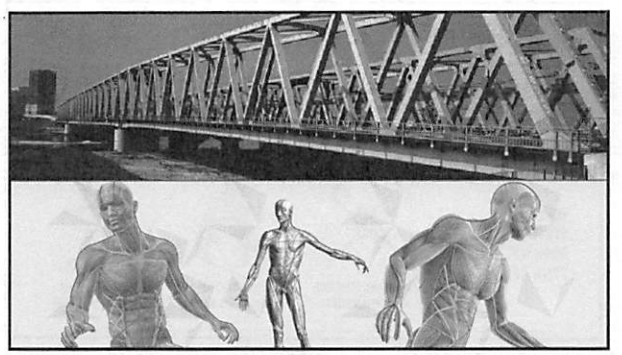
https://www.youtube.com/watch?v=BzgxYpDyO0M

Citation: " Jonas: Mosby's Dictionary of Complementary and Alternative Medicine. 2005.

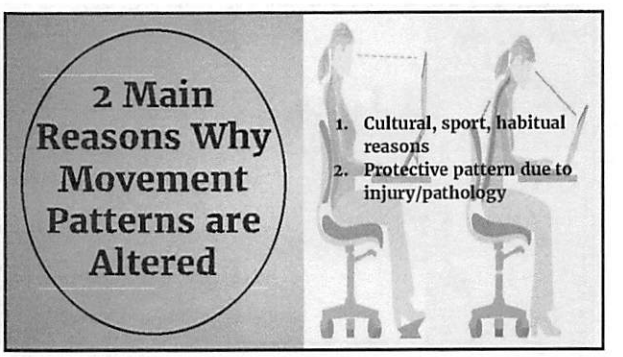


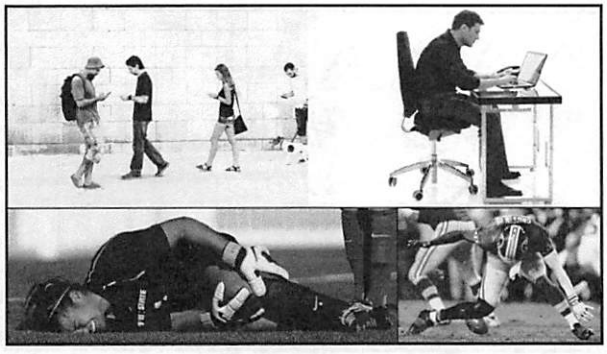


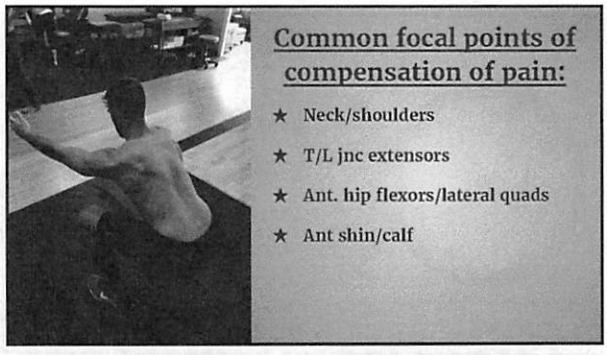
The triangle or three points of contact concept.

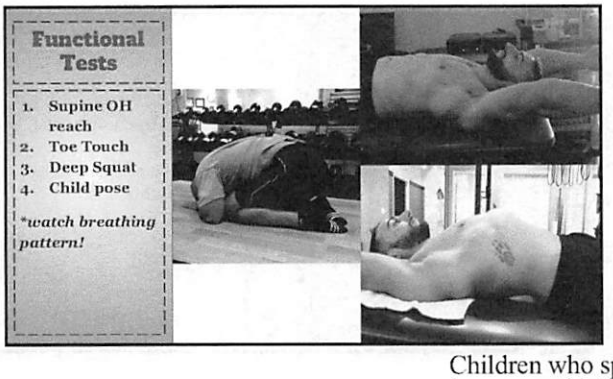


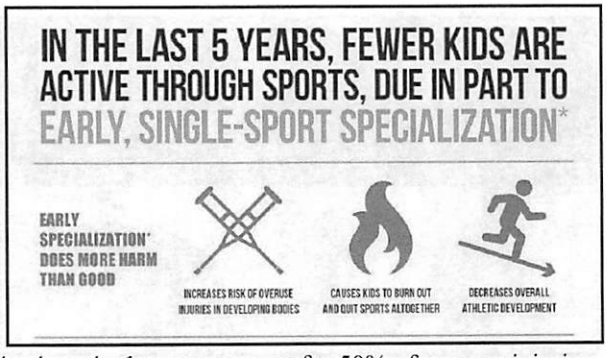
Another tensegritious structure that provides a stable foundation









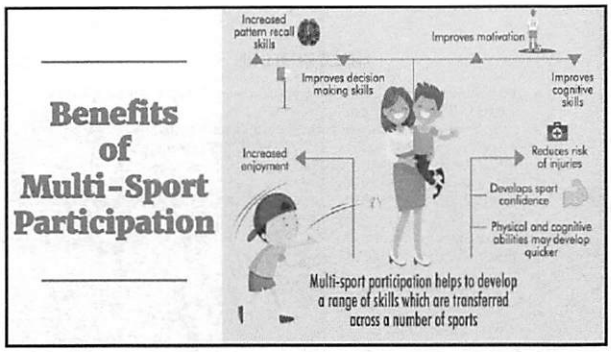


Children who specialize in a single sport account for 50% of overuse injuries in young athletes according to pediatric orthopedic specialists

A study by Ohio State University found that children who specialized early in a single sport led to higher rates of adult physical inactivity.

Loyola University found that early specialization in a single sport is one of the strongest predictors of injury. Athletes in the study who specialized were 70% to 93% more likely to be injured than children who played multiple sports!

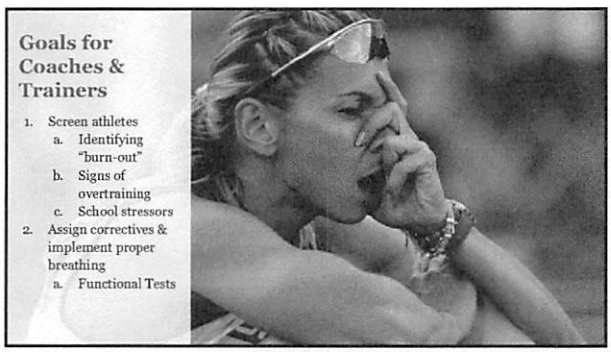
Children who specialize early are at a far greater risk for burnout due to stress, decreased motivation and lack of enjoyment



"Very few American kids are exposed to the rich proprioceptive environments that not only makes them good athletes, but also sets them up for a *lifetime* of good movement."

-Eric Cressey

Research shows that early participation in multiple sports leads to better overall motor & athletic development, longer playing careers, increased ability to transfer sports skills other sports & increased motivation, ownership of the sports experience, & confidence.
Multi-sport participation @ younger ages yield better decision making & pattern recognition, as well as increased creativity.
Early specialization ignores importance of deliberate play/free play: Deliberate play increases motor skills, emotional ability, and creativity.
There are Many Paths to Mastery: A 2003 study on professional ice hockey players found while most pros had spent 10,000 hours or more involved in sports prior to age 20, only 3000 of those hours were involved in hockey specific deliberate prac. (& only 450 of those hrs were prior to age 12).



Recap & Questions

- Breathing directly affects core, strength, and power production due to increases abdominal pressure
- Proper breathing will help facilitate proper joint position and motor control
- Core engagement, performance gain plateau, injury, and postural decrement
- Early sport specialization will limit movement variability and the increase risk of injury.
- What coaches and trainers can do for their athletes

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