


- More Than One Joint
- 17 Muscular Attachments to Scapulae Alone



The shoulder joint

## Shoulder Joint Shenanigans

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### Glenohumeral Joint

- Ball and socket joint.
  - Can be considered a golf ball and tee
  - Relies on passive support by labrum, capsule, & ligaments
- RC: SITS
  - Collectively with long head of biceps brachii, depress and stabilize humeral head

### Glenohumeral Joint

- Supra = abduction, counteracts superior pull of deltoid.
- Infra/Teres = ER
  - Collectively aid in ER when humerus @ 60-90 degrees abduction
  - Humeral head depression
- Subscap = IR
  - Only RC muscle to have posterior pull, counteracting ant. pull of ant. deltoid, infra, and teres minor

## Lets Plow Through the Boring Stuff First

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- Not a true joint
  - Lacks ligamentous support, joint capsule, synovial membrane & fluid.
- Function = place humerus in space to position optimal alignment that improve functional support of GH joint

- Neutral = between 2<sup>nd</sup> & 7<sup>th</sup> thoracic vertebral levels
- 1-3 inches from midline of the spine
- Actions: adduction, abduction, retraction, protraction, depression, elevation, Down Rot, Up Rot, IR, ER, Ant Tilt, Post Tilt

## Scapulothoracic Joint

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<p><b>Acromioclavicular</b></p> <ul style="list-style-type: none"> <li>• Aids in optimal positioning of scap for OH activities</li> <li>• Muscles Involved: Anterior deltoid, upper traps, subclavius</li> </ul>	<p><b>Sternoclavicular</b></p> <ul style="list-style-type: none"> <li>• Only bony attachment of the appendicular skeleton to axial skeleton</li> <li>• Muscles Involved: SCM, Pec Major.</li> </ul>
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**Almost Done...Promise** 4

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- Which is more important: Stability or Mobility?
- Alignment!
  - Stretch into misalignment = instability
  - Strengthen in misalignment = imbalance



**CSP Static Assessment** 5

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<p>Poor Posture</p> 	<p>Good Posture</p> 	<p>Poor Posture</p> 	<ul style="list-style-type: none"> <li>• Straight lines &amp; 90 degree angles.</li> <li>• Spine and thorax should stack vertically over pelvis, with ribs in relative caudal position.</li> <li>• Gentle kyphotic curve in t-spine, gentle lordotic curve in cervical &amp; lumbar.</li> <li>• Shoulder and pelvis "level."</li> </ul>
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**Static Assessment** 6

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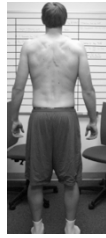
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**Static/Isolative Posture Presentations**

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**Static Downward Rotation**

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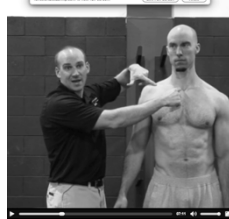
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**Clavicular Angle**

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**Glenohumeral Anterior Glide** 10

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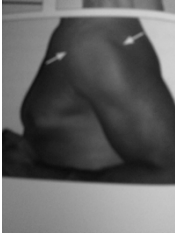
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- Occurs as shoulder moves into extension.
- Divot appears on posterior aspect of joint due to loss of centration.
- Humeral head translates forward
- Anterior Glide = more than 1/3 of humeral head can be palpated in front of acromion process



**Glenohumeral Anterior Glide** 11

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- **Short Posterior Joint Capsule** – tightness in posterior muscles does not allow humerus to move posteriorly, making it move forward.
- **Short Posterior Rotators** – infra, teres minor, post deltoid
- **Muscle Imbalances** – weakness of subscap to draw GH joint in, or over dominance of lats & teres major as internal rotators will drive humeral head forward.
- **Dysfunction** – Reverse posturing and cueing “down and back” lock the scapulae into position. Humerus has no where to go.

**4 Causes** 12

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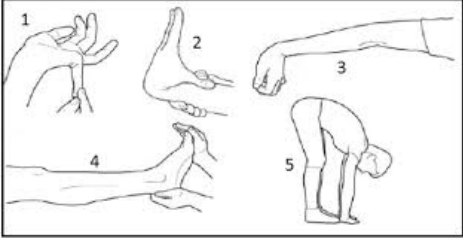
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**Beighton Laxity** 13

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**LATS!!!**

Massive muscle, with many insertion points.  
Intertubercular Groove of Humerus, Ribs, Scapulae (40%), Thoracolumbar Fascia (some on Ilium)

Think the lats don't play a role in shoulder function?

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- Humeral Extension, Adduction, Internal Rotation, Horizontal Abduction
- Lumbar Extension, Lateral Flexion
- Respiration
- THINK: what do people have to do to get their arms over their head?

**LATS**

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**Not Packed**      **Packed**



**“Packing”**

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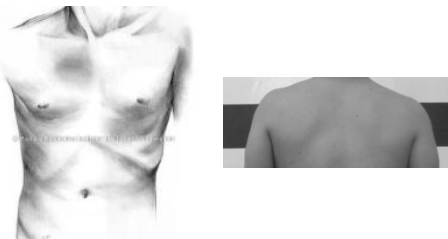
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**Left AIC** 17

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- Diaphragm, iliacus, psoas, TFL, Vastus Lateralis, biceps femoris
- Have an IAC on both sides
  - Right foot lands = Left AIC engaged (and vice versa)
- Left side always “on” and “pushes” us into right side dominance.

**Left AIC** 18

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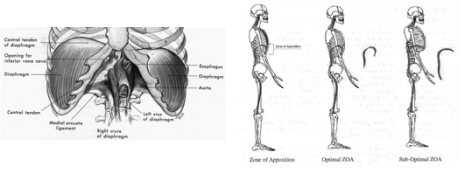
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**Zone of Apposition** 19

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- Airflow drives the nervous system.
- Respiration you learned in school is gas exchange. Breathing is movement.
- Canister vs. Scissors
- Chest Breather = dominant “accessory” breathing muscles.
- LAIC = stronger, what feels normal. (NOT OPTIMAL)
- Left Stance = changes pelvic floor, diaphragm better aligned, STRONGER POSITION.

**PRI For Dummies** 20

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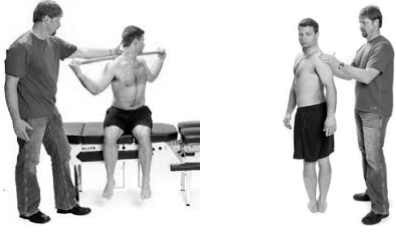
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**Rotation** 21

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- After first 30 degrees of scapular elevation, both GH and scapula move in a 2:1 ratio
- Watch for shrugging
- Landmarks: base of spine, inferior angle of scapulae

**Scapulohumeral Rhythm** 22

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**Houston, We Have a Problem** (Photo: Mike Reinold) 23

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**Shoulder Flexion (Passive)** 24

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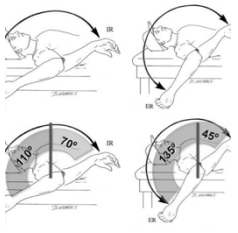
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• Posterior Capsule tightness?

**GIRD?**

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The slide contains four diagrams. The top two show a person in a starting position for a throw, with arrows indicating internal rotation (IR) and external rotation (ER). The bottom two are circular diagrams showing the range of motion for IR and ER, with angles of 70° and 45° respectively.

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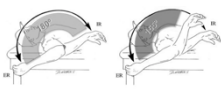
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Loss of side-to-side IR is actually a normal anatomical adaptation in overhead athletes and SHOULD NOT be considered pathological GIRD unless there is a subsequent loss of TOTAL rotational motion in the dominant arm as well.



- Mike Reinold

**New GIRD**

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The slide contains two diagrams showing the shoulder in different rotational positions, with arrows indicating the direction of rotation.

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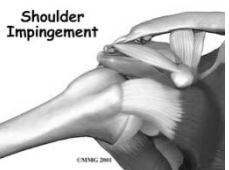
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- Garbage Term.
- No two shoulders are the same.
- Many root causes, which makes assessment all the more imperative.



**Shoulder Impingement**

**Shoulder "Impingement"**

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The diagram shows a 3D anatomical view of the shoulder joint, highlighting the area of impingement between the acromion and the rotator cuff tendons.

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- Overuse
- Rotator Cuff Weakness
- Scapular Stability
- Poor GH ROM
- Soft Tissue Restrictions
- Poor T-Spine Mobility
- Type 3 Acromion
- Poor Exercise Technique
- Poor Cervical Spine Function
- Opposite Hip-Ankle Restrictions
- Poor Programming Balance
- Faulty Breathing Patterns

## The Bigger Picture. 12 Shoulder Health Risk Factors

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## 1. Overuse

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## 2. Rotator Cuff Weakness

Band work isn't always the answer

No need to get fancy.

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- Role of Rotator Cuff:
  - External/Internal Rotation?
  - Elevate arm in scapular plane?
  - Humeral Depression.
- It's TRUE Function
  - Center humeral head within glenoid fossa

**Rotator Cuff Training** 31

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- High-Reps = superior humeral migration
- FATIGUE!



**Is Band Work REALLY the Answer?** 32

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- Most common pathology in lifters and "computer guy"
  - Standard sub-acromial "impingement"
- Anterior Pain; bursal side
- Pain with bench pressing, overhead activities, as well as approximation
- Primary vs. Secondary



**External Impingement (Meathead-itis)** 33

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• Morphological/  
Structural



**Primary** 34

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• Lifestyle Factors

- Poor Scapular Positioning
- T-spine Mobility
- Poor Tissue Quality
- Watching 50 Shades of Grey

**Secondary** 35

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• Namely, posterior shoulder pain; articular side (inside)

• Supra and infraspinatus "pinned" against Posterior-Superior glenoid and labrum

- shoulder stability sacrificed for mobility
- 7,200+ degrees IR per throw (20 full revolutions per second)
- Humeral head migrates superiorly = ouchie

• Seen most often in overhead athletes



**Internal Impingement** 36

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**Red = Bursal. Green = Articular**

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- Unless you're an overhead athlete you don't have this.
- Don't get it from sitting at your desk
- As you move into ER, sometimes you "pinch" Posterior-Superior aspect of glenoid
- Contact b/w articular side of supra/infraspinatus & posterosuperior rim of glenoid.
- Late Cocking: max abduction + ER

**Internal Impingement** 38

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**Internal Impingement**  
Proposed Mechanisms

- Microinstability
- Anterior laxity / posterior tightness
  - Thrower's ROM (excessive ER, limited IR)
- Hyperangulation mechanics
- Muscle imbalance
  - Fatigue
  - Weakness, ER/IR
  - Loss of dynamic stability

**IR in Action** (Courtesy: Reinold) 39

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Why It Occurs	What Makes it Worse?
<ul style="list-style-type: none"><li>• It's normal (in overhead athletes)</li><li>• However, more excessive the ER = more risk</li></ul>	<ul style="list-style-type: none"><li>• Scapular Position<ul style="list-style-type: none"><li>• Affects position of glenoid</li><li>• Decrease in ability to rotate scapulae</li></ul></li><li>• Thorax position affects scap position</li><li>• Anterior Laxity<ul style="list-style-type: none"><li>• Ant. Translation = FAIL</li><li>• Instability</li></ul></li></ul>

**Internal Impingement** 40

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- Points to front of shoulder and it hurts all day = it's NOT Internal Impingement.
- Hurts in "cocked position," and points to back of shoulder = Ding, ding, ding.
- Can use "Apprehension Test" to ascertain things.

**Final Say** 41

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- Acute Phase
  - Refrain from throwing (2-6 weeks)
  - Reduce pain and inflammation.
  - Re-establish dynamic stabilization
  - Manual therapy
- No aggressive stretching.

**Treatment/Training** 42

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## CrossBody Stretch

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### Strength Training

- Posterior Cuff
- Scapular Retraction
- Scapular Posterior Tilt
  
- SLER
- Prone ER
- Prone Trap Raise

### Dynamic Stabilization

- Wall Dribbles
- Half Kneeling Rhythmic Stabs.
- Band Rhythmic Stabs.
- Ball to Wall Rhythmic Stabs.
- Deceleration Flips
- 90/90 ER, ER Holds, and IR/ER Holds
- Bottoms-up Carries

## Training Emphasis

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## 3. Scapular Stability

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- Scapular Stability?
- Nothing about the scapulae is meant to be stable.
- **Controlled Mobility**



Stability →  
Mobility →  
Stability →  
Mobility →  
Stability →  
Mobility →

**Joint By Joint Approach** 46

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<b>Computer Guy</b>	<b>Meathead/Athlete</b>
<ul style="list-style-type: none"> <li>• EMG of lower vs. upper traps with and w/o impingement</li> <li>• WITH impingement = greater ratio of upper to lower trap dominance</li> <li>• Asymptomatic: UT to LT ratio of 1.80</li> <li>• Symptomatic: UT to LT ratio of 3.15               <ul style="list-style-type: none"> <li>• Upper trap 3x more active than lower trap in subjects with impingement.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Prioritize <u>UPWARD ROTATION</u></li> <li>• Strengthen eccentric action of upward rotation.</li> <li>• Improve shoulder flexion?</li> </ul>

**Different Strokes, Different Shoulders** 47

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**How To Improve Overhead ROM** (Photo: Mike Reinold) 48

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- Shoulder
  - Capsule → least common. Soft Tissue (muscle)
- Scapula
  - Upward Rotation (imbalance or motor control?)
- Thoracic Spine
- Lumbo-Pelvic Control

**FOUR Most Common Things to Look At** 49

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- Foam Roll Lats
- Teres Minor/Major
- Pecs
- Extension of T-Spine

**Attack Tissue Quality** 50

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- Want to improve UR, but also strengthen eccentric control of upward rotation.
  - Band Ws
  - Band Windshield Wiper
  - Band Wall Walk
  - Plank to Downward Dog, Yoga Push-Up Variations
  - Plank Rolling/Bodysaw
  - Dolphin
  - Serratus Upward Jab
  - Serratus Wall Slide w/ Foam Roller, Wall Slide Variations
    - Wall Plank Arm Slide I, II (w/ shoulder rotation/elbow support), III (w/ shoulder rotation/hand support)
  - Supine Arm Slide/Spider
  - Standing Back to Wall Spider
  - TRX Serratus Slide

**Upward Rotation** 51

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**Supine 90/90 Floor Slide**      **Seated Wall Slide**



**Upper Cross Syndrome**      52

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- Quadruped Variations
- Cat-Camel
- Side Lying Windmill
- KB Pullover w/ Foam Roller
- Side Lying Extension-Rotation
- Prone Thoracic Extensions
- Prone Sphinx

**T-Spine**      53

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**Deadbug w/ KB**      **Prone Plate Switches**



**Lumbo-Pelvic Control**      54

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**Bear Crawl w/ Plate Glide**      **Core Engaged ASLR**



**Lumbo-Pelvic Control**      55

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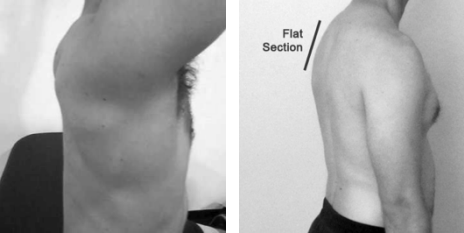
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**Flat T-Spine?**      56

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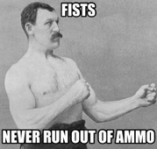
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<b>Proponents (Anti-Flexion)</b>	<b>Opponents (Pro-Flexion)</b>
<ul style="list-style-type: none"> <li>Spinal flexion should be saved for "life" activities, and not "wasted" on crunches and other spinal flexion-based exercises</li> </ul>	<ul style="list-style-type: none"> <li>Note a discrepancy between what is done in the lab and what is occurring on fields and in gyms with respect to <u>total</u> flexion cycles.</li> </ul>
<p><b>Fistacuffs</b></p> <p><small>www.TonyGentilcore.com</small></p>	 <p>57</p>

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**It's *Always* Spinal Flexion's Fault**

In the Lab  
 In Vitro = 4,400-86,000 bending cycles  
 Compression loads equating to 1500N  
 McGill found crunch to elicit 2000N (450 lbs)

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- Studies in question all done In vitro
  - Limited by removal of musculature & does not replicate in vivo response to human movement.
  - All living tissue remodels when subjected to applied stress
    - Wolff's Law, Davis's Law
- Studies meant to mimic occupational workers & emulate 1000s of reps.
  - Not entirely realistic.
  - Can this REALLY be compared to what happens on the gym floor?
- Real Training = allowed to rest, tissue remodels
- Exercise Induced Disc Damage = fatigue failure outpaces rate of adaptive remodeling

**To Crunch Or Not to Crunch: An Evidence Based Examination of Spinal Flexion Exercises, Their Potential Risks, and Their Applicability to Program Design (Contreras, Schoenfeld, Aug. 2011, Vol. 33, Issue 4, pp 8-18.**

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- Spinal motion shown to facilitate nutrient delivery to intervertebral discs.
- Spinal Flexion = improved spinal flexibility
  - Lack of sagittal plane flexibility = LBP

**Benefits of Spinal Flexion.**

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- Inc. Connective Tissue Strength
- Inc. Muscular Strength
- Inc. Motor Learning.
- Inc. Neuromuscular Coordination.
- ALSO
  - May help alleviate LBP in people with ***HYPER***mobility.

**Strength Training Works** 61

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- 1. End Range Lumbar Flexion (and Extension).
- 2. Lumbar flexion for those already in flexion.
- 3. Lumbar flexion under load.

**My (Flexion) Rules...** 62

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**All 4s Belly Breathing**      **Deep Squat Belly Breathing**



**Flexion is Necessary!** 63

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### 4. Poor Exercise Technique

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- Have to earn the right!
- What's the cue for OLY Lifting?
- A TON of anterior instability
- More bicep tendon issues

### Should People Overhead Press?

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**What you THINK is happening**



**What's ACTUALLY happening**



### Gymnastics Training

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• Tall Kneeling to Standing  
• Get-Ups  
• Bottoms-Up Presses  
• Pull-Ups/Chin-Ups

**Overhead Stuff That  
Doesn't Make Me Swallow  
a Live Grenade**

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• Underrated component of shoulder health  
• Stay cognizant of imbalances/postural issues.

• Rollouts  
• Hanging Leg Raise  
• Knees Only, 90 Degrees, Ankle Taps  
• Regressed to Floor  
• Grease the Groove  
• Rule of 10

**Pull-Up/Chin-Up  
Programming**

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• Bench Press  
• Rows  
• BO Rows, Cable Row, DB Row, CSR, Batwing, TRX w/ Reach

**Lets Discuss...**

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<b>Overhead Athlete</b>	<b>Computer Guy</b>
<ul style="list-style-type: none"> <li>• Let the scapulae move!               <ul style="list-style-type: none"> <li>• Landmine Variations</li> <li>• Push-Ups</li> <li>• Off-Center DB Press</li> <li>• Cable Press                   <ul style="list-style-type: none"> <li>• HK, Squared Stance, Staggered, w/ Rotation</li> </ul> </li> <li>• Turkish Get-Up</li> <li>• Short Lever KB Rotation</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Reduce benching volume.</li> <li>• Learn to bench correctly</li> <li>• Improve Pull-up strength</li> <li>• Reduce benching volume.</li> </ul>

**5. Poor Programming** 70

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- Positional Breathing
- T-Spine/Core Control
- Shoulder Flexion ROM
- Scapular Control (Wall Slides)
- Glenohumeral Motor Control (Prone/Supine ER/IR)
- Glenohumeral ROM (only when indicated!)

**Programming Considerations (Warm-Up)** 71

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- Eliminate overhead activities – have to earn the right (lower back considerations).
- Modify or eliminate Horizontal pressing
- Lots of horizontal pulling
- Hammer t-spine mobility
- Avoid “at risk” position – front squat over back squat

**Programming Considerations** 72

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- Limited ROM before full ROM
- Adducted before abducted
- Unstable (GASP!!!!) before stable
- Closed-chain before open chain
- DBs before barbells
- Isometrics before "regular" speeds
- Traction before approximation (pull-ups, before OH pressing)

## Programming Considerations Continued

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- (feet-elevated push-up ISO holds>(feet-elevated) body weight push-up>stability ball push-up>weighted push-up>neutral grip DB floor press>neutral grip decline DB press>pronated grip decline DB press>barbell board press>barbell floor press>neutral grip DB press>low incline DB press>close grip bench press>bench press>barbell incline press>chicks will want to hang out with you. WIN!!!!

## Bench Press Progression

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