Understanding Shoulder Instability

Introductions

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- Founder & Mentor: Grow Physio Academy

Steve Miller

MSc

GROW Physio

Learning Objectives

- Define shoulder instability and differentiate it from laxity
- Understand static vs dynamic stabilizers of the shoulder
- Perform structured ROM and strength assessment
- Utilize ActivForce 2 for objective strength measurement
- Integrate findings into clinical decision-making

Agenda

- Introduction: Understanding Shoulder Instability
- Clinical presentations
- Classifications
- Mechanisms of injury
- Common causes and risk factors
- Clinical Assessment
  - Range of Motion (ROM)
    - Shoulder IR/ER, Flexion/Extension, Abduction/Adduction
  - Muscle Testing
    - Shoulder IR/ER, Abduction/Adduction
- Case Study
  - Data Review and Analysis
- Treatment and Rehabilitation Strategies
- Q&A

Understanding Shoulder Instability

What is Shoulder Instability?

- Symptomatic excessive humeral head translation
- Failure of static and/or dynamic restraints
- Presents with pain, apprehension, weakness, or recurrent subluxation
- May occur after trauma or repetitive microstress

Clinical Presentations

- Scapular winging or anterior tilt
- Excessive ER at rest
- Muscle atrophy (infraspinatus fossa)
- Apprehension during abduction + ER

Dynamic scapular dyskinesis often contributes to recurrent symptoms.

Joint Laxitiy

- Increased passive joint motion
- Often congenital or generalized
- Typically asymptomatic
- No pain, apprehension, or functional limitation
- May be present bilaterally

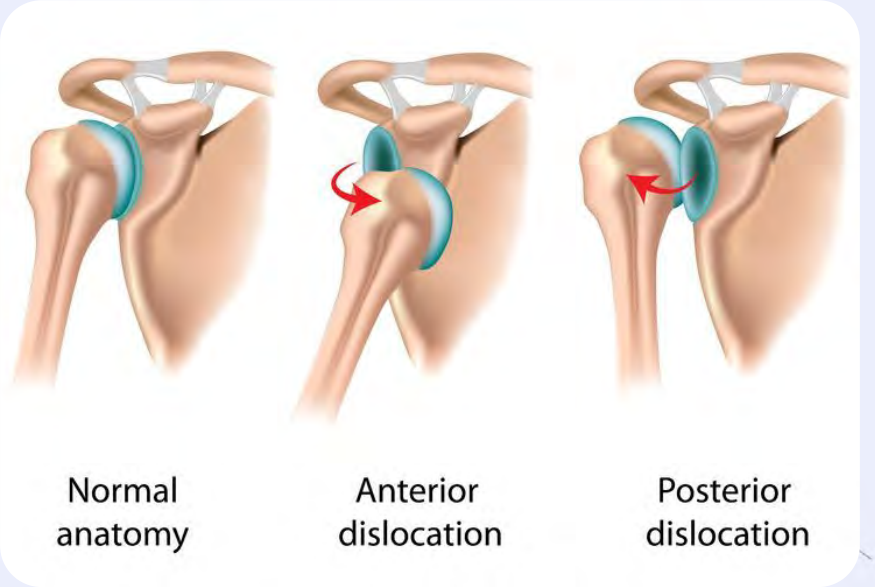
Note: Laxity becomes instability when it produces symptoms.

vs.

Shoulder Instability

- Symptomatic excessive humeral head translation
- Associated with pain, apprehension, or subluxation
- Functional limitation during activity
- Often history of trauma or repetitive stress
- May lead to recurrent episodes

Classifications of Shoulder Dislocations



- Anterior (≈90% of cases) – abduction + ER mechanism
- Posterior – flexion + adduction + IR load
- Multidirectional (MDI) – symptomatic laxity in ≥2 directions
- Traumatic vs atraumatic onset

Note:

Anterior instability often damages anterior labrum (Bankart lesion).

Posterior instability common in contact sports or weightlifters.

Static Stabilizers

- Glenoid labrum deepens socket by ~50%
- Capsule and glenohumeral ligaments limit end-range translation
- Inferior glenohumeral ligament (IGHL) complex stabilizes at 90° abduction
- Negative intra-articular pressure adds passive stability

Static stabilizers become more important at end ranges.
IGHL anterior band resists anterior translation in ABER.

vs.

Dynamic Stabilizers

- Rotator cuff compresses humeral head into glenoid
- Subscapularis resists anterior translation
- Infraspinatus & teres minor resist posterior/anterior shear
- Scapular stabilizers maintain glenoid alignment
- Neuromuscular control coordinates timing

Dynamic control is the primary focus of conservative PT management.

Mechanisms of Injury

- Traumatic dislocation (high force event)
- Repetitive overhead loading (throwing, swimming)
- Microtrauma causing capsular attenuation
- Generalized hypermobility conditions

Overhead athletes often develop anterior instability due to repetitive ER stress.

Click here to watch video.

Common Causes

- Overhead athletes (baseball, volleyball, swimming)
- Contact athletes (football, rugby)
- Weightlifters (bench press, overhead press)
- Patients with history of traumatic dislocation
- Individuals with generalized joint hypermobility

Risk Factors

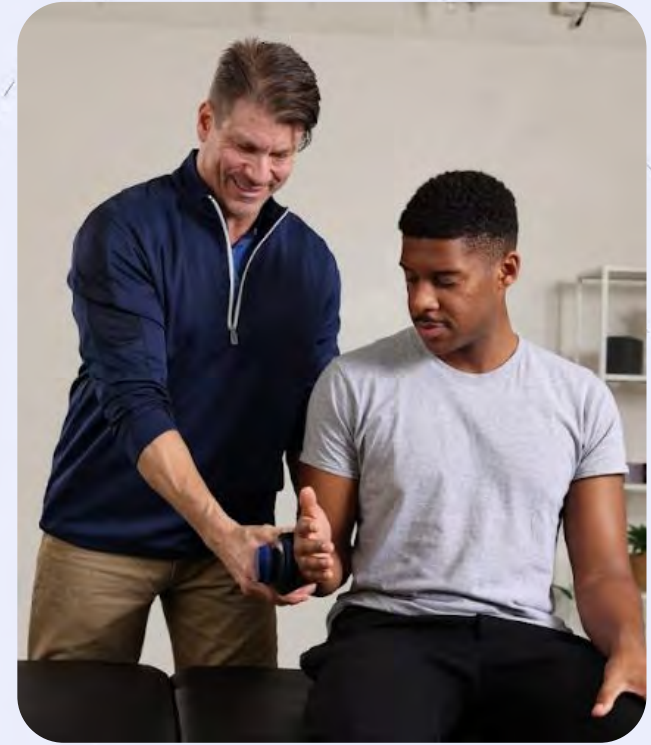
- Previous shoulder dislocation or subluxation
- Repetitive overhead loading
- Capsular laxity or connective tissue disorders
- Rotator cuff weakness (especially ER deficit)
- Scapular dyskinesis
- Poor neuromuscular control

Click here to watch video.

Clinical Assessment: Range of Motion

Shoulder Internal and External Rotation

Can be tested in seated position with device strapped.



Shoulder Abduction

Can tested in seated or supine position with device strapped on the arm before movement.

Shoulder Flexion

Can tested in seated or supine position with device strapped on the arm before movement.

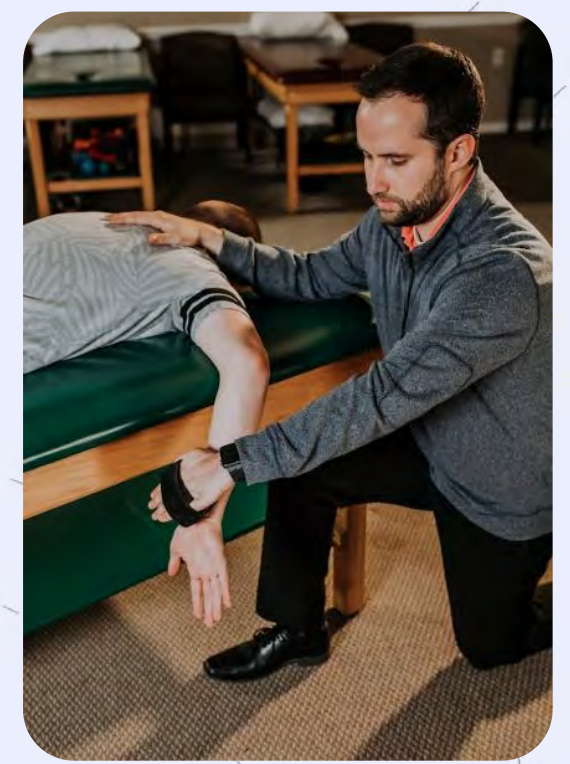
Shoulder Horizontal Abduction & Adduction

Can tested in seated or supine position with device strapped on the arm before movement.

Clinical Assessment: Muscle Testing

Shoulder Internal & External Rotators

Can be tested in seated or prone position.

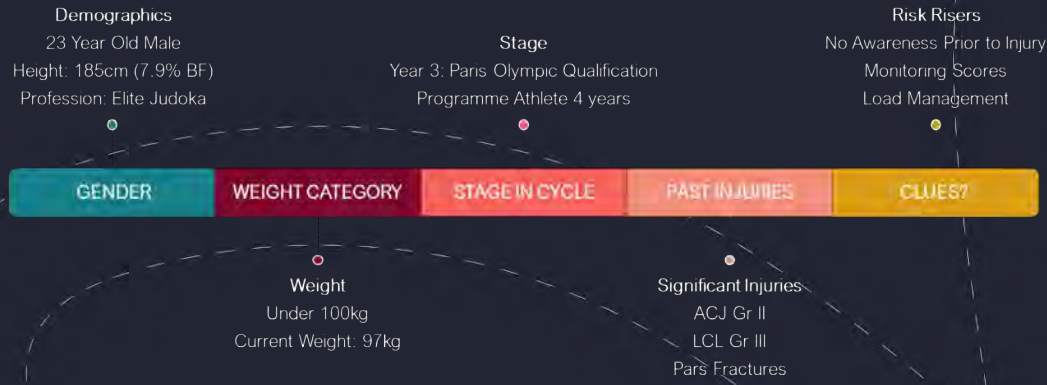


Shoulder Abductors (Scaption)

Can be tested in seated position.

Case Study: Judoka

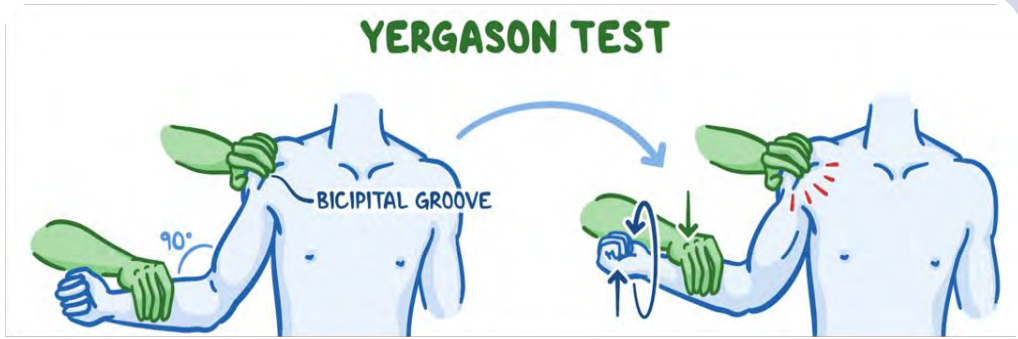
- 23 Year Old Elite Athlete
- Traumatic Onset: Posterior Subluxation
- Conservative vs Surgical Management

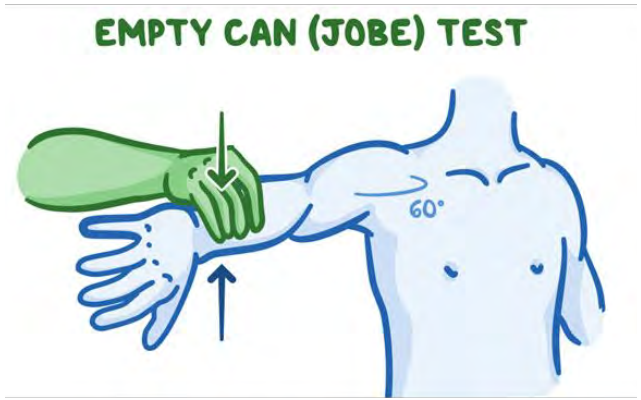


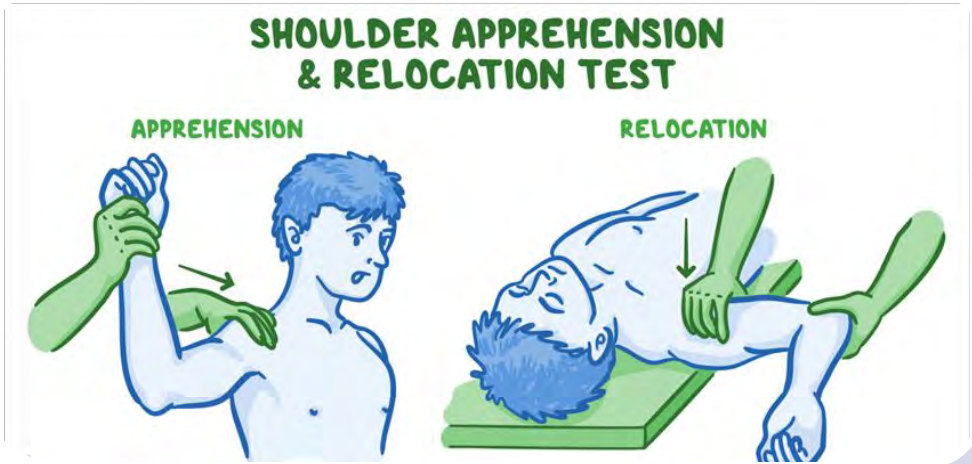
Clinical Presentation

- Obs/Visuals: No apparent deformity, swelling or bruising ✓
- Palpation: Painful over proximal biceps tendon and posterior GHJ ✗
- Shoulder RoM: 50% loss of active LR RoM in neutral (passive > active) ✗
- Special Tests: Labral Tests Positive or Pain Limited: Traction & Compression ✗
- Weight Bearing Status: Unable to Press Up on floor or wall ✗
- Strength: Significant Reduction in Output in All Planes of Motion, Pain Limited ✗

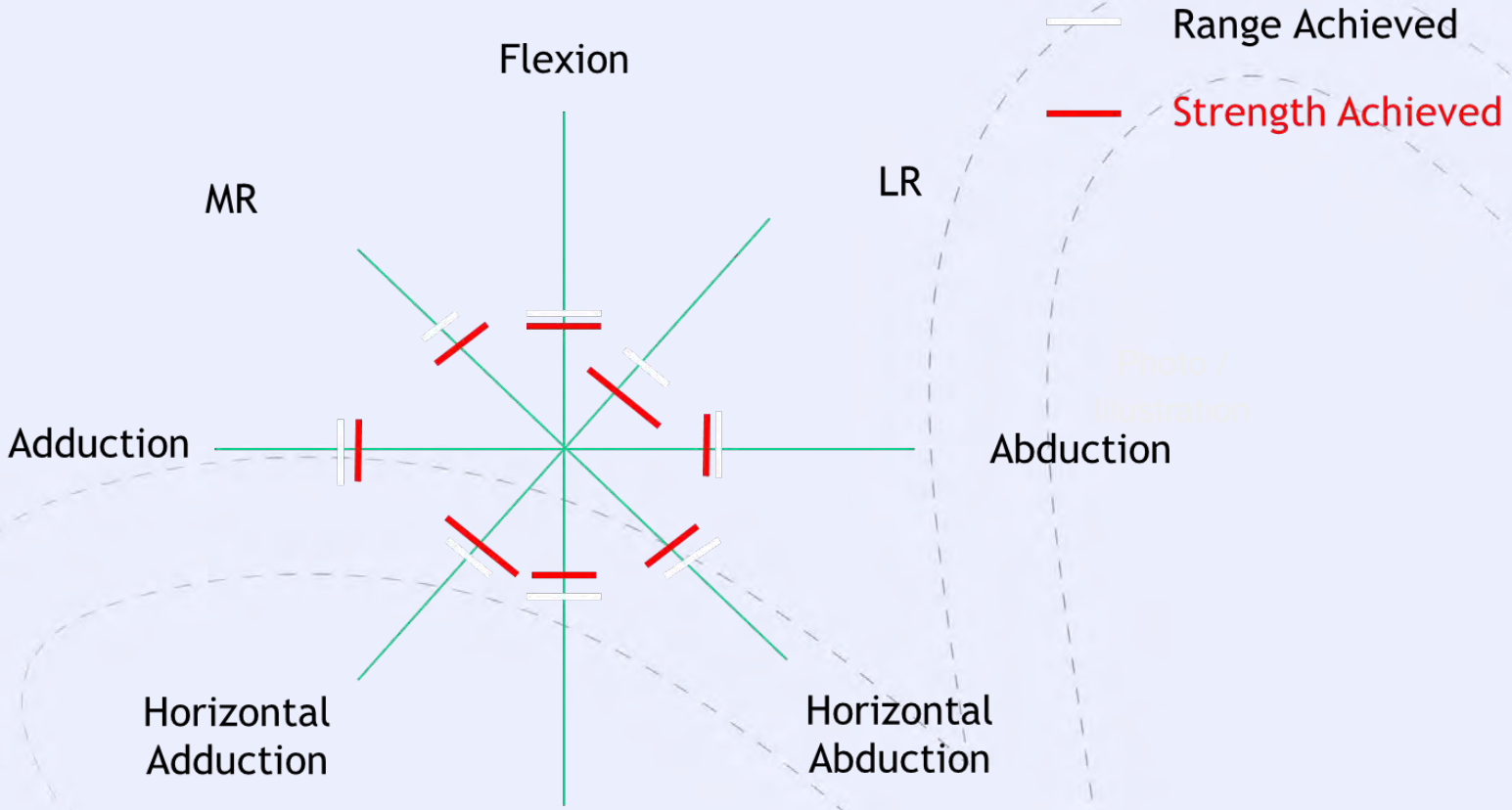
‘Special Tests’







ARoM & Strength Output



Differential Diagnosis

Region	Palpation	RoM	Strength / Function	Special Tests / Comments
Cervical				Full, painfree RoM, no referral, NAD on spurlings, no midline/bony tender
ACJ/SCJ				Horizontal Adduction/scarf painful to posterior aspect of shoulder, no clavicular pain on palpation/crepatis
GHJ / Labral				Pain on Neers +, Scoop test +, Resisted flexion in HK position +
Rib/Thoracic				Nil on rib palpation, rib heights and expansion symmetrical, scalenes NAD
Soft Tissue (Myogenic)				Isolated resisted testing reduced on LR, PRoM > ARoM
Neurovascular Status (Neuro)				All dermatomes, pulses and capilliary refill normal (including axilliary patch)
Non-MSK				No PMH, no FH, no red flags, no rheumatology or neurological features

Diagnostic Findings

PROCEDURE: MRI Shoulder Lt

CLINICAL INDICATION: Left shoulder injury? Acute reduced anterior dislocation

FINDINGS: The biceps tendon is intact and normally located within the bicipital groove. This inserts normally with no evidence of slap type tear.

Subscapularis is intact with a normal subcoracoid interval.

The supraspinatus and infraspinatus tendons appear intact. No significant fluid in the subacromial bursa.

The AC joint is normally aligned. A small amount of oedema within the subcutaneous fat superficial to the AC joint possibly indicating a localised soft tissue contusion.

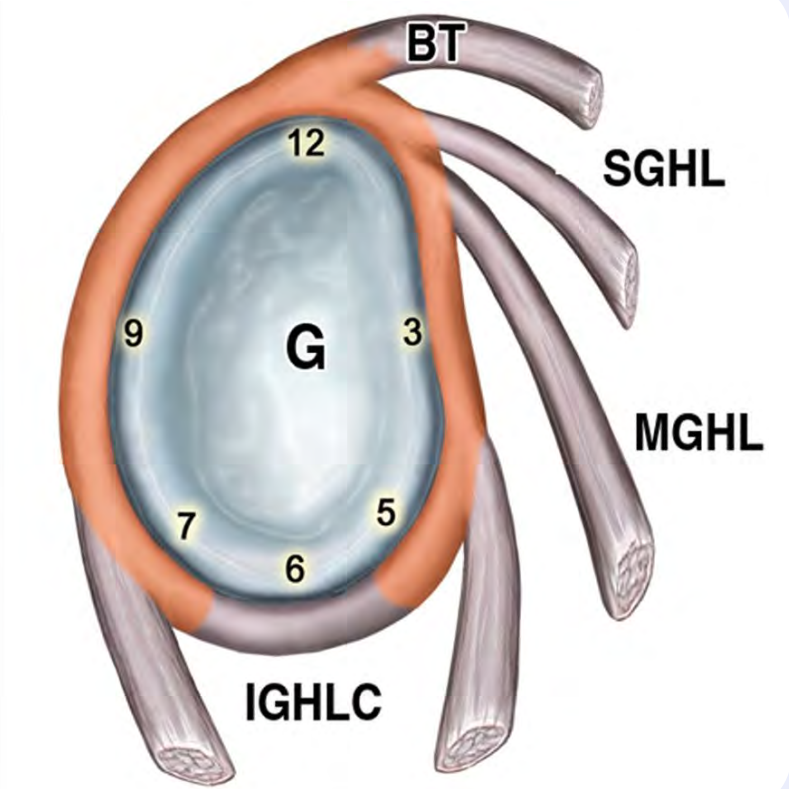
There is bone marrow oedema anteriorly within the humeral head. There is also some patchy signal change within the posterolateral humeral head but there is minimal oedema in this region. This however could reflect a more chronic Hill Sachs lesion.

There is oedema around the posterior aspect of the humerus deep to the teres minor musculotendinous junction. This appears to reflect an avulsion injury of the posterior attachment to the humeral head. It is best appreciated on axial images 10-12. It may also involve the proximal posterior fibres of the inferior glenohumeral ligament. There is likely to be a posterior labral tear extending on the 8-6 o'clock positions.

There is no significant glenohumeral joint effusion and articular cartilage is preserved on both glenoid and humeral aspects.

The regional musculature is normally maintained. Normal spinoglenoid notch.

Overall appearances would therefore indicate the acute injury probably reflects an anterior humeral head bone contusion and posterior subluxation injury with avulsion of the posterior humeral capsular attachment and possibly proximal fibres of the posterior band of the inferior glenohumeral ligament as described.



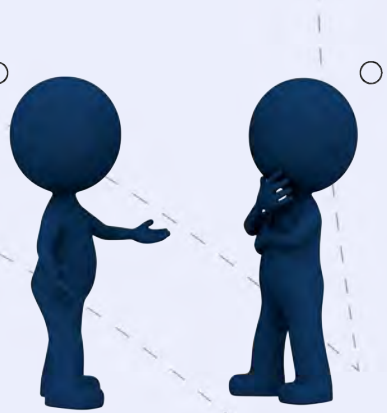
Athlete & MDT Discussions

Medics / Surgeon

Looks like a Posterior Dislocation. Surgeon encourages full range of motion pre-op. Avoid any stress to posterior capsule.

Athlete

Understands findings of scan. Athlete happy to see consultant. **Initial thoughts:** Progressing well & feels can manage without an op.



Planning

BRITISH JUDO

Rehabilitation programme outline

Max Gregory

Left Shoulder - Posterior Shoulder Subluxation 18/04/2024 - Conservative Management

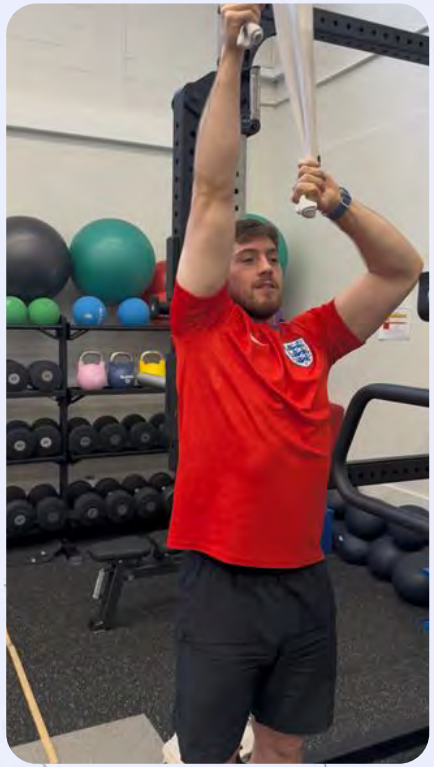
Post Injury	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Events												EST E/O 7th July		
Date	18/04/2024	25/04/2024	02/05/2024	09/05/2024	16/05/2024	23/05/2024	30/05/2024	06/06/2024	13/06/2024	20/06/2024	27/06/2024	04/07/2024	11/07/2024	18/07/2024
Phase	Stability and hypertrophy				Frontal / transverse stability			Judo specific, power, pertubation			Monitored randori			
Overview	Restoration of full range of movement Progress difficulty of rotator cuff and scapula setting exercises Progress proprioception exercises with increased BW loadings (50% --> 100%)				Functional specific movement, strength & power Regain neuromuscular control Progressive loadings through multidirectional ranges			Implementation of pertubation for preparatory and reactive stabilisation Overload of overhead and throwing activities going into apprehension positions			Rehab maintenance Return to Men's S&C programming Judo volume and intensity progressions			
Mobility	AROM into abduction with ER so long as confident and controlled Including **careful** passive stretching into and through this range				Regain control through full combined positions Begin increasing load of passive stretch through combined EOR's (especially overhead)			Maintain full range of movement with no negative reactions from overload of upper limb No aprehension with EOR **OP** (**by end of stage**)			Maintain full range of movement			
Stability & Capacity	Rhythmic stabilisations with resistance progressions Rotator cuff and scapula capacity (progression of exercise intensity/difficulty) No evidence of compensation, scapula winging or humeral head translation				Banded diagonals/Non-linear capacity Eccentric control focus with bodyweight exercises (introduce pulls, dips, hanging core) EOR combined movement			Transition of capacity to power/plyo exercises and progressions into apprehension positions Eccentric focus with judo specific resistances (K-Pulley to Uke progressions) Pertubation of open & closed chain exercises			Maintain Outcome Measues Activation programme pre-randori sessions			
Conditioning	Bike and running Skiing when no concerns with linear muscle capacity (Tricep loading) Rowing when no concerns with scapula and cuff control & capacity				Skiing Rowing Sled Push/Pull Banded Judo (**If under control and confident**)			No restrictions Incorporate judo specific progressions into conditioning sessions			Full Men's programme			
Strength	Bilateral linear strength - Posterior focus > Anterior focus Can start unilateral strengthening when have full ROM				Build upper limb strength if able to begin in previous stage Care taken with overhead activities Strength > Power			Progressive loads with overhead lifting U/L Power progressions once completing within rehab Olympic lifting techniques Rehab then Strength			Full Men's programme			
Judo	Judo warm-up environment: Bearwalks & Banded linear movements (high pulls) Banded uchi komi (**care with band pulling into ER**) Linear uchi komi with uke (**avoid uke pulling into ER**)				Judo technical environment: Rope climbing Ne waza positional tollerance (**Full control**) Nage komi (throwing uke) **late stage!**			Judo training environment: Break fall simulations, Handstands & Cartwheels Grip fighting Nage komi (if competant with break falls)			Randori environment: Progressions of Uke fighting weight Progressions of Randori intensity Progressions of TW, NW and transitions			
Outcome Measures	Pain Free Press-ups				UL-YBT - LSI = >90% with all 3 movements			Unrestricted K-Pulley Judo Techniques			Pain Free Randori			
	Pain Free TRX Walking				Dumbbell Lateral Fly Fatigue >90% LSI			Pain Free Dummy Throws			Maintain Outcome Measues			
	Prevent compensatory movement patterns				Upper Limb Capacity (<10% Pre-injury)			Max Reps Clap Press Ups Pre + Post Fatigue (90%)						
	Improved proprioceptive awareness				Shoulder Isometric ER + IR >90% LSI (HHD)			Unrestricted Nage Komi (Push & Pull)						
	Hand Held Grip Dynammometer (LSI = >90%) Sleeve & Post				Shoulder Isometric Abduction >90% LSI (HHD)			Full S&C Content < 5% of pre-injury strength						
	HHD Elbow Flexion + Extension (LSI =>90%)				ASH Peak Force (I, Y & T) LSI =>90%			Landmine velocity throw (90% LSI)						
	HHD Shoulder Flexion + Extension (LSI =>90%)				? Score on chest press or chest fly scores?			Seated Shot-Put - LSI >90%						
	CKCUEST L-R +90% LSI / 3x Fatigue = 90% LSI				Single arm hang duration (LSI =>90%)			CMJ Press-Up & SA press to DA landing						

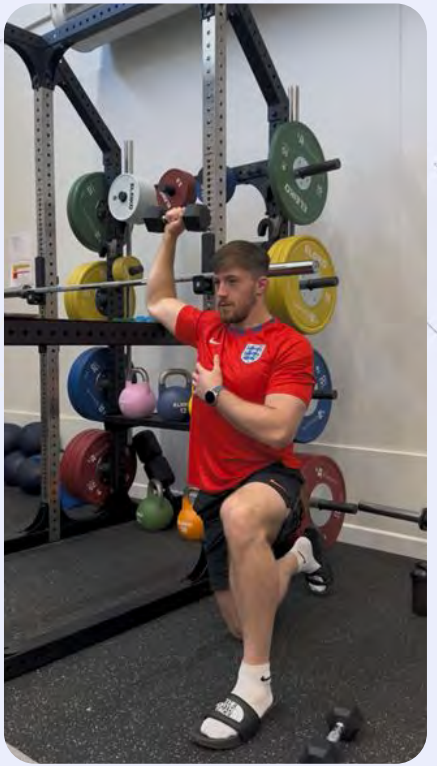
Working on RoM: Shoulder Specific

Passive & Active Assisted

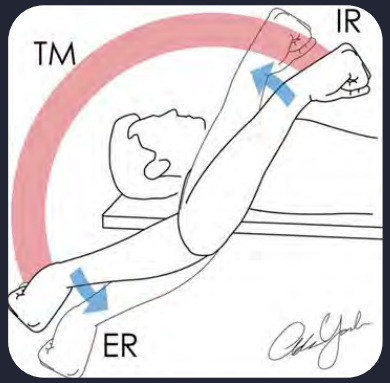
Shown: Gi Assisted Pulleys

Measured Pre & Post using ActivForce





Shoulder RoM: IR/ER/GRID



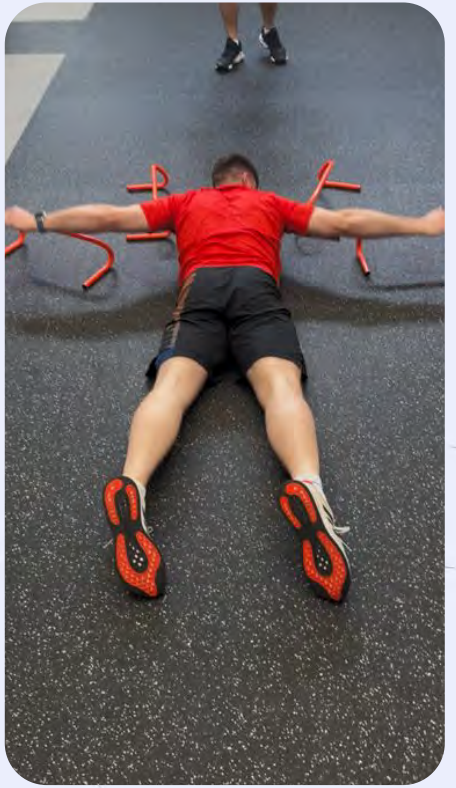
Shoulder IR & ER	Left		Right	
	IR	ER	IR	ER
Baseline	45	120	60	125
Week 3	40	70	58	122
Week 8	42	97	62	123
Week 12	42	114	57	125

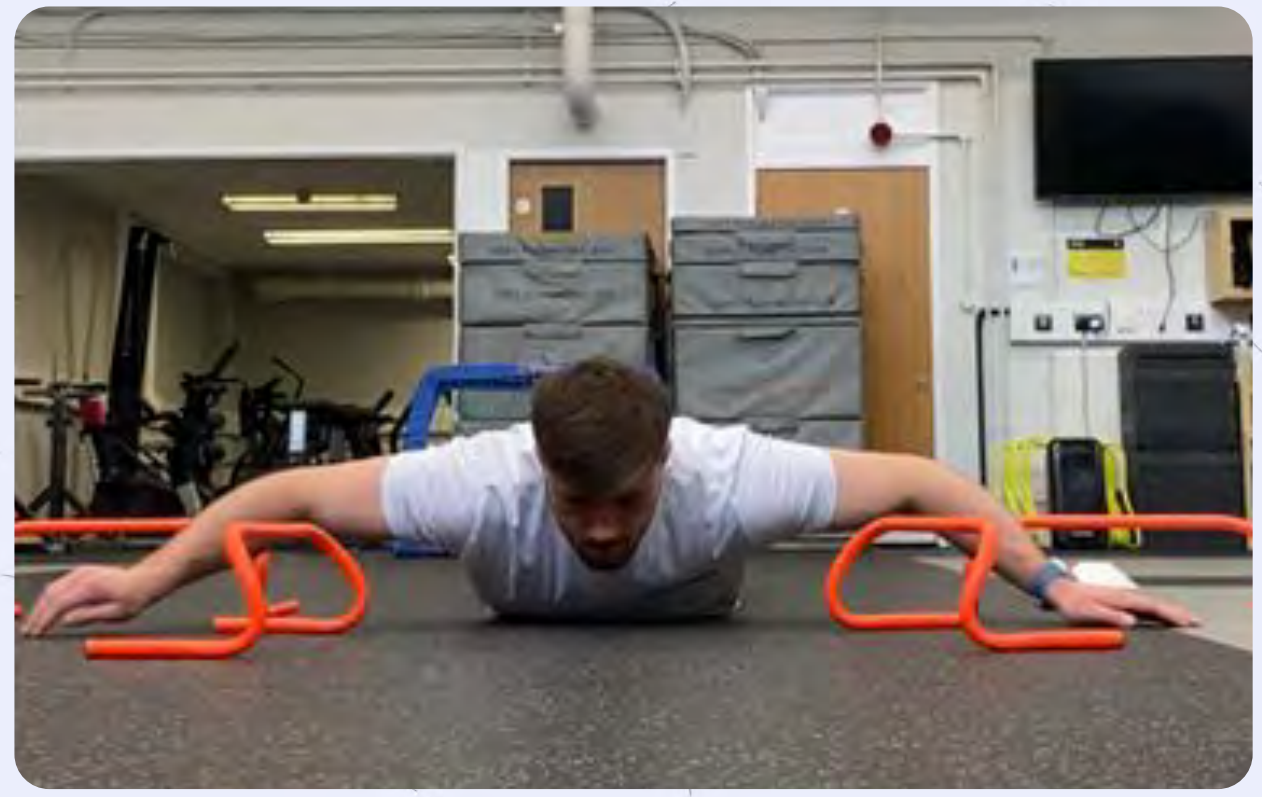
Working on RoM: Thoracic Moblity

Measuring Tx Rotation with ActivForce

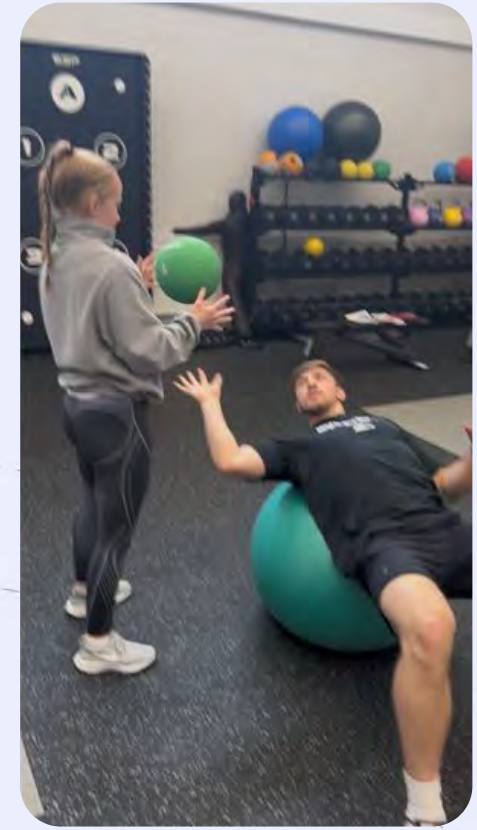
Tx Mobility Exercises

Restore Control through Range

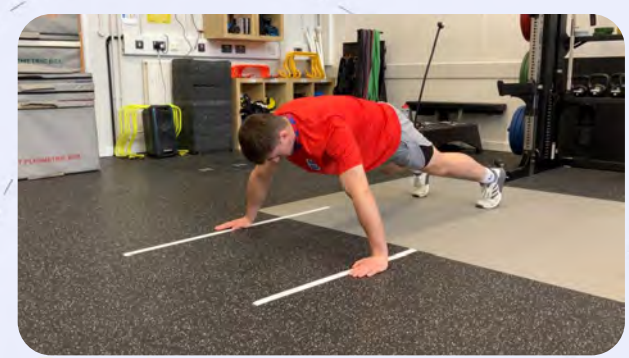




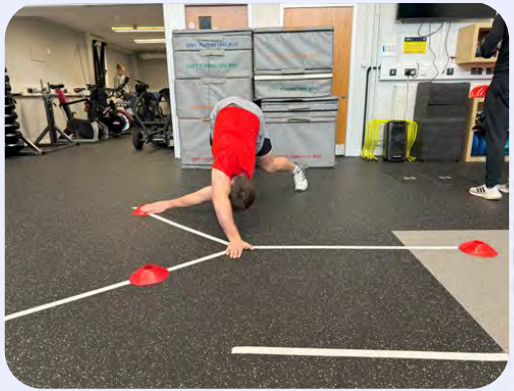
Outer Range Control: Incorporating Trunk



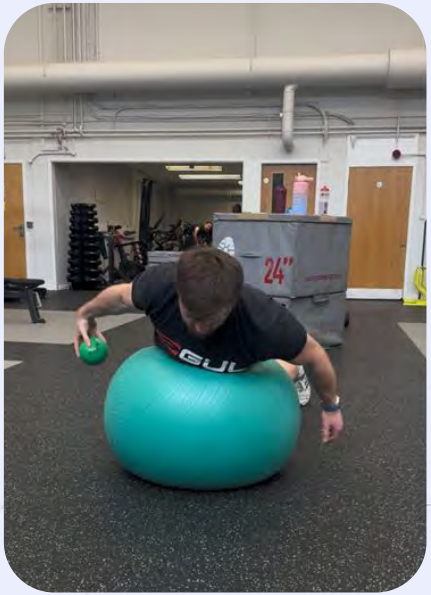
Load Bearing Demands

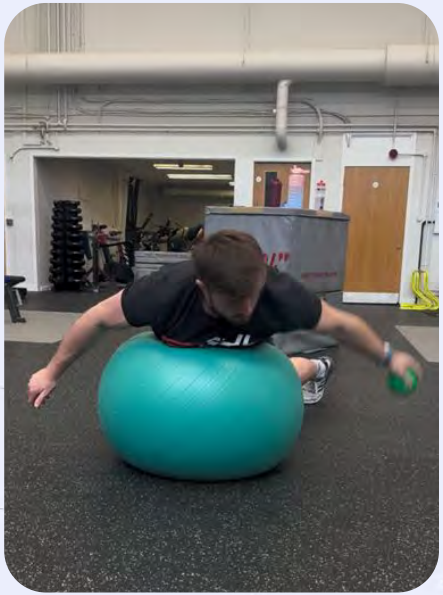


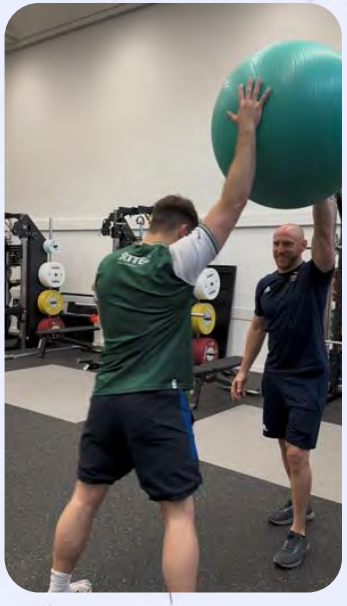
Upper Limb Y-Excursion Test

Rotator Cuff Perturbations

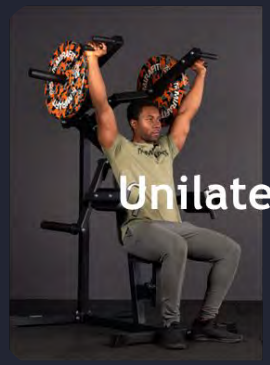




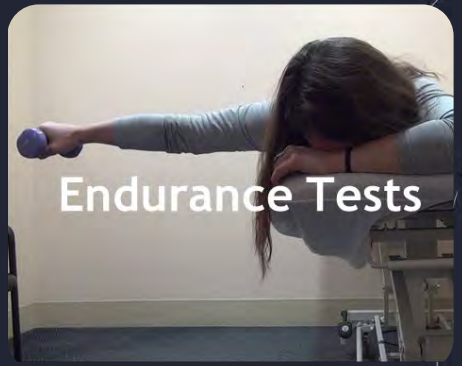


Landing Confidence & Variables

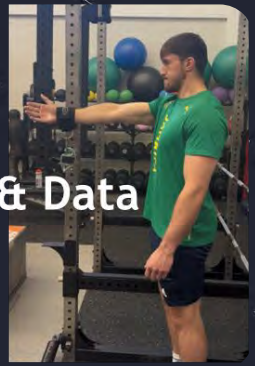
Importance of Testing



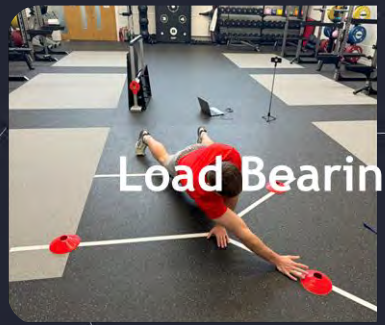
Unilateral Loading



Endurance Tests



Rot Cuff & Data



Load Bearing Status

Injury Risk Positions

BW Hang

Training & Competing Worldwide

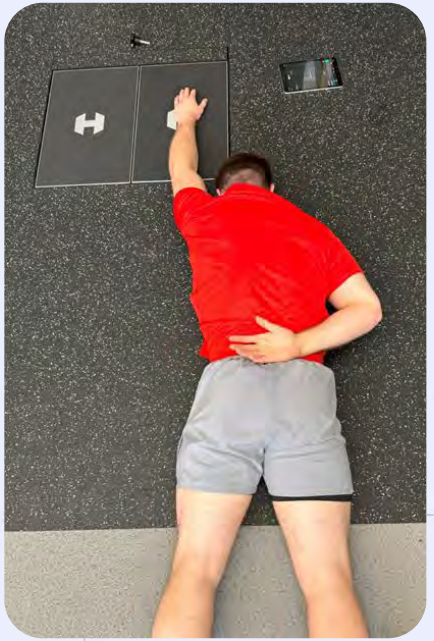
Benefits of time spent out of country for athletes:

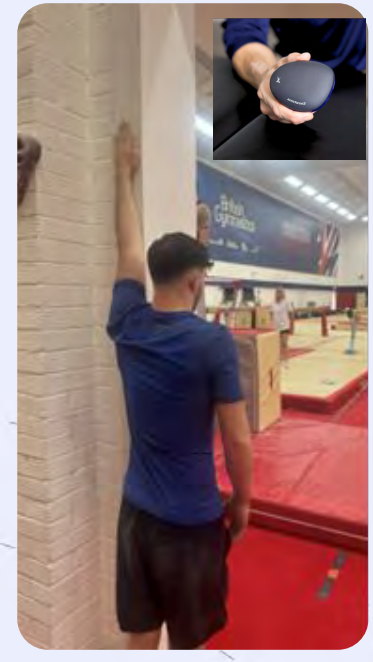
- Comps & Camps
- Train with best judokas in the world
- Up to 6 months out of country per year

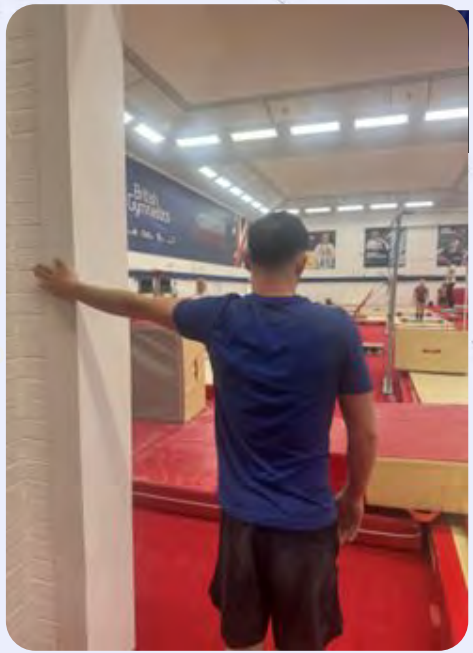
- Significant Challenge for Sports Science & Medicine Departments

IJF WORLD JUDO TOUR TOKYO

Activ Force: ASH Test







Traditional Battery of Testing - Not Feasible

- Vald Force Frame Testing in Gym

- Adapted Technique using ActivForce

Testing Benefits

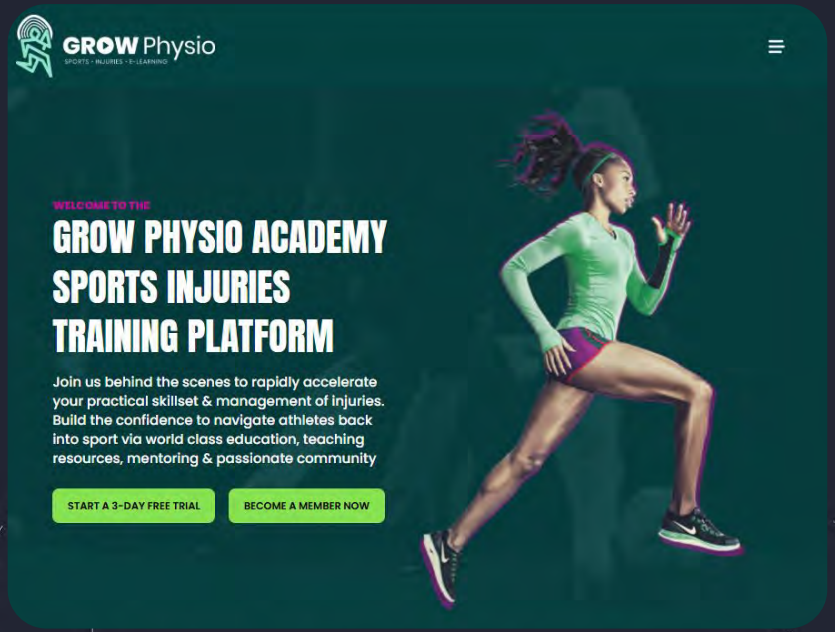
Why Do We Test in British Judo?

- Identify deficits & asymmetries
- Compare to baseline & squad
- Realities & Motivation for Athlete

- Is Rehabilitation Working?
- Where do we need to focus?
- Where are they more ‘vulnerable’?

- Confidence: All Parties
- Objective markers for coaches
- Can’t fake numbers!

Join Grow Physio Academy



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Steve Miller

16 Sports Injury Management Guides

£67 or 2 monthly payments of £35

Applied Testing & Screening for Athletes

39 Lessons

Need more clarity and direction on running your own battery of testing and squad screening for your athletes? Adding metrics is so important to gain a deeper understanding of the individual and team's physical qualities so you can put into place the relevant injury reduction systems and processes. This step-by-step guide reveals how we screened our Olympic and Paralympic squads leading up to Paris 2024 and beyond

VIEW THE COURSE

£67

Athletic ACL Practical Course

20 Lessons

This course walks you through everything you need to know to manage ACL clinically from assessment, acute management, decision-making surgery vs conservative, treatments, rehabilitation & prevention programs and monitoring to ensure athletes do not break down again and have to repeat the process & potentially end careers.

VIEW THE COURSE

£67

Shoulder Injuries in Sport

24 Lessons

The perfect guide to managing shoulder injuries for therapists (and athletes) to help guide them through injury back to sport with proven approaches from elite sport that can be used at any level. By signing up to the waitlist you will be able to benefit by hearing first when the course is ready and benefit from any early-bird offers...

VIEW THE COURSE

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Summary & Questions?

References:

- Kisner, C., Colby, L. A., & Borstad, J. (2017). Therapeutic exercise: Foundations and techniques (7th ed.). F.A. Davis.
- Magee, D. J. (2021). Orthopedic physical assessment (7th ed.). Elsevier.
- Reinold, M. M., Wilk, K. E., Macrina, L. C., & Dugas, J. R. (2010). Current concepts in the evaluation and treatment of the shoulder in overhead throwing athletes. Journal of Orthopaedic & Sports Physical Therapy, 40(2), 90–104.
- Wilk, K. E., Macrina, L. C., & Reinold, M. M. (2012). Nonoperative and postoperative rehabilitation for glenohumeral instability. Clinics in Sports Medicine, 32(4), 865–891.
- American Academy of Orthopaedic Surgeons. (2023). Shoulder instability. https://orthoinfo.aaos.org