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Return to Sports Criteria Following Shoulder Injury

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I have no disclosures

Problems:

- Re-Injury rates significant
- Return to sports often based on subjective findings
- Many physicians have time-based criteria
- Athlete mental state/desires
  - Fear, anxiety, readiness to return
- End of reimbursable PT visits?
- **Lack formal objective criteria for return**

Clinical Question:

- What are the keys when considering RTS after shoulder injury?
- Where is the evidence?

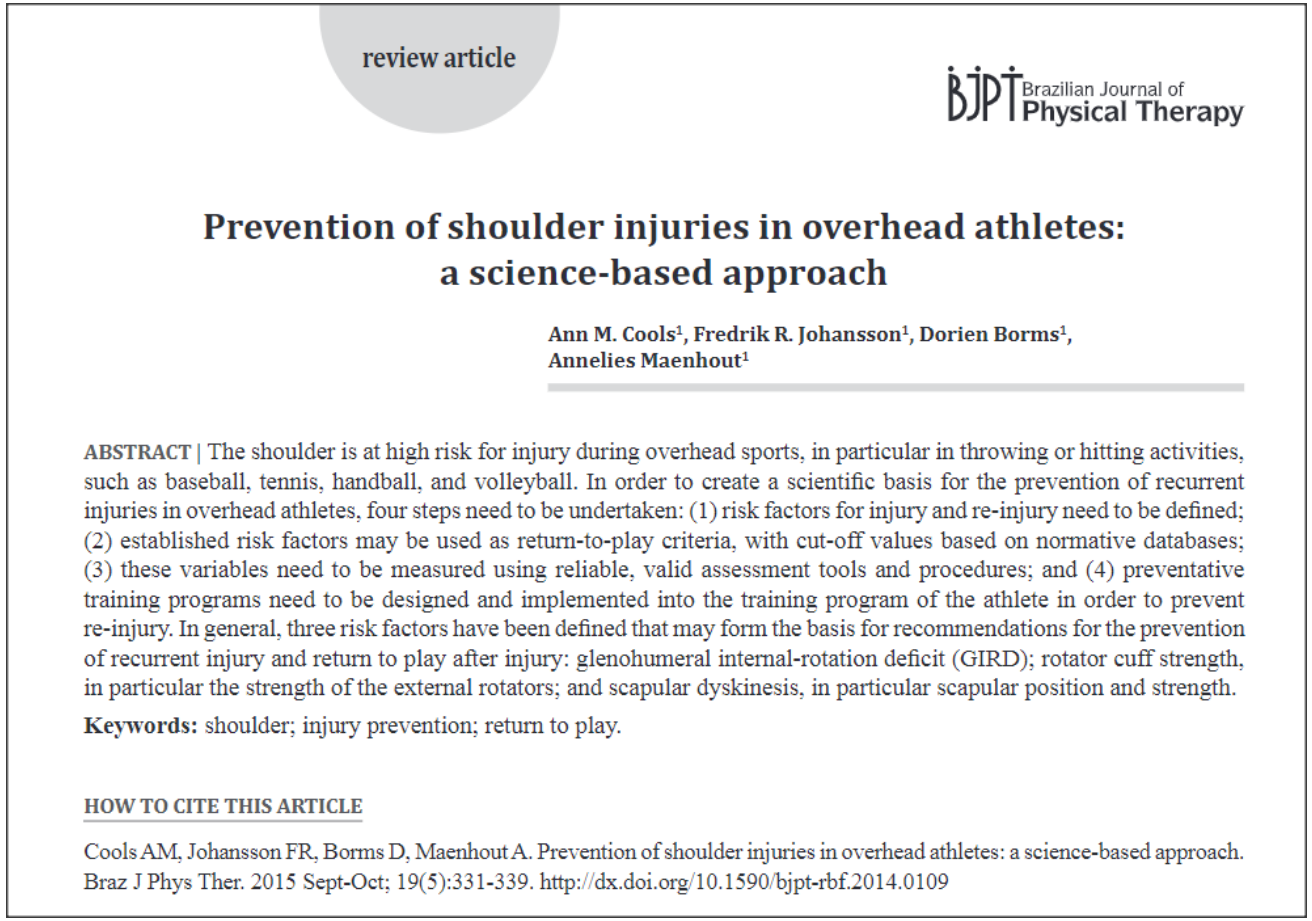
Considerations:

- Injury
  - Bone loss, tendon damage, glenoid,
  - Treatment (conservative vs surgical)
  - Pain
  - Impact ROM, Strength
    - on kinetic chain
  - Age
- Time frame
  - Time of season
- Demands of the sport
- Desires of athlete, coach, parent
  - Mental state (Fears, desires, concerns, confidence/readiness)

Considerations for assessment:

- Strength
  - Objective/reproducible measurement (Isometric, Isotonic, Isokinetic)
  - Normative values
- ROM
  - Positioning
- Stability
- Pain
- Scapula Dyskinesia
- Kinetic chain
  - FMS?
- Mental state
  - PROs

What does the literature say?



review article

BJPT Brazilian Journal of Physical Therapy

Prevention of shoulder injuries in overhead athletes: a science-based approach

Ann M. Cools[1], Fredrik R. Johansson[1], Dorien Borms[1], Annelies Maenhout[1]

ABSTRACT | The shoulder is at high risk for injury during overhead sports, in particular in throwing or hitting activities, such as baseball, tennis, handball, and volleyball. In order to create a scientific basis for the prevention of recurrent injuries in overhead athletes, four steps need to be undertaken: (1) risk factors for injury and re-injury need to be defined; (2) established risk factors may be used as return-to-play criteria, with cut-off values based on normative databases; (3) these variables need to be measured using reliable, valid assessment tools and procedures; and (4) preventative training programs need to be designed and implemented into the training program of the athlete in order to prevent re-injury. In general, three risk factors have been defined that may form the basis for recommendations for the prevention of recurrent injury and return to play after injury: glenohumeral internal-rotation deficit (GIRD); rotator cuff strength, in particular the strength of the external rotators; and scapular dyskinesis, in particular scapular position and strength.

Keywords: shoulder; injury prevention; return to play.

HOW TO CITE THIS ARTICLE

Cools AM, Johansson FR, Borms D, Maenhout A. Prevention of shoulder injuries in overhead athletes: a science-based approach. Braz J Phys Ther. 2015 Sept-Oct; 19(5):331-339. http://dx.doi.org/10.1590/bjpt-rbf.2014.0109

- Risk factors for Injury
- RTP criteria
  - Based on normative data
- Measured w/ reliable, valid assessment tools/procedures
- Consider
  - GIRD
  - Rcuff Strength (ER)
  - Scapular dyskinesis

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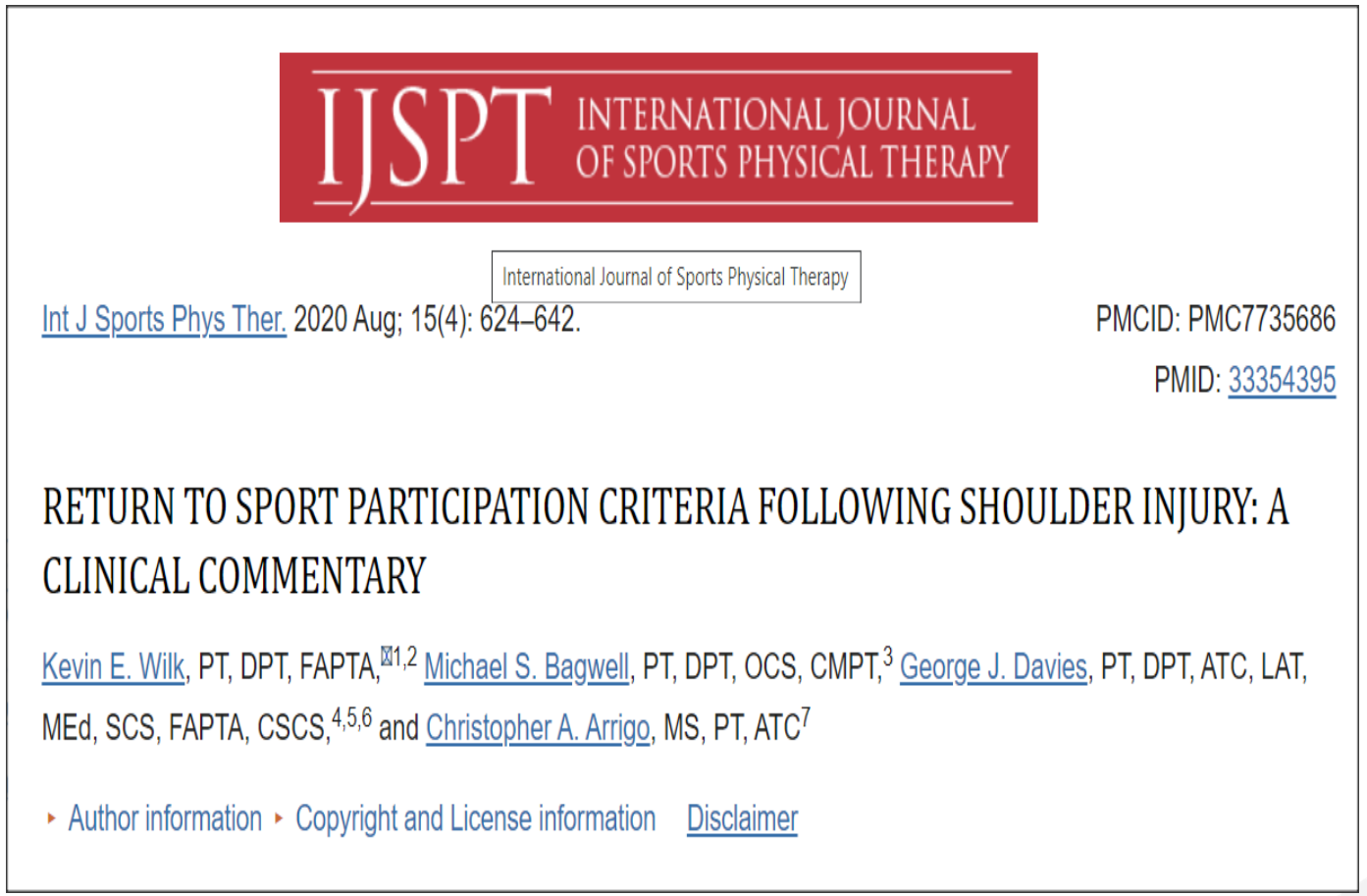
Literature:



IJSPT INTERNATIONAL JOURNAL OF SPORTS PHYSICAL THERAPY

International Journal of Sports Physical Therapy

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PMID: 33354395

RETURN TO SPORT PARTICIPATION CRITERIA FOLLOWING SHOULDER INJURY: A CLINICAL COMMENTARY

Kevin E. Wilk, PT, DPT, FAPTA,[1,2] Michael S. Bagwell, PT, DPT, OCS, CMPT,[3] George J. Davies, PT, DPT, ATC, LAT, MEd, SCS, FAPTA, CSCS,[4,5,6] and Christopher A. Arrigo, MS, PT, ATC[7]

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*Sequential, criterion-based process
*PROs
*Strength
*Functional performance

- Different tests for overhead athletes (Micro vs Macro trauma)
- Used predetermined criteria
  - Minimize reliance on subjective criteria
  - Pre-established criteria/goals

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Bern Consensus Statement:

[CONSENSUS STATEMENT]

ARIANE SCHWANK, PT, MSc[1-3a] • PAUL BLAZEY, PT[4a] • MARTIN ASKER, PT, PhD[5,6] • MERETE MØLLER, PT, PhD[7,8]
MARTIN HÄGGLUND, PT, PhD[9] • SUZANNE GARD, PT, MSc[10,11] • CHRISTOPHER SKAZALSKI, PT, DPT[8]
STIG HAUGSBØ ANDERSSON, PT, PhD[8] • IAN HORSLEY, PT, PhD[12] • ROD WHITELEY, PT, PhD[13,14] • ANN M. COOLS, PT, PhD[15]
MARIO BIZZINI, PT, PhD[16] • CLARE L. ARDERN, PT, PhD[17-19] • ON BEHALF OF THE ATHLETE SHOULDER CONSENSUS GROUP[b]

2022 Bern Consensus Statement on Shoulder Injury Prevention, Rehabilitation, and Return to Sport for Athletes at All Participation Levels

JOSPT 2022

Bern 2022

FIGURE 3. The 3 elements of the return-to-sport continuum. Republished with permission from BMJ Publishing Group Ltd.[5]

TABLE 5 SPORT-SPECIFIC TESTS RECOMMENDED BY THE DELPHI GROUP FOR OVERHEAD (WITH OR WITHOUT THROWING) ATHLETES AND COLLISION-SPORT ATHLETES

Performance Test	ROM/Strength Test	Kinetic Chain	Sport-Specific Test Example
CKCUEST[25] **VIDEO 11**[a]	90°/90° concentric/eccentric rotator cuff testing	Push-up test: assessing for ability, quality of movement, control, and endurance	Number of pain-free throws/serves at or above previous speed
PSET[32,33,63] **VIDEO 12**[a]	Isometric rotation strength ER/IR at 90°/0°	Side plank endurance	Throwing at full speed
Shoulder Endurance Test (SET) (endurance test for ER in ABD/ER, 90°/90°)[26]	Total rotational ROM within 10% of the contralateral side	Plyometric push-up	Visual assessment of the "smoothness" of the throwing technique
The Athletic Shoulder Test (ASH-Test)[6]	ER force measured with HHD in prone at 90°/90° and 90°/0° **VIDEO 13**[a]	Single-leg squat test	Wrestling drills
Y Balance Test for the upper and lower extremities[40] **VIDEO 14**[a]	ER/IR ratio: sport-specific numbers apply	Thoracic spine rotation	Tackle replication (eg, for American football or rugby) **VIDEO 15**[a]
Seated medicine-ball throw[25] **VIDEO 16**[a]	IR/ER ratio at 90°/90° in sitting (break test, HHD) **VIDEO 17**[a]	Bench press	Tackle replication with leg grab **VIDEO 18**[a]
Ball abduction-ER test **VIDEO 19**[a]	IR/ER ratio in sitting at 90° of abduction and neutral rotation **VIDEO 20**[a]	Upper-limb rotation test[25]	...
Ball taps on wall test **VIDEO 21**[a]	...	...	...
Prone ball-drop test **VIDEO 22**[a]	...	...	...

Abbreviations: CKCUEST, closed kinetic chain upper extremity stability test; ER, external rotation; HHD, handheld dynamometry; IR, internal rotation; PSET, posterior shoulder endurance test; ROM, range of motion.
[a]*Videos can be found at www.jospt.org/doi/10.2519/jospt.2022.10952*

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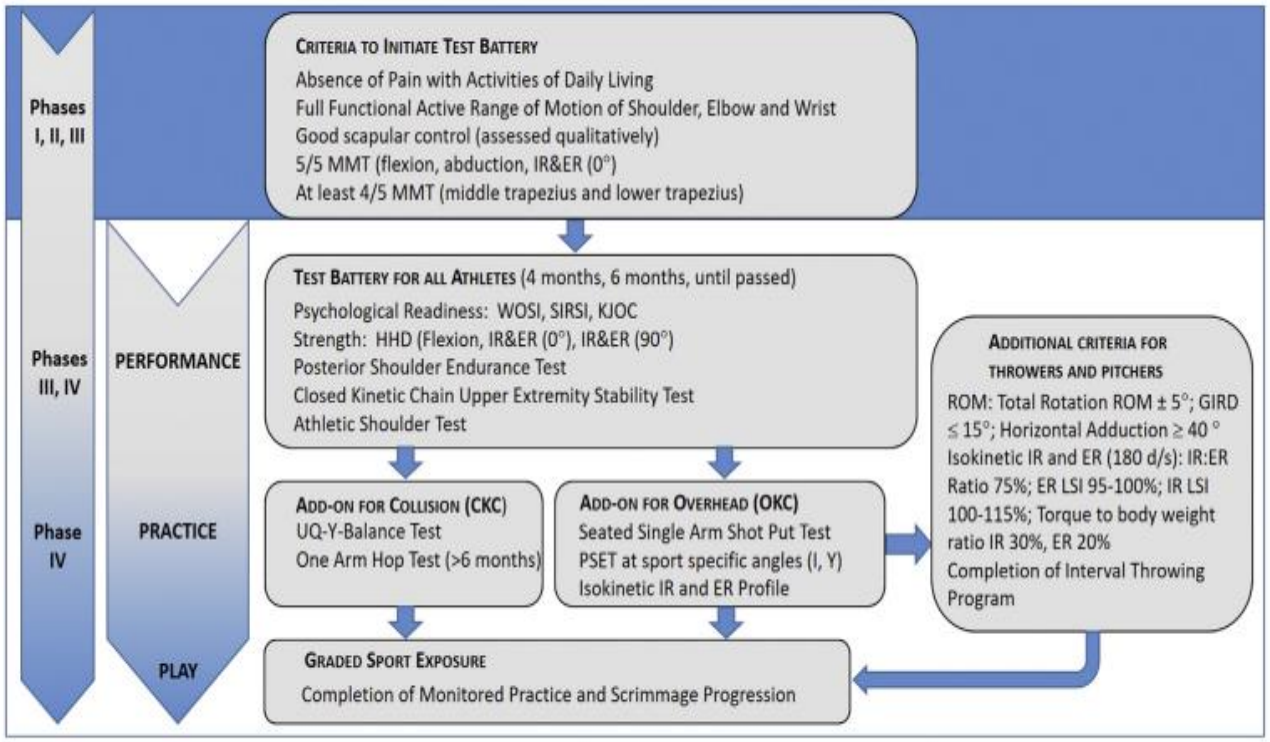


Fig 1. Framework for sequentially testing athletes recovering from shoulder stabilization procedures. This stepwise structure suggests criteria to be administered as the athlete progresses through phased rehabilitation and graduated exposure toward full athletic participation. (CKC, closed kinetic chain; d/s, degrees per second; ER, external rotation; GIRD, glenohumeral internal rotation deficit; HHD, handheld dynamometry; IR, internal rotation; KJOC, Kerlan-Job Orthopedic Clinic Shoulder and Elbow Score; LSI, limb symmetry index [involved/uninvolved × 100]; MMT, manual muscle testing; OKC, open kinetic chain; PSET, Posterior Shoulder Endurance Test; ROM, range of motion; SIRSI, Shoulder Instability Readiness to Return to Sport Index; UQ, Upper Quarter; WOSI, Western Ontario Shoulder Instability Index.)

Rehabilitation and Return to Sport in Athletes

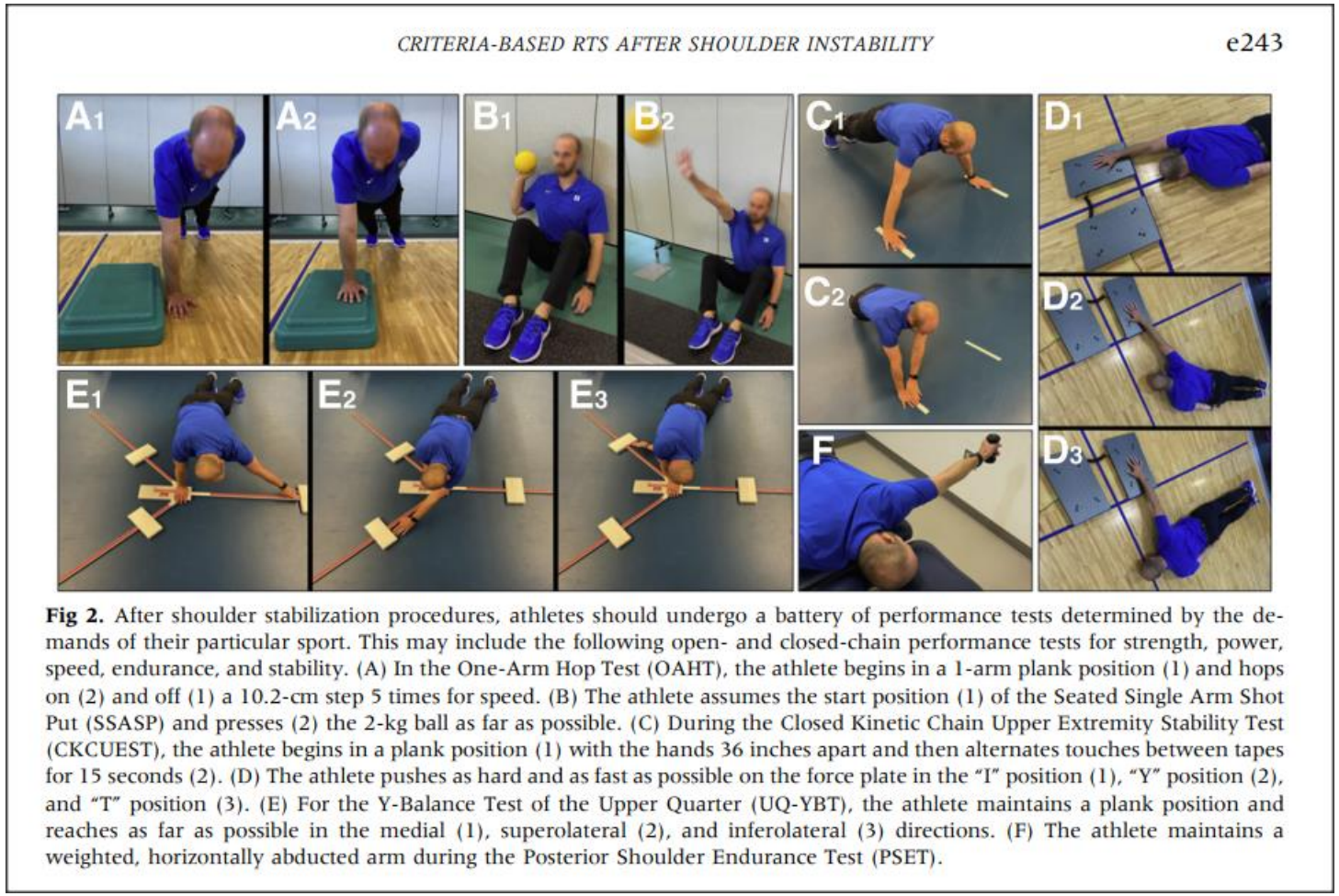
Return to Sport After Shoulder Stabilization Procedures: A Criteria-Based Testing Continuum to Guide Rehabilitation and Inform Return-to-Play Decision Making

Thomas Otley, P.T., D.P.T., C.S.C.S., Heather Myers, P.T., D.P.T., S.C.S., L.A.T., A.T.C., Brian C. Lau, M.D., and Dean C. Taylor, M.D.

- Phased approach
- Performance, Practice, Play
- Test Battery (4, 6 mo +)
- Add ons for collision, overhead

Ortley T, et al, Arthroscopy, Sports Medicine and Rehabilitation 2022

Functional Assessment:



CRITERIA-BASED RTS AFTER SHOULDER INSTABILITY e243

Fig 2. After shoulder stabilization procedures, athletes should undergo a battery of performance tests determined by the demands of their particular sport. This may include the following open- and closed-chain performance tests for strength, power, speed, endurance, and stability. (A) In the One-Arm Hop Test (OAHT), the athlete begins in a 1-arm plank position (1) and hops on (2) and off (1) a 10.2-cm step 5 times for speed. (B) The athlete assumes the start position (1) of the Seated Single Arm Shot Put (SSASP) and presses (2) the 2-kg ball as far as possible. (C) During the Closed Kinetic Chain Upper Extremity Stability Test (CKCUEST), the athlete begins in a plank position (1) with the hands 36 inches apart and then alternates touches between tapes for 15 seconds (2). (D) The athlete pushes as hard and as fast as possible on the force plate in the "I" position (1), "Y" position (2), and "T" position (3). (E) For the Y-Balance Test of the Upper Quarter (UQ-YBT), the athlete maintains a plank position and reaches as far as possible in the medial (1), superolateral (2), and inferolateral (3) directions. (F) The athlete maintains a weighted, horizontally abducted arm during the Posterior Shoulder Endurance Test (PSET).

- Requires an understanding of the demands of the sport
- Breakdown essential components
- Closed vs Open Kinetic chain testing
- Functional

Ortley T, et al, Arthosocopy, Sportsmedicine and Rehabiliation 2022

Patient Reported Outcomes

- Pain
  - 0-10 scale
- Perceived Recovery
  - % recovered
- Fear/Anxiety
  - Kinesiophobia
- Formal functional outcomes

    * Validated, applicable

CSCCA & NSCA Consensus Statement

CSCCa and NSCA Joint Consensus Guidelines for Transition Periods: Safe Return to Training Following Inactivity

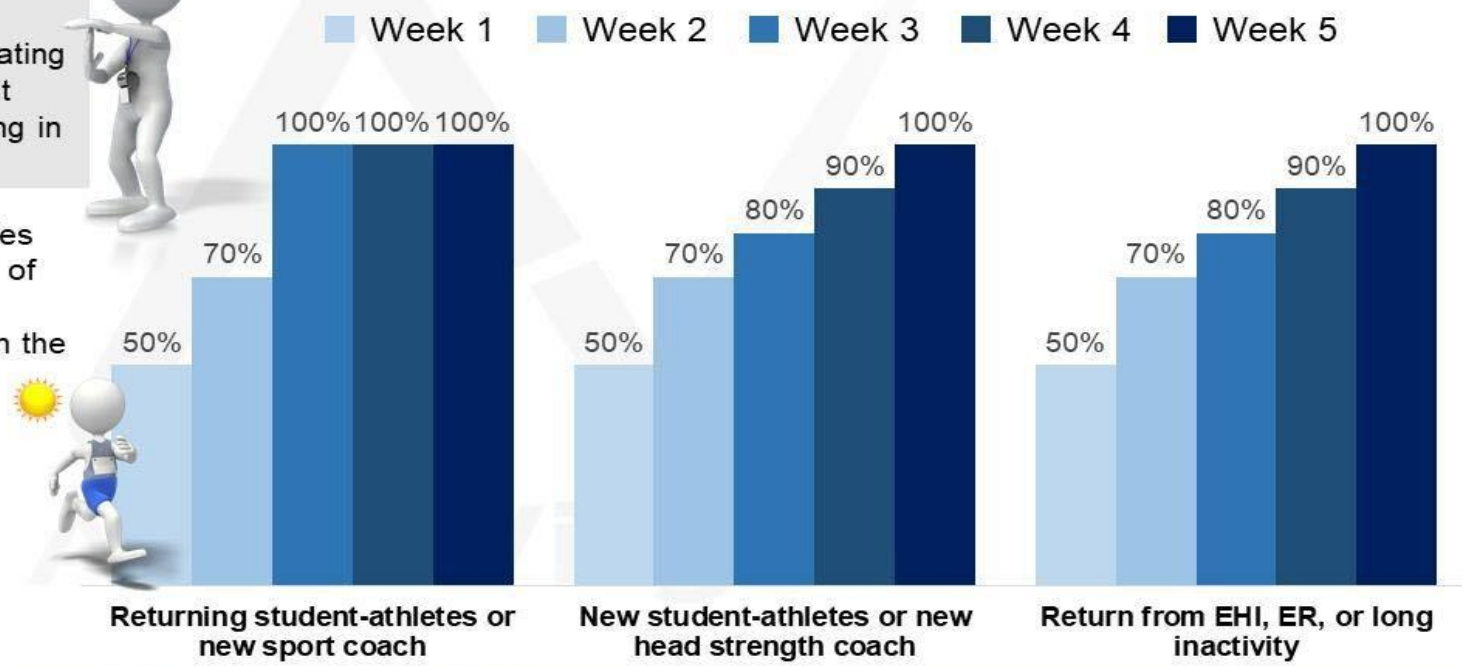
Conditioning Activities
The 50/30/20/10 Rule

Aim: to ensure that strength & conditioning coaches are evaluating their programs to be certain that student-athletes return to training in a safe, effective manner

1. The 50/30/20/10 rule provides recommended percentages of weekly volumes and/or workloads for conditioning in the first 2-4 weeks of return to training following inactivity
2. Percentages are based on the uppermost volume of the conditioning program

EHI= exertional heat illness
ER = exertional rhabdomyolysis

Percent of Maximum Conditioning Volume per Week For Safe Return to Training Following Inactivity



Created by Adam Virgile adamvirgile.com

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Graphic References

Caterisano, A., Decker, D., Snyder, B., Feigenbaum, M., Glass, R., House, P., Sharp, C., Waller, M. and Witherspoon, Z., 2019. CSCCa and NSCA Joint Consensus Guidelines for Transition Periods: Safe Return to Training Following Inactivity. *Strength & Conditioning Journal*, *41*(3), pp.1-23.

The next level?

Original Research

Understanding Anterior Shoulder Instability Through Machine Learning

New Models That Predict Recurrence, Progression to Surgery, and Development of Arthritis

Yining Lu,* MD, Ayoosh Pareek,* MD, Ryan R. Wilbur,* BA, Devin P. Leland,* MD, Aaron J. Krych,* MD, and Christopher L. Camp,*† MD

Investigation performed at the Department of Orthopedic Surgery and Sports Medicine, Mayo Clinic, Rochester, Minnesota, USA

OJSM 2021

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Summary:

- Recurrent Injury, Lack of RTS at same level – Issues
- Consider total picture
- Establish criteria
  - Measure strength
  - ROM
  - Pain
  - Function
  - Psychological readiness
- Progression back to sports
- Continue to evaluate what really matters

Thank you!