Can imaging help make return to play decisions?

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inspired by aspire®
Objectives

- Where does imaging fit in 3 step model
Dream scenario

• Scan to predict tissue load tolerance
2016 Consensus statement on return to sport from the First World Congress in Sports Physical Therapy, Bern

Clare L Ardern, 1,2,3 Philip Glasgow, 4,5 Anthony Schneiders, 6 Erik Witvrouw, 1,7 Benjamin Clarsen, 8,9 Ann Cools, 7 Boris Gojanovic, 10,11 Steffan Griffin, 12 Karim M Khan, 13 Håvard Moksnes, 8,9 Stephen A Mutch, 14,15 Nicola Phillips, 16 Gustaaf Reurink, 17 Robin Sadler, 18 Karin Grävare Silbernagel, 19 Kristian Thorborg, 20,21 Arnlaug Wangensteen, 1,8 Kevin E Wilk, 22 Mario Bizzini 23
1. INJURY MANAGEMENT

- **STAKEHOLDERS**
  - Clinicians, coaches, family, organisation, management

- **ROLES**
  - Definition, competence, project leader identified

- **NEEDS**
  - Assessment & management

- **GOALS**
  - SMART principles applied

- **MONITORING**
  - Functional tests, health, well being, motivation

- **COMMUNICATION**
  - Systematic, efficient, informative → all stakeholders

\[ \text{Shared Decision Making} = \text{StARRT} + \begin{array}{c}
\text{Tissue health} \\
\text{Tissue stresses}
\end{array}
\]

2. CLINICAL REHABILITATION

- **Psycho**
- **Bio**
- **Social**

- **Tissue healing**
- **Load**
  - Optimal
  - Excessive

- **Tissue damage**

- **StARRT**
  - Tissue health
  - Tissue stresses
  - Risk tolerance

\[ \text{RTS} \]

\[ \text{success} \]
StARRT Framework

**Step 1:** Assessment of Health Risk

- Tissue Health
  - Patient Demographics (e.g. age, sex)
  - Symptoms (e.g. pain, giving way)
  - Personal Medical History (e.g. recurrent injury)
  - Signs (Physical Exam) (e.g. swelling, weakness)
  - Special Tests (e.g. pain with function, x-ray, MRI)

**Step 2:** Assessment of Activity Risk

- Tissue Stresses
  - Type of Sport (e.g. collision, non-contact)
  - Position Played (e.g. goalie, forward)
  - Limb Dominance (e.g. MSK alignment)
  - Competitive Level (e.g. professional, playoffs)
  - Ability to Protect (e.g. padding)
  - Functional Tests (e.g. diagonal hop test)
  - Psychological Readiness (e.g. affecting play)

**Step 3:** Assessment of Risk Tolerance

- Risk Tolerance Modifiers
  - Timing & Season (e.g. playoffs)
  - Pressure from Athlete (e.g. desire to compete)
  - External Pressure (e.g. coach, athlete family)
  - Masking the Injury (e.g. effective analgesia)
  - Conflict of Interest (e.g. financial)
  - Fear of Litigation (e.g. if restricted or permitted)

**Return-to-Play Decision**
The Role of Imaging in Determining Return to Play

Bethany U. Casagranda, DO*, Peter C. Thurlow, MD

Radiological clinics North America 2016

• Mentions 1 case study on imaging at RTP
Excellent reliability for MRI grading and prognostic parameters in acute hamstring injuries

B Hamilton,¹,²  R Whiteley,³  E Almusa,⁴  B Roger,⁴  C Geertsema,¹  Johannes L Tol¹

[Image of MRI scan]
Clinical findings just after return to play predict hamstring re-injury, but baseline MRI findings do not

Robert-Jan De Vos,¹,²,³ Gustaaf Reurink,² Gert-Jan Goudswaard,¹ Maarten H Moen,⁴,⁵ Adam Weir,¹ Johannes L Tol¹

- 64 athletes: Baseline MRI + Exam @ RTP
- 17 re-injuries (27%)
- Baseline MRI 👎
- Prev inj / 👈flexibility /
  👇strength/palpation pain
53 athletes: Baseline + RTP MRI
27 Gr 1 / 26 Gr 2
RTP 89% oedema
42% fibrosis
MRI observations at return to play of clinically recovered hamstring injuries

Gustaaf Reurink,¹,² Gert Jan Goudswaard,² Johannes L Tol,² Emad Almusa,³ Maarten H Moen,⁴ Adam Weir,² Jan A N Verhaar,¹ Bruce Hamilton,⁵ Mario Maas⁶

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Image c and d show MRI scans of hamstring injuries, highlighting areas of oedema and scar tissue. The images demonstrate the effectiveness of MRI in assessing the recovery status of athletes post-injury.
• 5 re-injuries (2 month f/u)
• 4/5 had fibrosis
• Compared to 38% no re-injuries
Is scar the bad guy?
No Association Between Fibrosis on Magnetic Resonance Imaging at Return to Play and Hamstring Reinjury Risk

Gustaaf Reurink,*†‡ MD, Emad Almusa,§ MD, Gert Jan Goudswaard,‖ MD, Johannes L. Tol,‖ MD, PhD, Bruce Hamilton,‖ MD, PhD, Maarten H. Moen,†# MD, PhD, Adam Weir,‖ MD, PhD, Jan A.N. Verhaar,† MD, Prof., and Mario Maas,** MD, Prof.

Investigation performed at Erasmus Medical Centre, Rotterdam, the Netherlands, and Aspetar Orthopaedic and Sports Medicine Hospital, Doha, Qatar

- 108 athletes MRI baseline and RTP
- 1 yr f/u
- 38% fibrosis @ RTP
• Fibrosis: Re-injury 24% (10/41)
• No fibrosis: Re-injury 24% (16/67)
Managing acute hamstring injuries in athletes
Gustaaf Reurink

be identified. As both remaining oedema and fibrosis formation on MRI at RTP were not associated with re-injury risk (chapter 11 & 12), RTP decisions should not be guided by MRI findings.

“RTP decisions should not be guided by MRI findings.”
A NEW ENEMY APPROACHES
Conclusion

• Little evidence on imaging @ RTP
• Some hamstring = no role

• Imaging should not guide RTP decision