Return to Sport After Surgical Management of Proximal Hamstring Ruptures: A Systematic Review and Meta-Analysis

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Disclosures

*No funding affiliations to be disclosed
Non-operative treatment of proximal hamstring ruptures may be indicated in single-tendon tears or multi-tendon tears with less than 2 cm retraction\(^1\).

Non-operative treatment can however, lead to knee flexion weakness, difficulty with prolonged sitting, and is often associated with inferior outcomes in comparison to surgical repair\(^2,3\).

Injury chronicity can be important because delayed repairs are often difficult to treat due to increased tendon retraction, poor tissue quality and the potential for fibrosis around the sciatic nerve\(^4\).

The purpose of this systematic review and meta-analysis is to examine the rate and timing at which athletes return to sport after undergoing surgical management of proximal hamstring ruptures.
Methods

Search
• The search terms “Hamstring”, “Repair”, “Reconstruction”, and “Sport” were used to search 3 databases (MEDLINE, PubMed, and EMBASE) from database inception until Oct 7 2017.

Screen
• Titles, abstracts, & full-text articles were independently screened by two reviewers.

Inclusion
• Inclusion criteria were studies reporting return to sport outcomes for surgical management of acute, chronic, complete, and partial proximal hamstring ruptures.

Exclusion
• Exclusion criteria included animal studies, conference papers, book chapters, non-English, review articles, and technical reports.

Results
• The rate of return to sports was combined in a meta-analysis of proportions using a random-effects model.

Quality
• The Methodological index for non-randomized studies (MINORS) was used to assess the quality of the included studies.
Methods

Figure 1: PRISMA flow diagram of the search strategy for articles assessing return to sport after surgery for proximal hamstring injuries
Study Characteristics

21 eligible studies included

- 10 retrospective case series
- 7 prospective case series
- 2 retrospective comparative studies
- 2 prospective comparative studies
- Median MINORS score for non-comparative studies: 11/16
- Median MINORS score for comparative studies: 18/24

846 patients

- Mean age = 41 years (range, 14 to 71)
- Mean follow up = 38 months (range, 6 to 76)
- 40% female
Study Characteristics

**Chronicity and Degree**
- Chronicity:
  - Acute = 462 (56%)
  - Chronic = 360 (44%)
- Degree:
  - Complete = 639 (75%)
  - Partial = 210 (25%)

**Types of Sports**
- waterskiing (n=147)
- rugby/football (n=93)
- soccer (n=51)
- running (n=50)
- gymnastics (n=31)
- downhill skiing (n=21)
- tennis (n=16)
- martial arts (n=16)
- baseball/softball (n=8)
Return to any level of sport

- Mean time to return to sport = 6 months (range, 1 to 36)
- Rate of return to sport = 87% (95% CI = 76.5% to 95.1%, I²=81%) in 12 studies (n=355)

Figure 2: Forest plot of the mean rates of return to any sporting activities (standard deviations)
Return to pre-injury level

- Return to pre-injury level of sport = 77% (95% CI = 66.4% to 86.1%, I²=83.6%) in 16 studies (n=572)

Figure 3: Forest plot of the mean rates of return to pre-injury level (standard deviations)
Subgroup Analyses

- Rate of return to competitive sports = 80% (95% CI = 56.7% to 97.5%, I²=36.6%) in 6 studies
- Rate of return to pre-injury level of sport for complete ruptures = 78% (95% CI = 65.1% to 88.2%, I²=81.7%) in 11 studies (n=393)
- Rate of return to pre-injury level of sport for partial ruptures = 80% (95% CI = 58.1% to 95.7%, I²=84.3%) in 4 studies (n=122)
- Rate of return to pre-injury level of sport for acute ruptures = 72% (95% CI = 56.1% to 86.1%, I²=64.3%) in 6 studies (n=129)
- Rate of return to pre-injury level of sport for chronic ruptures = 76% (95% CI = 57.9% to 90.6%, I²=0%) in 4 studies
Strengths and Limitations

😊 Primarily retrospective studies included
😊 Poor reporting of the different rates of return to sporting activities for patients in separate groups (e.g. type of sport etc.)
😊 Moderate heterogeneity (measured with $I^2$ statistic)
😊 Random effects model used
😊 Multiple databases searched
😊 Data pooled from relatively large number of studies
Conclusions

Surgical management of proximal hamstring ruptures yields a high rate of return to sport.

However, there was a notable proportion that were unable to resume activity at a pre-injury level of competition.

Subgroup analysis showed similar return to sport outcomes after surgery for partial and complete, as well as acute and chronic proximal hamstring ruptures.

High-level comparative studies are needed to make definitive conclusions.

