

Many Shoulder MRI Findings in Elite Professional Throwing Athletes Resolve After Retirement: A Clinical and Radiographic Study

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BACKGROUND

Anatomic findings on MRI scans of the shoulder likely affect patients differently based on their physical demands and fitness levels. The natural history of these anatomic findings once professional overhead athletes retire remains unclear. A better understanding of what happens with these findings after retirement may influence how we manage shoulder problems in athletes.

PURPOSE

- (1) What is the natural history of MRI-observed findings in the throwing and nonthrowing shoulders of professional European handball players after retirement from the sport? What proportion of these individuals have diagnosable findings on MRI, and do these findings disappear after retirement?
- (2) Do clinical findings such as Constant and Murley score and shoulder ROM change after retirement in these professional overhead athletes?

METHODS

The inception cohort of this series consisted of the entire Swiss National European handball team except the goalkeepers. These 30 professional players also played in the highest Swiss handball league in 2001. None of these players previously had shoulder surgery. During their career, they had a clinical assessment and bilateral shoulder MRI as part of an earlier study. We sought to evaluate the players who had retired and did not have a history of shoulder surgery, to evaluate the natural history of MRI-observed findings made in the initial study during their professional career. Of the 30 players, 10 were excluded (four continued to play professionally, four declined participation, and two had surgery after the initial study), leaving 20 (66%) for analysis at a mean of 6 years (SD, 3 years) after retirement. To gain a better understanding of the evolution of these MRI findings in the longer-term, we also evaluated 18 additional former professional European handball players who did not have any history of shoulder surgery, had all played in the highest Swiss league and for the National Team, and had terminated their career at a mean of 15 years (SD, 3 years) ago. All the subjects in both study groups (those at 6 and 15 years after retirement) underwent a detailed interview, standardized clinical

examination including ROM measurements, collection of the Constant and Murley scores and the subjective shoulder value of both shoulders, and bilateral shoulder MRI. MRI findings (consisting of abnormalities and normal variations) were reported as radiographic diagnoses, independent of the potential that these findings could be considered normal variations in people in this age group.

RESULTS

At the initial MRI evaluation, the proportion of active professional European handballers with diagnosable MRI findings in the throwing shoulder was 19 of 20 (95%) and for the handballers with nonthrowing shoulders was 17 of 20 (85%), while 15 years after retirement, both shoulders of all subjects showed MRI findings. None of the rotator cuff tears progressed to full-thickness tears after retirement. In the throwing shoulders, we observed fewer individuals with ganglion cysts larger than 5 mm (initial followup: six of 20 [30%] versus 6 years after retirement: 0 of 20 (0%); odds ratio, 14.5; [95% CI, 0.7-283]; $p = 0.044$). The Constant and Murley score increased in the throwing shoulder from 93 points (SD, 6 points) at initial followup to 98 points (SD, 3 points) at a mean of 6 years after retirement (mean difference, 5 points; SD, 5 points; 95% CI, 2.5-7.4; $p < 0.001$), and to 97 points (SD, 3 points) at a mean of 15 years after retirement. However these differences are below the typically reported minimum clinically important difference for the Constant and Murley score, and so are unlikely to be clinically relevant. External rotation in 90° abduction remained increased in the throwing shoulder compared with the nonthrowing shoulder up to 15 years after retirement (initial followup: mean difference, 8°; $p = 0.014$; 15 years after retirement: mean difference, 4°; SD, 15; $p = 0.026$). Internal rotation remained decreased in the throwing compared with the nonthrowing shoulders (during the career: mean difference, 5° [SD, 10°], $p = 0.036$; 15 years after retirement: mean difference, 3° [SD, 4°], $p = 0.021$).

CONCLUSIONS

Our data suggest that findings of the throwing shoulder like partial rotator cuff tears, bony cysts and ganglions do not progress after retirement, and sometimes they resolve. Because of this and because many MRI changes correlate poorly with clinical symptoms, the indication for surgical treatment of these findings should be questioned very carefully.

LEVEL OF EVIDENCE

Level II, prognostic study.

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