

# MRI abnormalities are common in Australian Rules Football players but their clinical relevance varies: a longitudinal study



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## Introduction

Australian Rules Football (ARF) has a strong following in Australia with over 1.4 million Australians participating in the sport [1]. As a collision sport it has one of the highest injury rates amongst any sport played in Australia [2]. MRI studies show that structural abnormalities are more common in athletes compared to matched controls [3]. Determining the clinical significance of knee changes in athletes is important because early detection of deleterious changes may help to prevent the development of future OA through better rehabilitation and targeted treatments.

## Aim

The aim of this study was to determine the prevalence of MRI knee abnormalities in Australian Rules Football (ARF) players and describe their associations with pain, function, past and incident injury and surgery history.

## Methods

75 male players (mean age 21, range 16-30) from the Tasmanian State Football League were examined early in the season (baseline). History of knee injury/surgery and knee pain and function were assessed. 58 players underwent a MRI scan of both knees at baseline. At the end of the season, clinical measurements were repeated on 63 and MRI scans on 44 players. Incident knee injuries during the season were recorded.

## Results

Table 1. Prevalence of MRI knee abnormalities at baseline	
	Percentage (n)
Bone marrow lesions(right or left knee)	67% (n=39/58)
Meniscal extrusion (right or left knee)	2% (n=1/58)
Cartilage defects (right or left knee)*	43% (n=25/58)
Suprapatella effusion-synovitis (right or left knee)*	67% (n=39/58)

\*Defined as grade 2 or greater.

- MRI abnormalities were common at baseline (67% bone marrow lesions [BMLs], 16% meniscal tear/extrusion, 43% cartilage defects, 67% effusion-synovitis)
- Pain and dysfunction were consistently greater in those with MRI abnormalities but this did not reach statistical or clinical significance.
- Previous injury and surgery was significantly more common in those with meniscal tears/extrusion (relative risk (RR) 2.40 (95% CI 1.71, 3.56) previous injury; RR 10.38 (95% CI 1.51, 71.27) previous surgery) and in those with greater synovial fluid volume (RR 1.17 (95% CI 1.09, 1.26) previous injury; RR 1.36 (95% CI 1.01, 1.82) previous surgery).

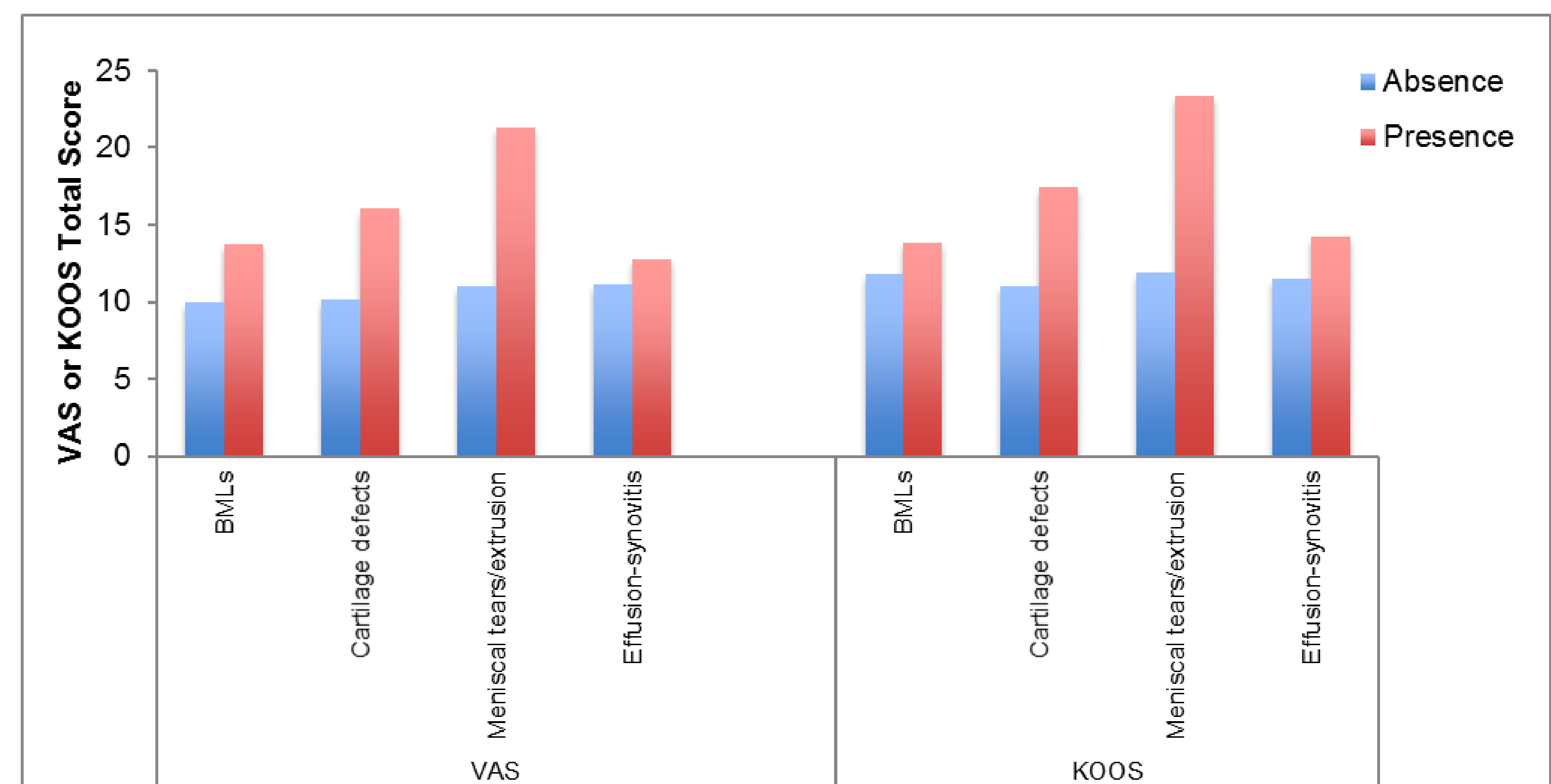
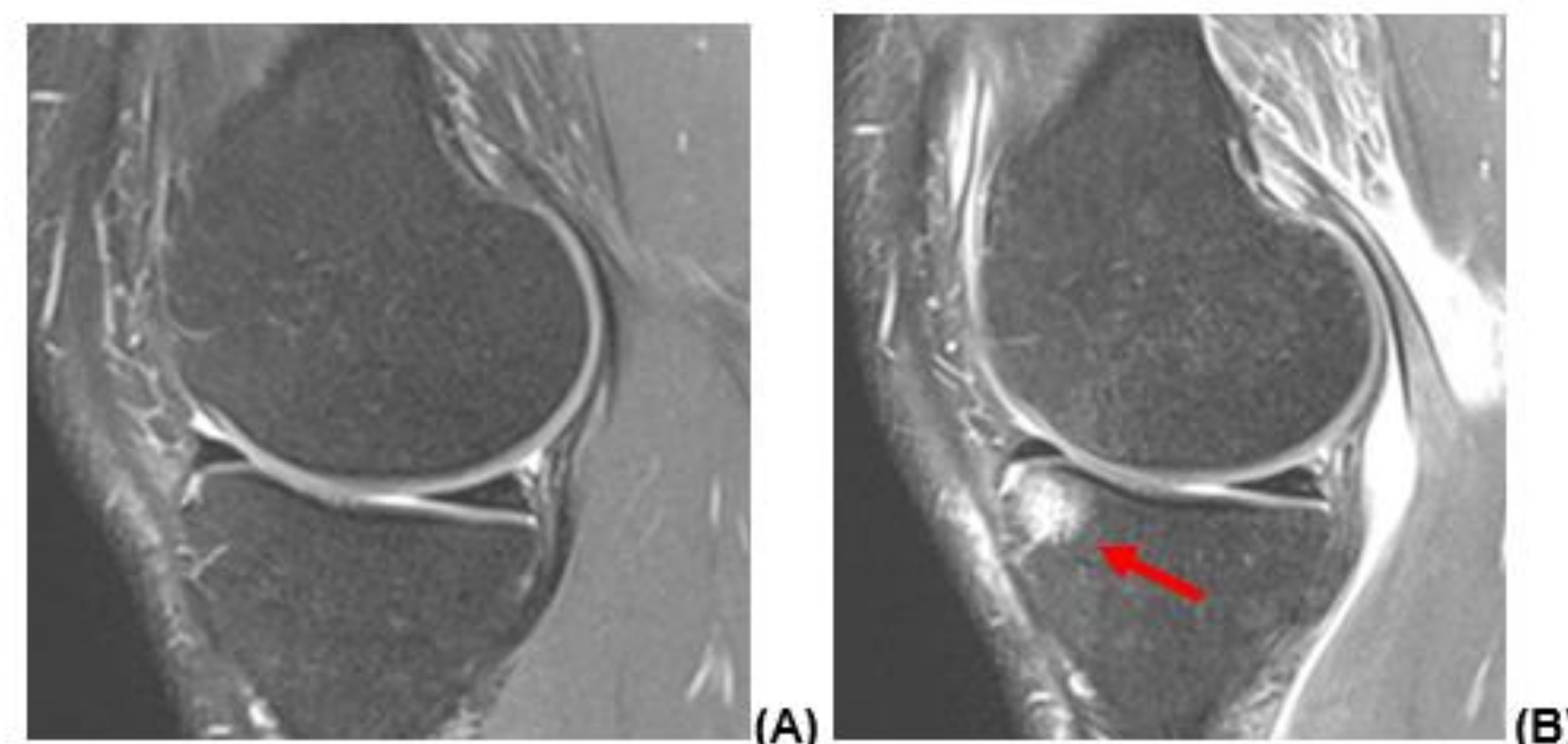


Figure 1: Pain scores by presence/absence of knee MRI abnormalities

- Incident injury was significantly associated with worsening of knee pain and function, BML development, and an increase in synovial fluid volume.



Supplementary Figure 1. Example of an incident bone marrow lesion in a player that reported having a knee injury during the season. A tibial bone marrow lesion (red arrow) has developed between the early season (A) and the end of season (B).

## Conclusions

- MRI abnormalities were common in sub-elite Australian Rules Football players but their associations with symptoms were small in magnitude, unlikely clinically important, and did not persist after further accounting for injury history.
- Meniscal tears/extrusion and synovial fluid volume were linked to a previous history of injury and surgery.
- BMLs and synovial fluid volume were linked to incident knee injuries

## Impact on clinical practice

- Our results suggest that the clinical relevance of MRI abnormalities in ARF players varies and should be interpreted in the context of clinical presentation
- Future work is needed to examine the longer-term impact of MRI abnormalities on joint health in athletes.

## References

1. Coutts et al, J Sci Med Sport 2010; 13:543-8.
2. Van der Heijden et al, Am J Sports Med 2016; 44:2339-46.
3. Whittaker et al, Br J Sports Med 2018; 52:934-9.