

Clinical Characteristics Of Isolated Meniscal Tears During Sports Activities Among Young Athletes

Tachibana Y¹, Kinugasa K¹, Amano H²,
Kita K³, Yonetani Y⁴, Horibe S⁵, Tanaka Y⁶

1: Osaka Rosai Hospital

2: Amano Orthopaedic Clinic

3: JCHO Osaka Hospital

4: JCHO Hoshigaoka Medical Center

5: Seifu Hospital

6: Osaka Metropolitan University



Disclosure

The authors have no financial conflicts to disclose.



Yuta Tachibana M.D., Ph.D.

Introduction

Isolated meniscal tears in stable knees

- ✓ Fewer studies (vs. those combined w/ ligamentous injuries ¹)
- ✓ Only ONE study investigating clinical characteristics ²



- Excluded discoid lateral meniscus (DLM)
: frequently seen in Asian people ³, vulnerable to tear ⁴
- Injury mechanisms were not clarified

Purpose

To elucidate the clinical characteristics of isolated meniscal injuries during sports activities among young athletes

Materials & Methods

Patients

2524 arthroscopic meniscal surgeries (2007/1~2021/12)

Inclusion criteria :

age<30 y.o.

intact cruciate ligament

clear injury mechanism during sports activities

183 cases (male/female:131/52, Mean age: 18.0 (8–29))

Medial meniscus (MM): n=47

Lateral meniscus (LM): n=136

→semilunar (SLM): n=86

→DLM: n=50

Materials & Methods

Injury mechanism

Non-contact

Kicking
Landing
Stepping
Running
Crouching
Sliding
Falling down
Others

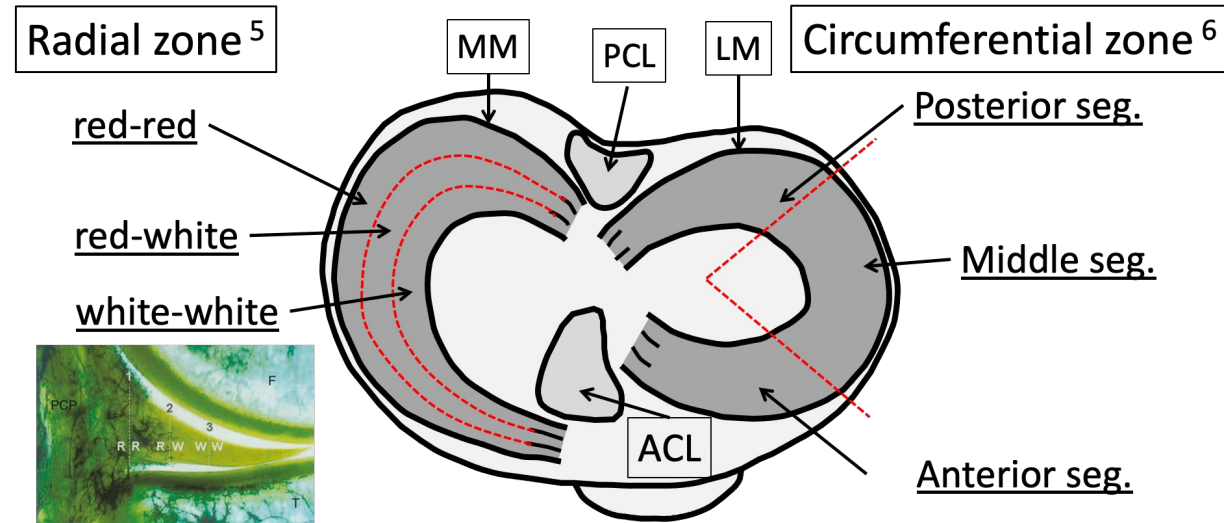
Contact

Hit
Tackled
Thrown

Tear type

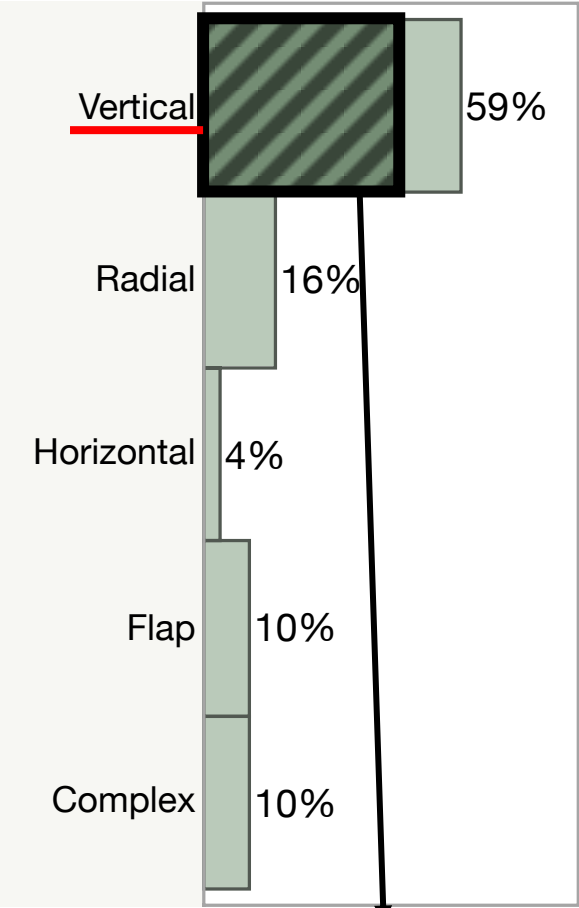
- Vertical
- Radial
- Flap
- Horizontal
- Complex

Tear location

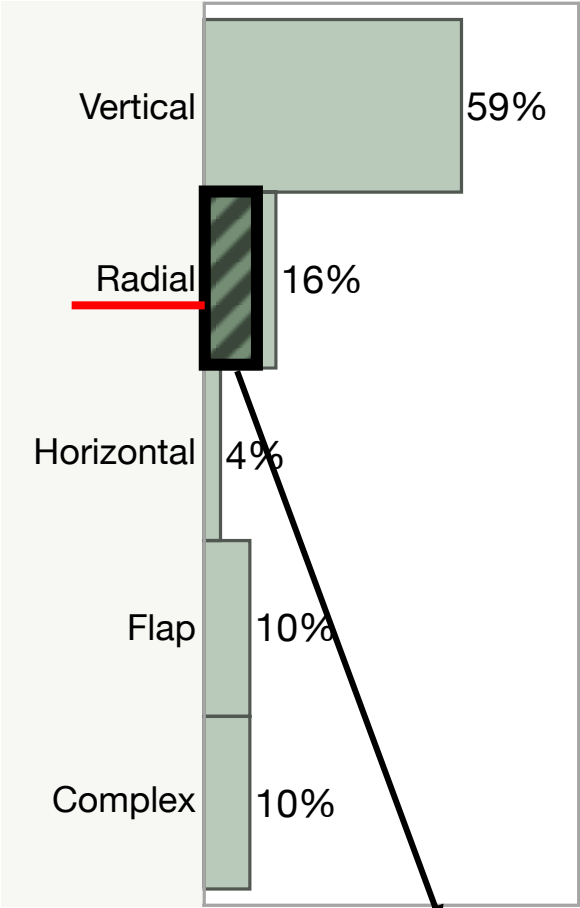


Result 1

Tear type

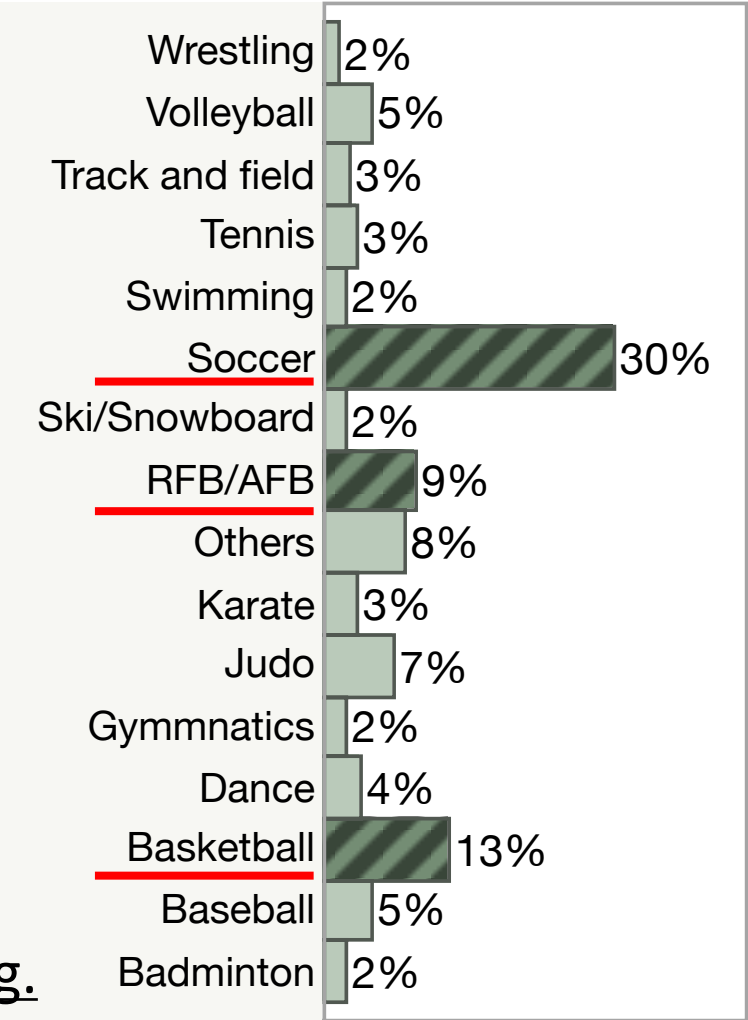


Red-red zone incl. posterior seg.
: 46% (84/183)



Complete tear @ middle seg.
: 11% (21/183)

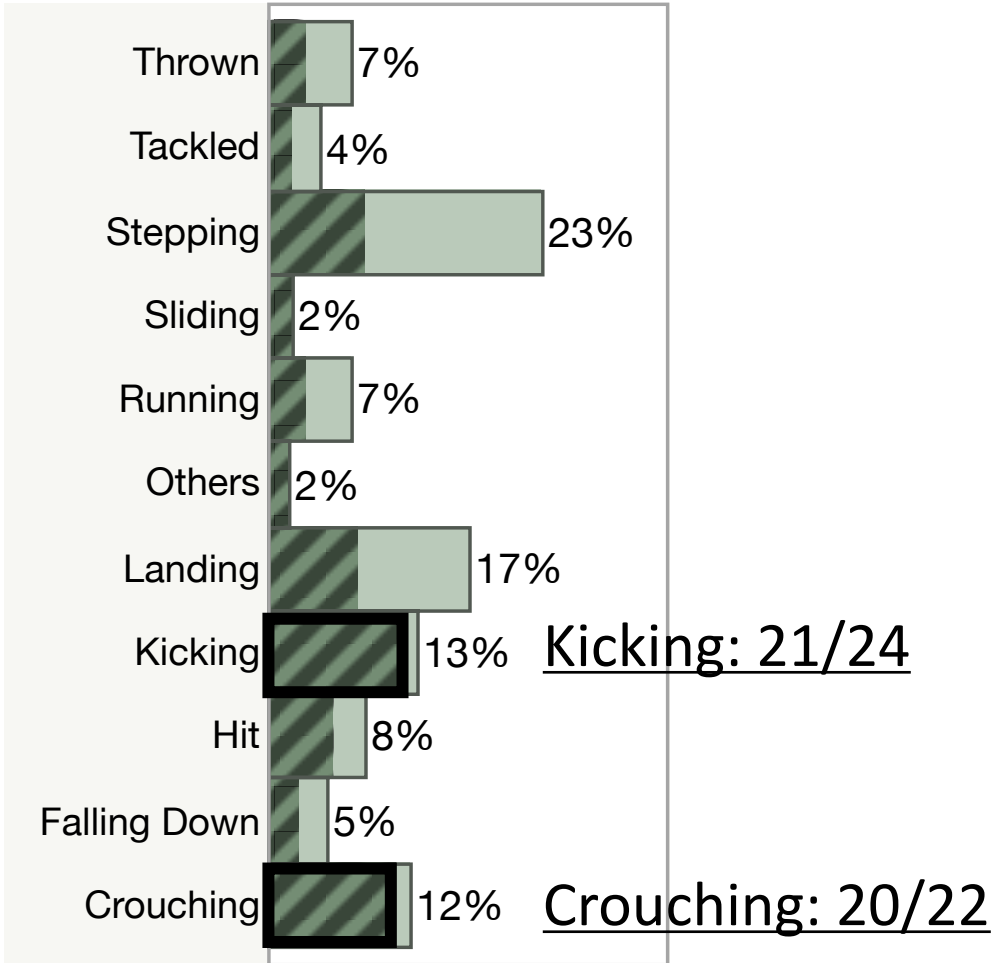
Sports genre



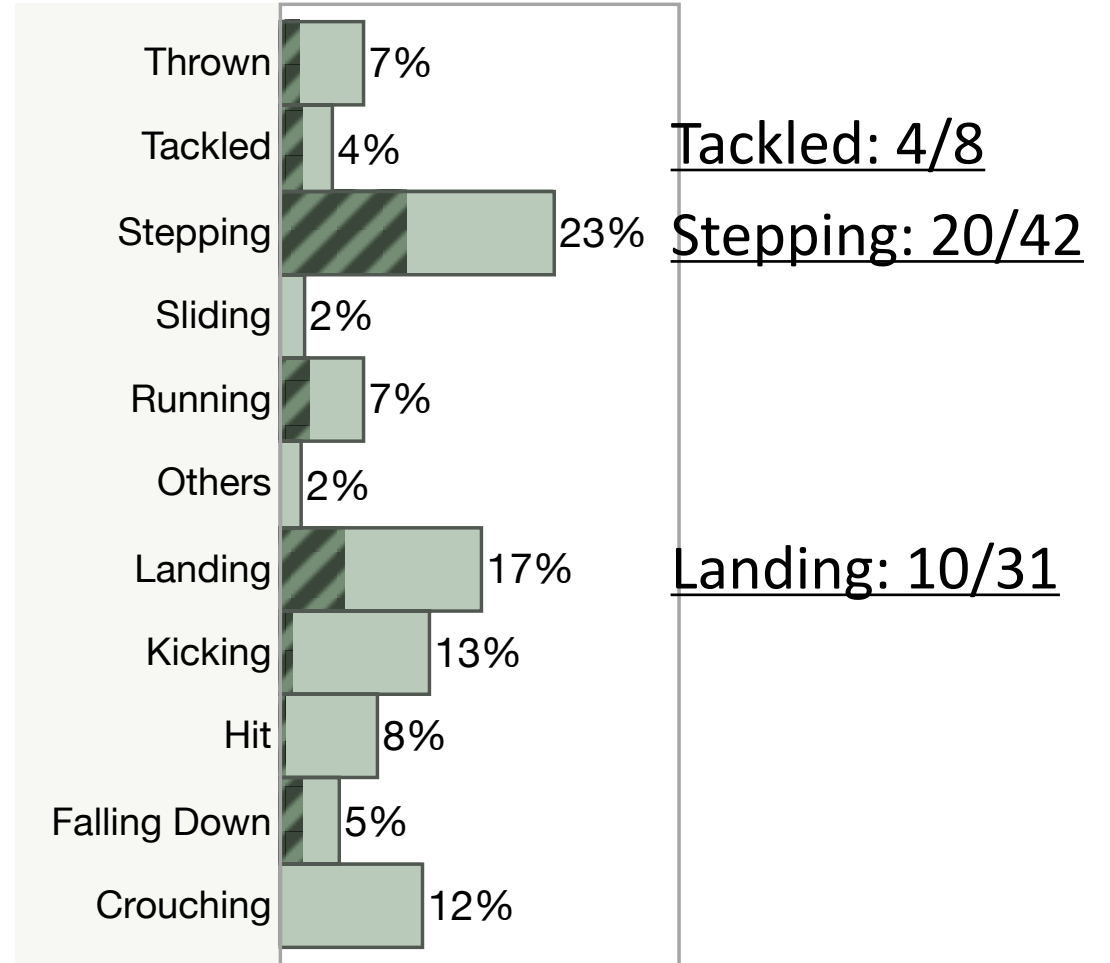
Result 2

Injury mechanism & tear type

✓ Vertical tear



✓ Radial/Flap tear



Result 3

Clinical characteristics based on meniscal type

✓ MM (n=47)

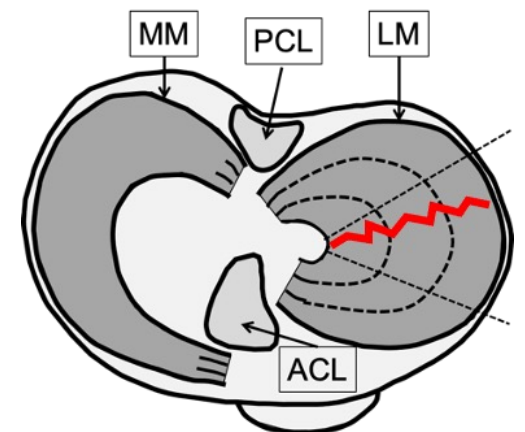
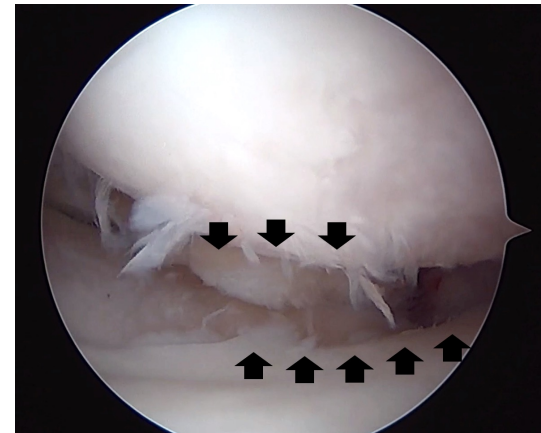
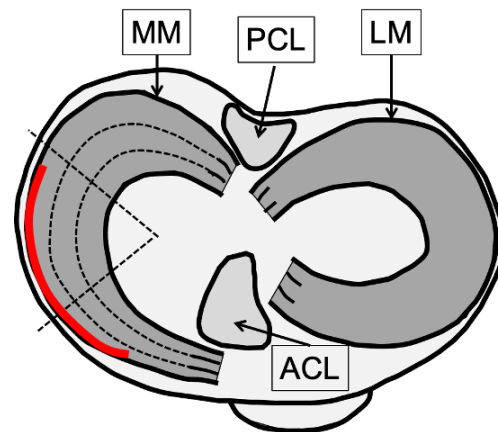
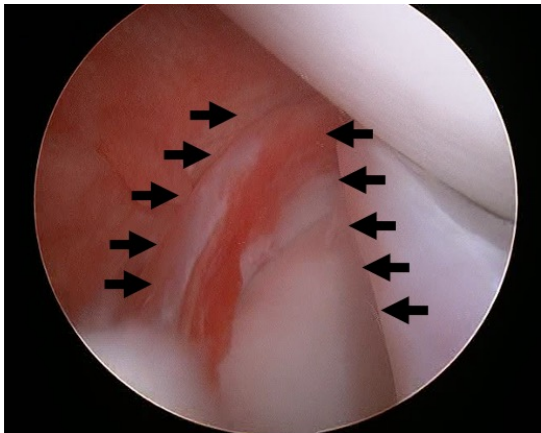
30 vertical tears

- 15 cases in anterior–middle seg. by kicking motion in soccer

✓ DLM (n=50)

17 radial tears in the middle seg.

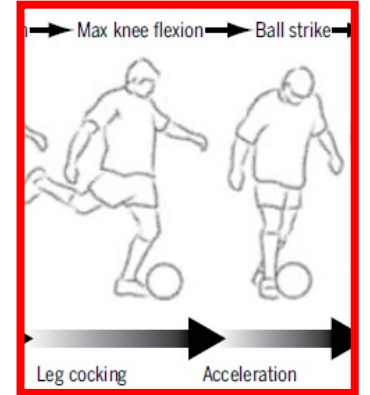
- 14 cases from white-white to red-red zone



Discussion

✓ MM

- Loose capsular connection @ anteromedial region anterior to the MCL⁷
 - Capsular attachment during kicking motion⁸
 - Strongly pulled @ Leg cocking phase
 - Pinched btw. tibia & femur @ acceleration phase⁹
- Vertical tear in the red-red zone of anterior–middle seg.



✓ DLM

- Number of collagen fibers ↓¹⁰
 - Irregular, anisotropical fiber arrangement @ central region¹¹
- Vulnerable to complete radial tear in the middle seg.

Limitations

- Retrospective analysis of surgical cases
- No non-operative cases
- No comparison btw. complete and incomplete DLM

Conclusion

The characteristics of isolated meniscal tears including DLM such as the injury mechanism, sport, and tear type/location are useful information for clinicians in knee injury management

References

1. Smith J, et al. Am J Sports Med.
2. Terzidis IP, et al. Am J Sports Med. 2006
3. Ikeuchi H, et al. Clin Orthop Relat Res. 1982
4. Vinagre G, et al. J ISAKOS. 2022
5. Arnoczky SP, et al. Am J Sports Med. 1982
6. Cooper DE, et al. Clin Sports Med. 1991
7. Smigielski R, et al. Knee Surg Sports Traumatol Arthrosc. 2015
8. Brophy RH, et al. J Orthop Sports Phys Ther. 2007
9. Tachibana Y, et al. Int J Surg Case Rep. 2021
10. Atay OA, et al. Am J Sports Med. 2007
11. Cui JH, et al. Arthroscopy. 2007