The ‘Floating Medial Meniscus’ Lesion In KD3M Knee Dislocations

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Author Disclosures

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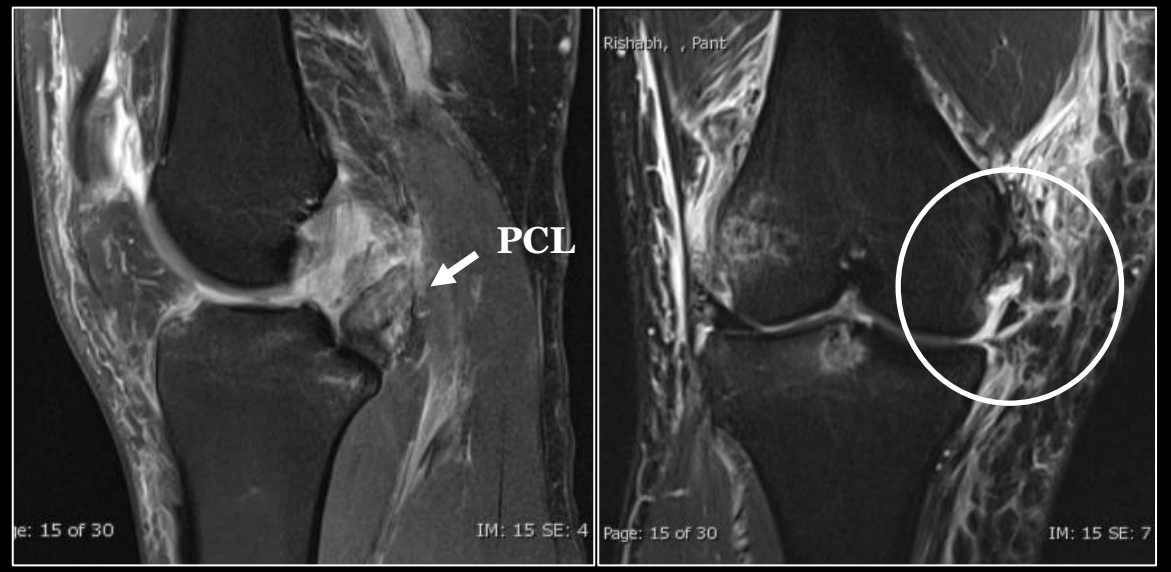
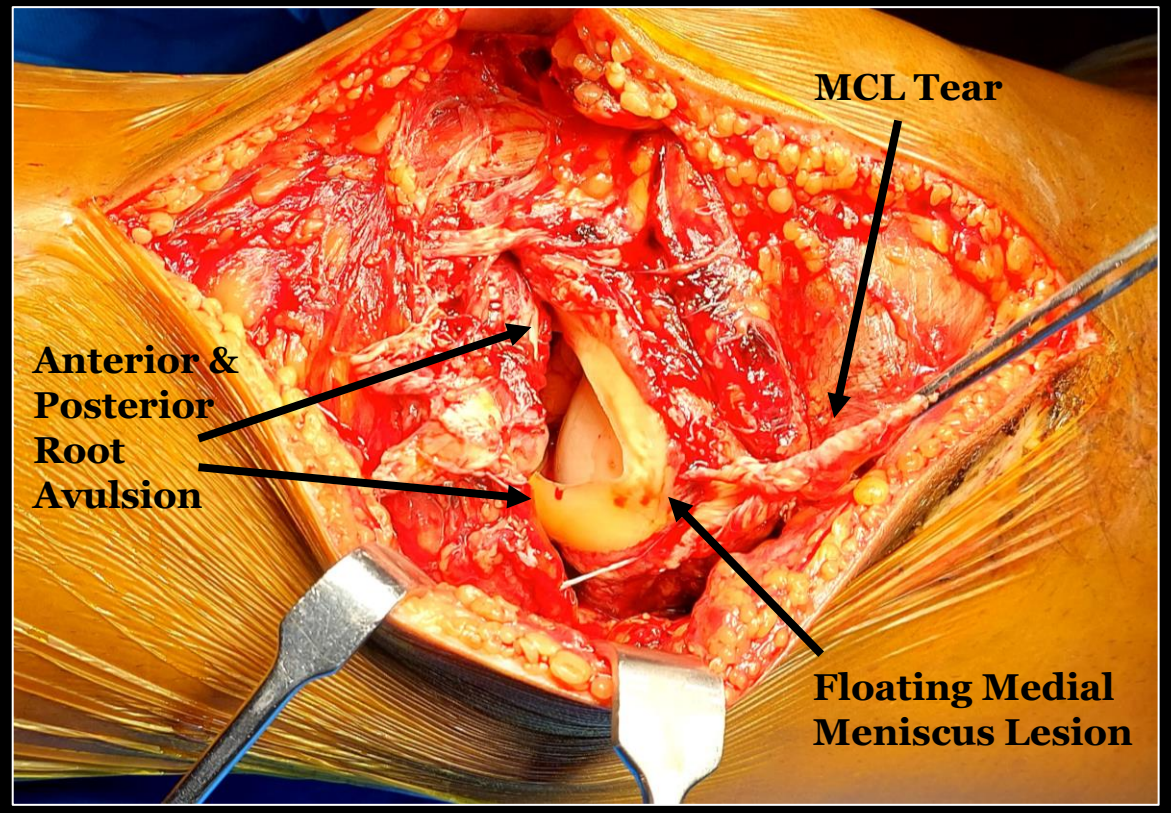
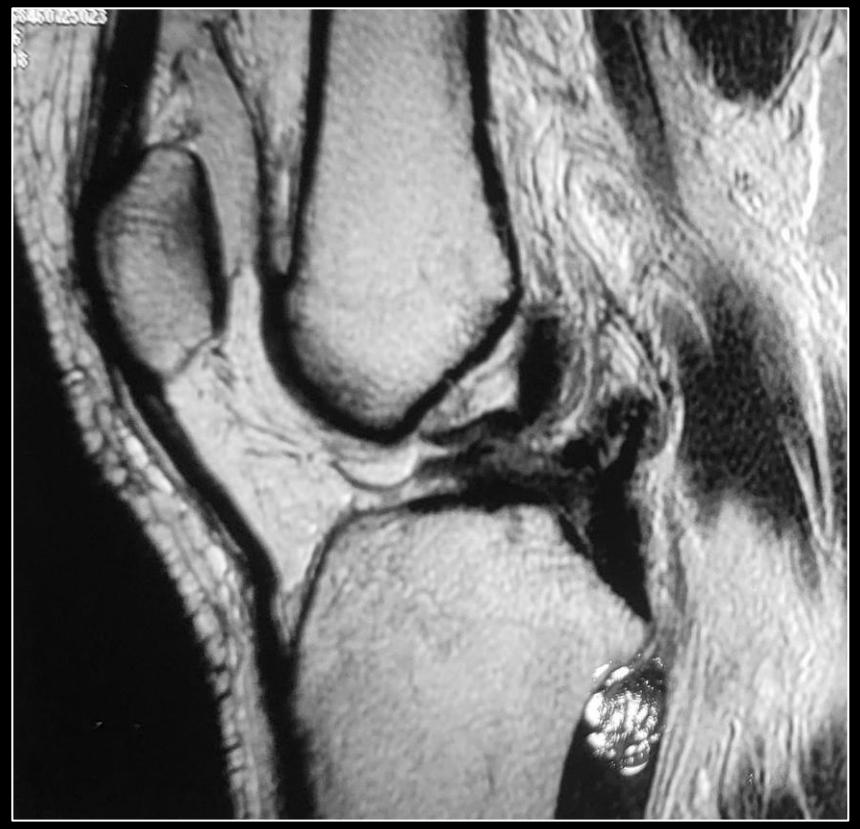
- High energy knee dislocations have the potential not only to disrupt multiple ligaments but also to cause complex meniscal tears not commonly encountered in non-dislocated knees.
- A particularly devastating injury pattern involves avulsion of both the anterior and posterior roots of the medial meniscus associated with disruption of the medial ligament complex and extra-articular displacement of the medial meniscus in the medial soft-tissues.
- We have termed this tear pattern as a ‘floating medial meniscus lesion’.

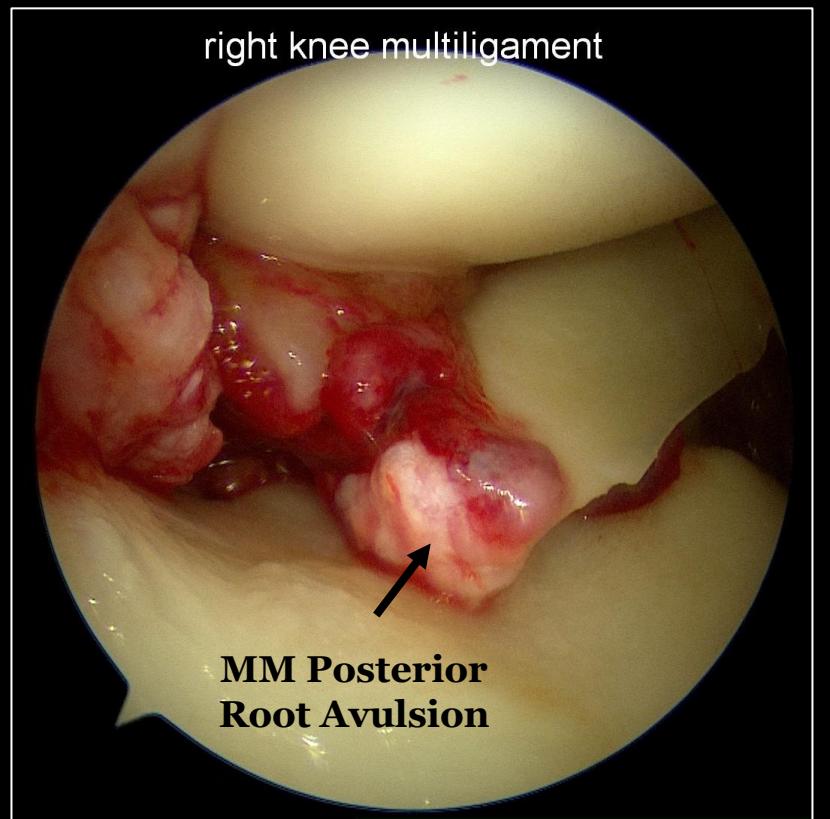




AIMS

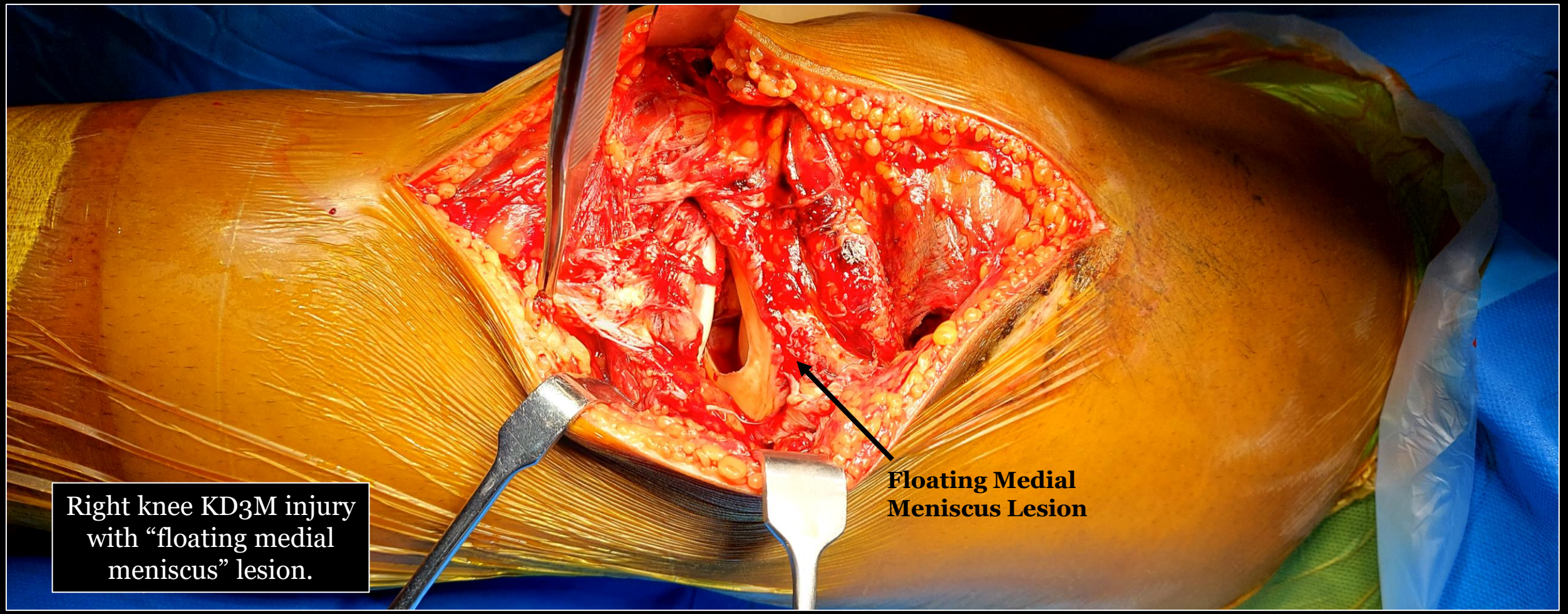
This study aims to define the “floating medial meniscus lesion” lesion, report its incidence, assess its impact on surgical timing, describe the repair technique, and evaluate healing rates and outcomes.





PATIENTS & METHODS

- We retrospectively analysed a database of multiple ligament knee injury surgeries performed between 2008 and 2022 at a referral centre for complex knee injuries and identified cases with a floating medial meniscus lesion.
- The surgical procedure involved a combined arthroscopic and medial open approach that addressed the meniscus tear and ligament tears in one stage.



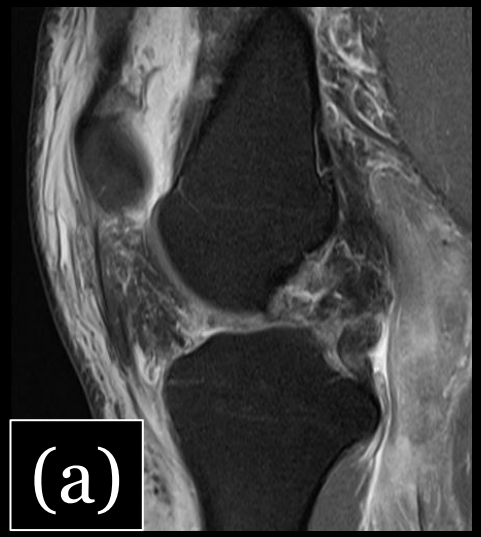
Right knee KD3M injury with “floating medial meniscus” lesion.

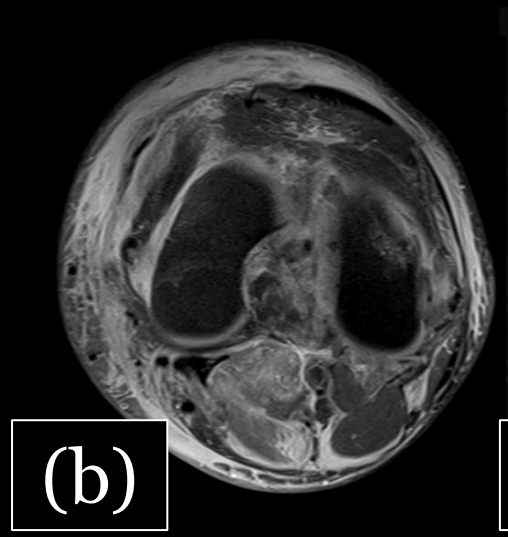
We first performed open medial exploration which allowed for meniscus reduction. This was especially useful for everted menisci. The medial arthrotomy prior to arthroscopy allowed accurate delineation of torn layers devoid of fluid extravasation, and also ensured that subsequent arthroscopy did not cause fluid accumulation in the soft-tissues. The arthrotomy did hamper joint distention and clear visualisation during arthroscopy but was not significant enough to affect accurate ACL and PCL tunnel creation, or medial meniscus anterior and posterior root repair using a transtibial pull-out suture technique.

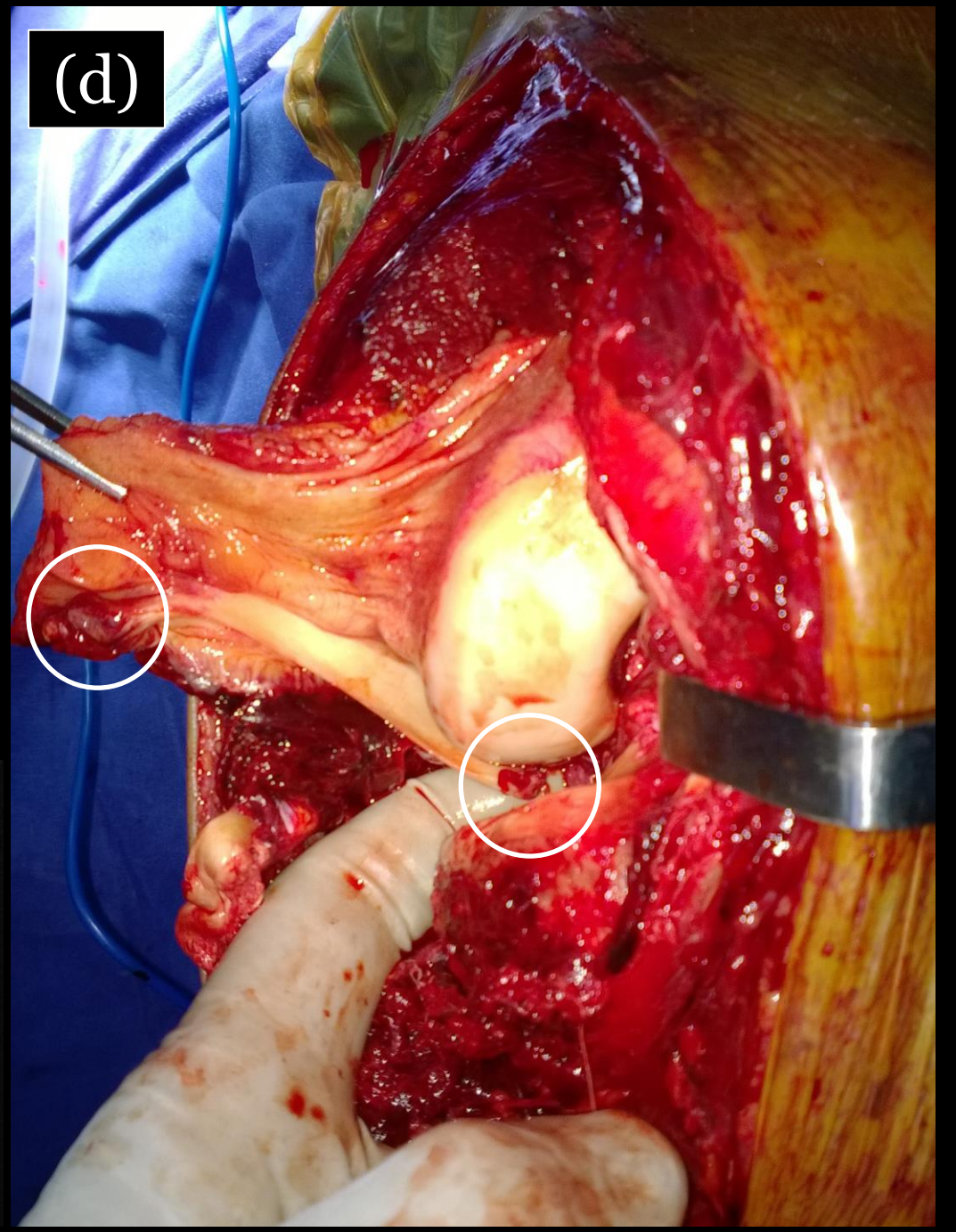
PATIENTS & METHODS

- Injury characteristics using the Schenk classification, preoperative imaging, and operative reports were reviewed.
- Clinical, functional and radiological outcome measures were determined at a minimum two-year follow-up.
- Chronicity was evaluated to determine whether the time interval from injury to surgery contributed to surgical challenges. Early intervention was defined as surgery within three weeks of injury.

KD3M with “floating medial meniscus” – delayed presentation. (a-c) MRI reveals tears of ACL, PCL, and MCL with extra-articular displacement of the medial meniscus. (d) Intraoperative image shows anterior and posterior root tears of medial meniscus with intact peripheral attachment to capsule. Dissection and reduction was challenging when delayed surgical repair was performed.

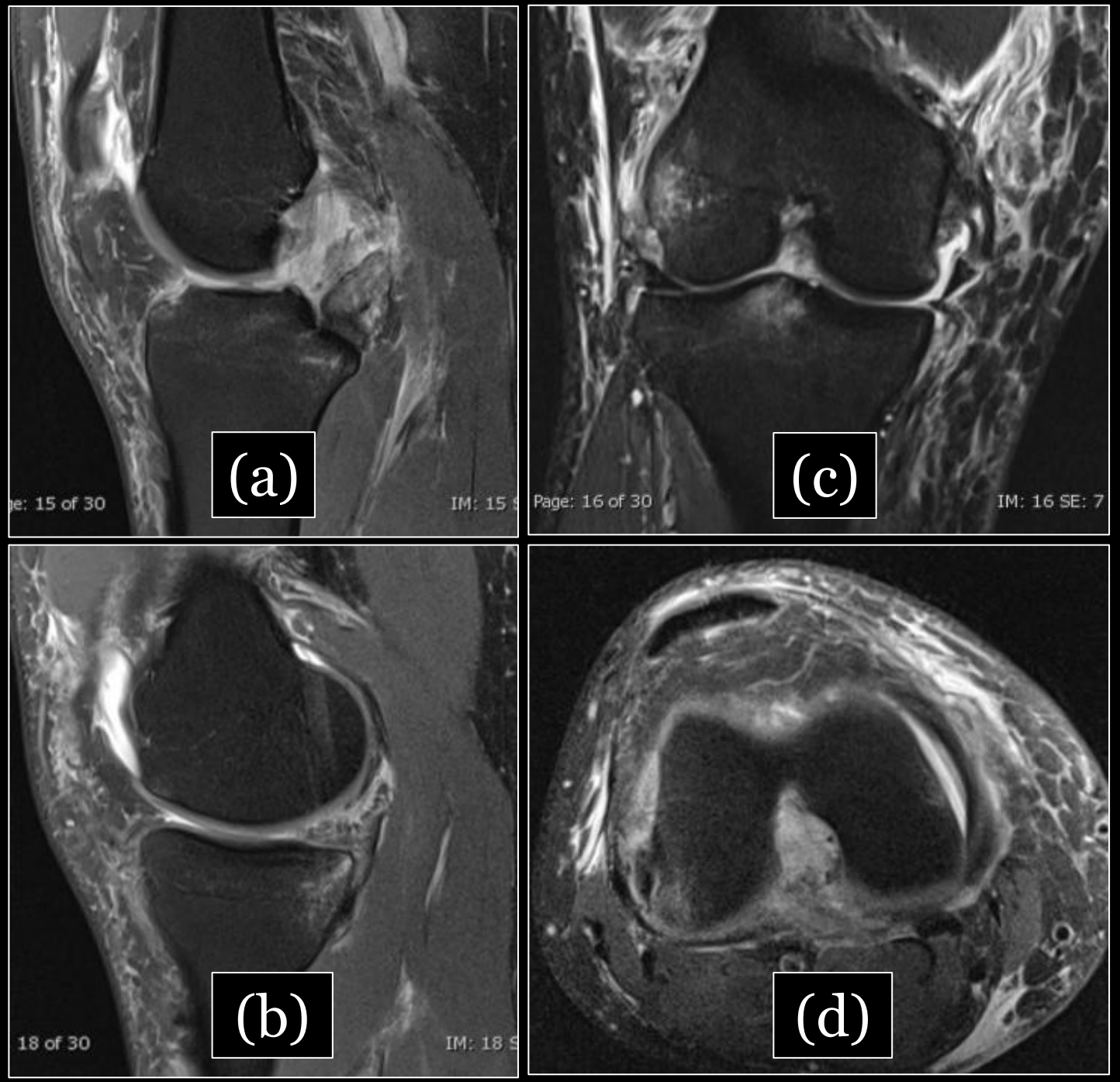




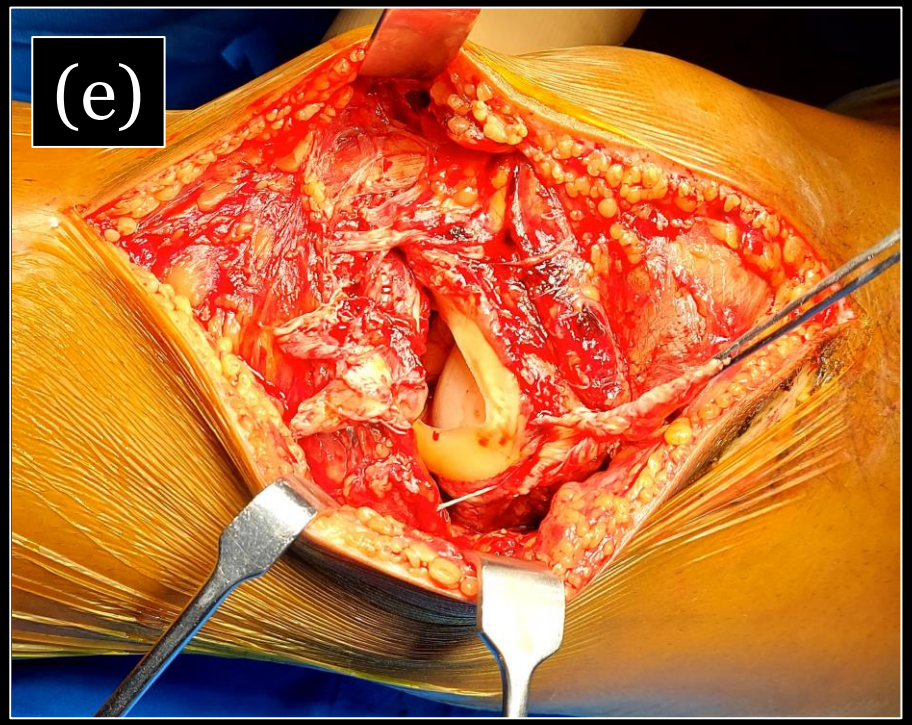


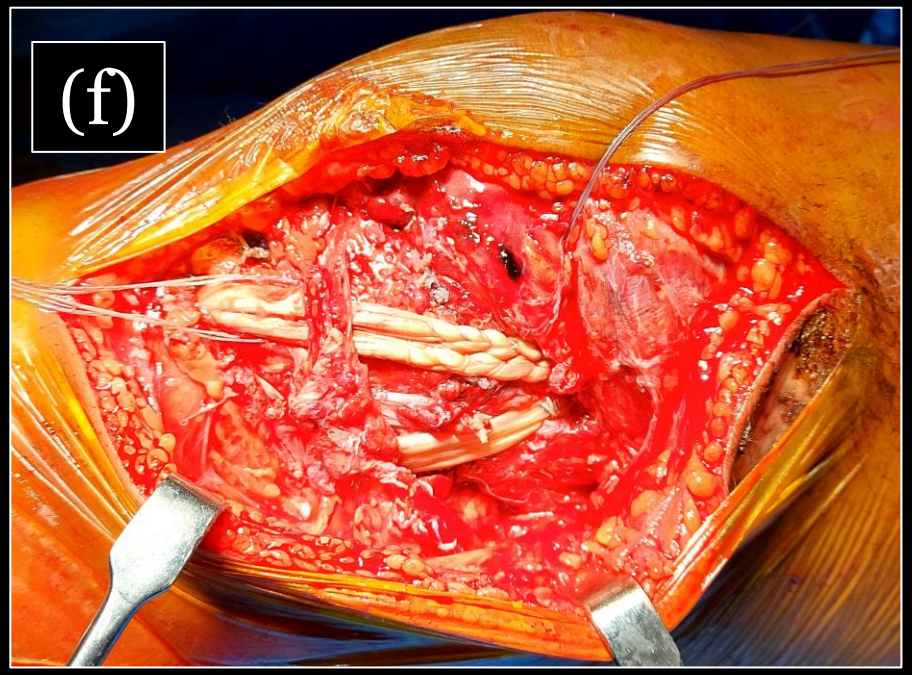
RESULTS

- From 341 knees operated for multiple ligament knee injuries (119 KD3M type), we identified 7 patients (all KD3M type) who had a floating medial meniscus lesion.
- 5 patients underwent early surgery, 2 had delayed intervention.
- Preoperative MRI effectively identified the lesions.
- Early surgery facilitated easier meniscus identification, reduction, and repair, whereas delayed surgery posed challenges.
- At follow-up, all patients had regained a minimum 0-130 degrees knee range of motion, with no residual instability or pain.
- Bilateral weight bearing radiographs revealed no significant difference in medial joint space between the affected and normal knees, with no evidence of degenerative changes.
- MRI revealed healed medial menisci roots, though some extrusion was noted in 4 patients.
- The mean IKDC score two years following surgery was 89.5 (range 76 to 93).



Acute KD3M with floating medial meniscus.
MRI reveals (a) bicruciate injury, (b) medial meniscus anterior & posterior root tears with “ghost sign”, (c) MCL tear with displaced medial meniscus floating in the soft-tissue hematoma. The peripheral attachment of the meniscus to capsule and meniscofemoral ligament is intact. (d) Axial MRI image with medial extra-articular displacement of the medial meniscus.



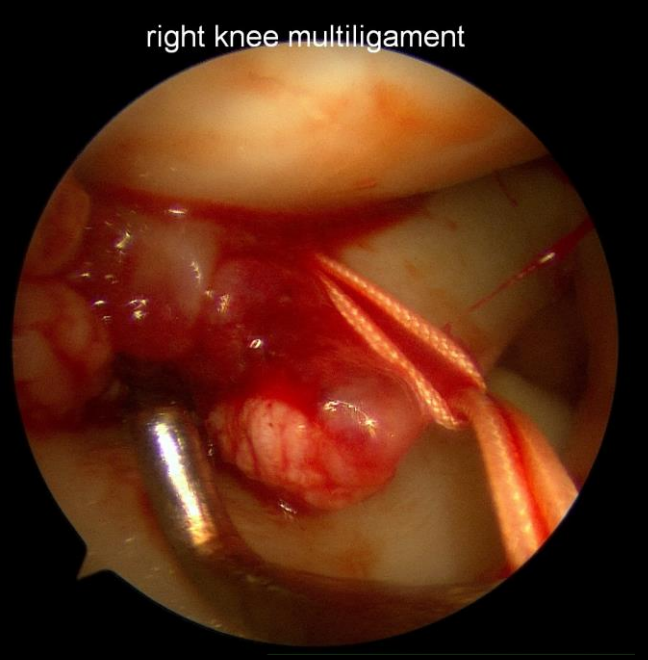


Acute KD3M with floating medial meniscus.

(e) Tears of the superficial and deep MCL with the medial meniscus displaced in the medial soft-tissues. (f) The patient underwent a single stage multiple ligament reconstruction which included MCL and POL allograft reconstruction. (g,h) X-ray & MRI two years following surgery reveals normal medial joint space & a healed medial meniscus with no extrusion.

CONCLUSIONS

Although floating medial meniscus lesions are daunting at presentation, they can be successfully repaired with a systematic surgical approach, resulting in satisfactory functional outcomes. Early surgery enables easier meniscus dissection, reduction and repair.



REFERENCES

1. Marder RS, Poonawala H, Pincay JI, et al. Acute versus delayed surgical intervention in multiligament knee injuries: a systematic review. Orthop J Sports Med. 2021;9(3):2325967211027856. doi:10.1177/2325967211027856.
2. Schenck RC, Richter DL, Wascher DC. Knee Dislocations: Lessons Learned From 20-Year Follow-up. (2014) Orthopaedic journal of sports medicine. 2 (5): 2325967114534387.
3. Pardiwala DN, Subbiah K, Thete R, Jadhav R, Rao N. Multiple ligament knee injuries: Clinical practice guidelines. J Arthrosc Surg Sports Med 2022;3:40-9.
4. Everhart JS, Higgins JD, Poland SG, Abouljoud MM, Flanigan DC. Meniscal repair in patients age 40 years and older: A systematic review of 11 studies and 148 patients. Knee. 2018 Dec;25(6):1142-1150. doi: 10.1016/j.knee.2018.09.009. Epub 2018 Nov 7. PMID: 30414793.
5. Rodríguez-Roiz, J.M., Sastre-Solsona, S., Popescu, D. *et al.* The relationship between ACL reconstruction and meniscal repair: quality of life, sports return, and meniscal failure rate—2- to 12-year follow-up. *J Orthop Surg Res* **15**, 361 (2020).
6. Keyhani, S., Movahedinia, M., LaPrade, R.F. *et al.* Long-term clinical results of using a posteromedial all-inside and anteromedial inside-out approach to repair unstable or irreducible bucket-handle medial meniscal tears. *J Orthop Traumatol* **24**, 12 (2023).
7. Strauss EJ, Day MS, Ryan M, Jazrawi L. Evaluation, Treatment, and Outcomes of Meniscal Root Tears: A Critical Analysis Review. JBJS Rev. 2016 Aug 9;4(8):e4. doi: 10.2106/JBJS.RVW.15.00082. PMID: 27603272.