



CASE STUDY

DOI: <https://doi.org/10.20883/jms.303>

Bicompartmental locked bucket-handle tears of menisci concealing the concomitant anterior cruciate ligament injury for 2 years – a case report

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ABSTRACT

Locked bucket-handle tears of both medial and lateral menisci, called in literature "Jack and Jill lesion", with simultaneous anterior cruciate ligament (ACL) injury is an extremely unusual phenomenon. It was reported only in a few cases in literature, which were unfortunately highly differentiated in the field of trauma mechanism, treatment options and postoperative care. Authors presented a clinical case of patient with a locked knee joint, by the torn both menisci, what masked the simultaneous ACL rupture and supremely imitated a stable joint. The locked knee is a clinical case demanding the urgent intervention to prevent further damages to the joint structures. Surprisingly, the patient after locking of the menisci and migration of their inner fragments to the intercondylar notch, started to feel the affected joint stable and dismissed from the further treatment for next 2 years. Complex trauma needs a complex treatment, and a single-stage or multi-stage surgical approach is performed. Authors chose a two-steps surgical procedure with primary meniscal repair and secondary, early ACL reconstruction.

Keywords: meniscal tear, ACL tear, locked knee.

Introduction

Knee menisci are fibrocartilaginous structures, important in such actions as load transmission, absorption of the shocks and joint stabilization. Meniscal tear is a common result of the knee joint trauma, especially twisting, and may cause pain and persistent functional impairment of the lower limb [1]. Meniscal lesions are classified according to location, size, pattern of tear (horizontal, vertical, radial, oblique), etiopathology (degenerative or traumatic), dislocation of the fragments

(bucket-handle tears and parrot-beak) [2, 3]. Locked bucket-handle tears are not frequent type and locked bucket-handle tears of both menisci is called in the literature "Jack and Jill lesion" [3]. Simultaneous ACL injury is an extremely rare phenomenon and were reported only few highly differentiated cases in the literature [4, 5, 6]. Moreover data regarding to the mechanism of this complex trauma, treatment and postoperative care have not been well explained and established yet.

We presented a clinical case of patient with torn both menisci that masked the simultaneous ACL rupture and supremely imitated the stability of the knee joint.

Case report

A 22 year-old male patient with a history of right knee joint trauma was admitted to the Orthopedic Department for a surgical treatment with a suspicion of ACL lesion and medial meniscus horizontal tear without dislocation. There was no previous history of the knee injury or pathologic symptoms in the affected limb. The trauma occurred during stepping off the stairs two years ago. According to recorded data from the Emergency Department, the injured knee was swollen, painful, range of movement was limited to 40° of

flexion and there was tenderness in the medial part of joint line with no signs of instability during the clinical evaluation. The antero-posterior and profile X-rays were normal and did not show any signs of a bone injury or pathology. The Magnetic Resonance Imaging (MRI) performed two weeks after trauma revealed complete ACL rupture and longitudinal medial meniscus (MM) tear. Two years later patient decided for the arthroscopic treatment due to reported temporary, mild pain in the medial and lateral compartments, locking of the knee joint but negated symptoms of instability. Preoperative physical examination in the Orthopedic Department revealed moderate joint effusion, range of motion 10–120° of the affected knee joint, negative ACL stability tests. Meniscal tests were positive for MM and lateral meniscus (ML).

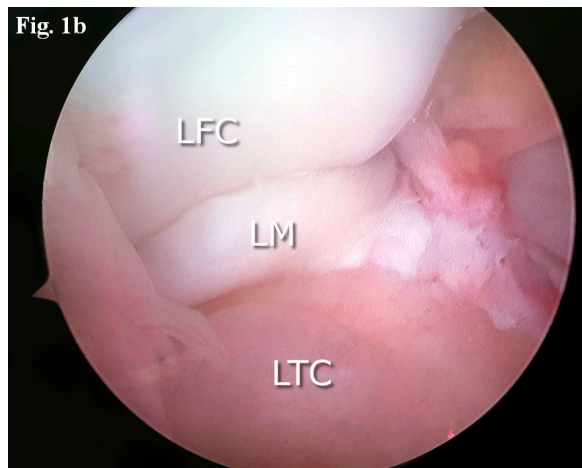
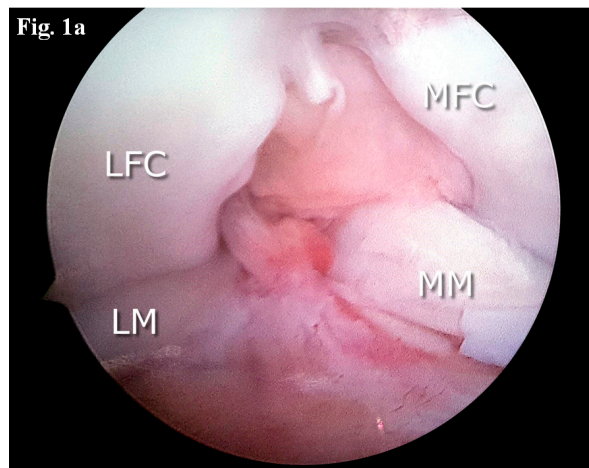


Figure 1. a. Arthroscopic picture illustrating both MM and ML locked. b. Arthroscopic picture illustrating locked ML (MM – medial meniscus, LM – lateral meniscus, LFC – lateral femoral condyle, MFC – medial femoral condyle, LTC – lateral tibial condyle)

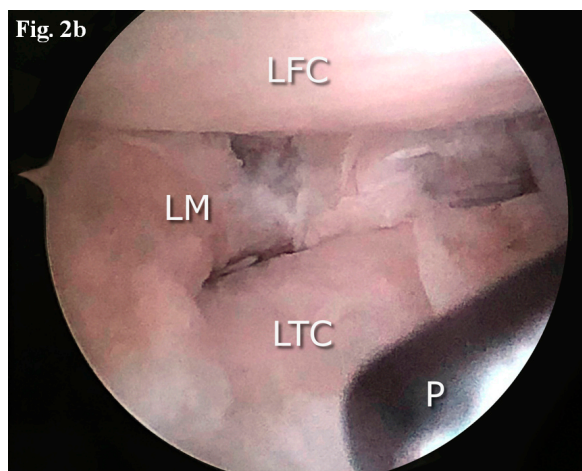
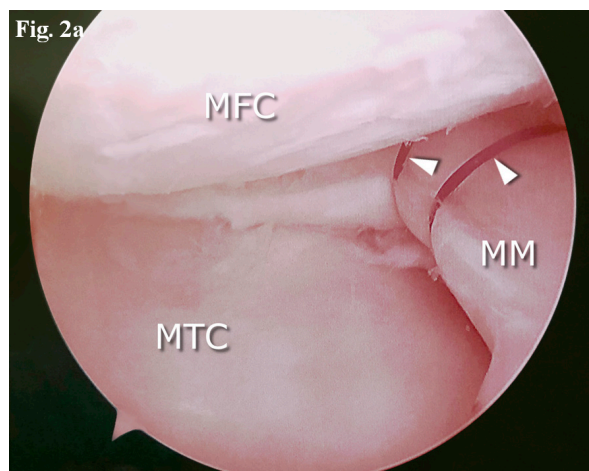


Figure 2. a. Arthroscopic picture illustrating sutured MM. b. Arthroscopic picture illustrating partially resected ML (MFC – medial femoral condyle, MTC – medial tibial condyle, MM – medial meniscus, arrowheads – sutures, LTC – lateral tibial condyle, LFC – lateral femoral condyle, LM – lateral meniscus, P- arthroscopic probe/hook)

Arthroscopic inspection was performed under spinal anesthesia. During knee joint arthroscopy bucket-handle tears of both MM and ML were found with the inner fragments displaced into the intercondylar notch. The ACL was completely ruptured with atrophy of the stumps and the PCL was intact. There were foci of chondromalacia 2° stage, according to The International Cartilage Repair Society classification on the both femur condyles. After reduction of both menisci by the arthroscopic hook and detailed investigation of the injury side, it was decided to perform partial meniscectomy of the torn and degenerated fragment of the ML. The MM was repaired using all-inside and outside-in technique, totally with 4 sutures. According to postoperative protocol brace and crutches were used for six weeks. The torn ACL treatment was planned as a second-stage arthroscopic reconstruction, in 6–8 weeks after the primary operation. Informed consent of the case report was obtained from the patient.

Discussion

Locked bucket-handle tears of both MM and ML with simultaneous ACL rupture is an extremely rare pattern of the knee joint injury, with individual approach to the treatment.

A majority of cases when both meniscus locking is associated with sport activities: skiing, volleyball, basketball, football [2, 7, 8, 9]. The mechanism of this injury is usually a result of high-energy valgus trauma or hyperextension trauma with rotation [2]. The bucket-handle tear of meniscus is commonly associated with anterior cruciate ligament rupture however it seems to be interesting that the moment of the meniscus locking sometimes does not occur together with the ACL rupture [9]. Koukoulis et al described locked bucket-handle tears of both MM and ML with simultaneous ACL and medial collateral ligaments injury in a male patient who had fallen from the height with the valgus mechanism of the trauma [5]. In our case the trauma was work-related, low-energy and probably meniscus locking appeared as a multi-stage process; the MRI performed 2 weeks after trauma did not reveal the "Jack and Jill lesion" in the beginning. We conclude that moment of meniscus locking occurred in a early few weeks after injury and prevented the sensation of joint instability in ACL

deficient knee. Shepherd et al described a similar case, that appeared as a multi-stage process in a period of two years, however their patient had an unstable knee joint [9].

The locked knee is a clinical case when the urgent treatment is strongly advised. A choice of single-stage or multi-stage surgical approach depends on operator's experience, number and difficulty of the required procedures. Cetik et al made a single-stage partial meniscectomy and ACL reconstruction [6]. Shelbourne et al advised a two-stage procedure to reduce the complication rate [10]. We chose a two-stage procedure and in our opinion meniscus repair should be based on degeneration of its structure, however it is important to protect the operated limb in the brace in the period between surgical procedures.

The MRI is a highly sensitive and specific diagnostic technique for bucket-handle tears of menisci [3]. There are described various signs for this pathology which facilitate the proper identification [8]. Ultrasound is a standard imaging modality of the knee joint however it should be clearly stated that the role of the ultrasound in meniscal tears diagnosis is controversial, with sensitivity and specificity from as low as 60% and 21% to as high as 90% and 83%, respectively [11]. Our case presented that the locking of the bucket-handle tears of menisci, with the concurrent ACL rupture can appear surprisingly and how important is to suspect locking of the meniscus during physical examination.

Conclusion

Early and proper arthroscopic treatment allows to avoid progression of the knee structures damage and to restore knee stability and function.

Acknowledgements

Conflict of interest statement

The authors declare no conflict of interest.

Funding sources

There are no sources of funding to declare.

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Acceptance for editing: 2018-10-15
Acceptance for publication: 2018-12-20

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