



State of the art in multiligament knee injuries: from diagnosis to treatment

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Patients with multiligament knee injuries represent a heterogeneous group of complex lesions. The challenge starts with performing an accurate diagnosis in the acute phase and selecting the appropriate treatment. Surgical techniques are diverse and there are no standard rehabilitation protocols for all cases. Unfortunately, due to the complexity and the uniqueness of each case, treatment should be patient oriented and there is no simple algorithm to follow.

The recently published special issue in *Annals of Joint* on “the multiligament injured knee” (MLIK) led by the guest editors Camilo Partezani Helito and Jorge Chahla, brilliantly show an updated evidence based approach from the leaders in the field (1).

The special issue summarizes in a very concise and resourceful edition the current evidence for the treatment of these complex injuries. The deep understanding of these lesions from the words of experienced surgeons brings light to this not so-well comprehended subject. There is no simple algorithm of treatment, as these lesions are extremely heterogeneous; outcomes published rely mostly on level 3 and 4 studies and there are several techniques described, anatomic and nonanatomic (2-5). In addition, the rehabilitation protocols are diverse, from a rigid brace to an immediate range of motion. Considering the relative rareness and diversity of these lesions, added to the fact that there are not as many high-volume centers worldwide for multiligament knee injuries, level 1 studies are not readily available. In that sense, this compendium of experts' opinions becomes even more valuable.

The MLIKs are challenging from the moment of

the diagnosis, with frequently missed or misdiagnosed cases, especially when considering the posteromedial and posterolateral corners of the knee. An accurate physical examination, stress images and magnetic resonance imaging (MRI) are mandatory when a knee dislocation is suspected, as it was interestingly highlighted in this issue (6,7). In cases of chronic laxity, the stress radiographs and the long leg films assume an even more important role, as the MRI may not always predict clinical insufficiency (8,9).

Regarding the timing of surgery, current evidence supports best outcomes for the acute surgical treatment, within 3 weeks from trauma (2). Also pointed out by Lucidi and colleagues, the timing of surgery can be delayed in special situations such as vascular injuries or gross instability, even with a knee brace when an external fixator (EF) is required (10). The use of a hinged EF over a knee brace in the postoperative period remains controversial, but literature tends to favor the use of knee braces on a regular basis, as several complications have been reported with the use of an EF and also, there is a lack of evidence of its clinical superiority (11,12).

The surgical technique employed is also a matter of controversy. There is a trend towards selecting a more “anatomical” surgical approach when treating the MLIKs. Despite several biomechanical and a few clinical studies supporting the choice of a more anatomic technique, there is a lack of level 1 clinical studies confirming that hypothesis (3,4). Further studies should investigate this subject.

The article approaching the antero-lateral complex instability led by Delaloye *et al.* highlights an interesting topic that brought excitement in the knee surgery

community in recent years (13). They provided evidence in large case series that the anterolateral ligament (ALL) reconstruction associated to the anterior cruciate ligament (ACL) showed lower graft failure than isolated ACL in a minimum of a 2-year follow-up, regardless of the graft choice (14,15). The role of the anterolateral ligament in the setting of a MLIK hasn't been established yet, but their excellent results with isolated ACL are very positive.

One technical pearl worth mentioning is regarding tunnel placement. Moatshe *et al.* brilliantly provided essential tips to reach optimal tunnel placement (16). Anatomic techniques usually require more tunnels and its convergence should be observed and avoided. In the setting of an instability of the four major ligaments of the knee, a total up to four tunnels in the medial femoral condyle, and three in the lateral femoral condyle could be necessary. It is important to note this potential problem ahead of time when selecting the surgical technique, because tunnel convergence leads to failure and the ultimate superiority of an anatomic technique over a non-anatomic one is yet to be proven.

With regard to graft selection, both autograft and allograft tissue reconstructions have resulted in a satisfactory mid-to-long-term restoration of knee function (17). An allograft is typically recommended in multiligamentous injuries as it eliminates graft site morbidity, reduces dissection time, and decreases postoperative pain and stiffness. However, allografts are not always available; they introduce an added cost and carry the risk of disease transmission—although rare (18).

Another fundamental aspect of the patient evaluation is limb alignment. Abdelrahman *et al.* outlined the importance of the assessment of deviation in coronal and sagittal planes. In chronic cases with laxity and axis deviation, long leg films are non-negotiable (19). Classically, a two-staged procedure has been recommended when dealing with those lesions. In the first stage, an osteotomy is performed and if instability persists, a second stage with ligament reconstruction is done. Although studies have shown that up to 38% of patients achieved stability and didn't have to go through the second procedure, good clinical outcomes have also been published with a one-staged surgery (20,21).

Finally, rehabilitation protocols have evolved over time and authors have shown that it is possible to return to play sports after these complex injuries, if all treatment principles are respected (22).

I congratulate Dr. Helito and Dr. Chahla for putting together so many renowned experts in the field, and

providing the reader with the cutting edge evidence for dealing with these so very complex injuries.

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Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

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