



The medial collateral ligament: the neglected ligament

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It strikes us that the medial collateral ligament (MCL) complex has been neglected in terms of study and understanding, despite the MCL being the most commonly injured knee ligament [2]. Obviously, most surgeons do accept that on rare occasions, surgery for the MCL is required, but, because of the belief in good healing capability, there seems a pervading belief that MCL injuries almost inevitably do well with non-surgical treatment. We accept this *laissez-faire* approach to this ligament at our, and our patients', peril. Recently there has been increasing evidence that in the context of ACL injury and ACL reconstruction, neglected (even mild) MCL laxity is associated with ACL graft re-rupture [12]. Furthermore, it is the belief of the authors that the MCL is the hardest ligament in the knee to reconstruct satisfactorily. Surely, the MCL demands more interest and research?

There are a number of reasons for the lack of interest in the MCL. First, most MCL injuries do indeed heal well, and do so with a satisfactory clinical outcome without surgery. However, when exactly will surgery be required?

Historical surgical interventions employed techniques that were crude, and to make matters worse the complicated anatomy and biomechanics of the MCL complex were poorly understood by those operating. Not surprisingly complications were common and MCL laxity, in valgus and/or anteromedial rotation, often persisted. As a result by the mid-90s, it was thought that it was best to treat all MCL tears, including those with concomitant ACL rupture, non-surgically at first. The logic was that delayed surgery was no worse than acute surgery and had fewer complications. For example, in the case of combined ACL and MCL

injury in a patient with demands that required ACL reconstruction, a period of bracing and physiotherapy preceded planned delayed ACL reconstruction, allowing MCL healing [7]. Whilst this remains absolutely appropriate for most patients, for others, it may not be. Furthermore, it often led to the situation at ACL reconstruction that the surgeon knew that there was persisting MCL laxity, but would invariably decide that it would be well tolerated. Unfortunately, it is our experience that not all patients 'get away with it': while the ACL graft is a secondary restraint to valgus, the absence of the MCL function throws increased load onto it and so it is not an effective splint for the MCL. In many of our revision ACL cases, associated MCL reconstruction is needed for an MCL tear that occurred in the primary injury causing ACL rupture.

In recent years, there has been recognition that achieving success in ACL reconstruction requires not just optimal graft choice, quality, placement, and fixation but also by dealing with peripheral lesions that increase stress in the ACL graft [1]. These lesions include root tears of the menisci, meniscocapsular 'ramp' lesions, and anterolateral soft-tissue injuries. These injuries may demand a range of procedures, including correction of misalignment in the coronal and sagittal planes (usually revision cases), and anterolateral enhancement techniques such as lateral extra-articular tenodesis. It is known that anterolateral procedures lead to dramatic reduction of ACL graft failure rates [8]; given that it is also known that unaddressed MCL deficiency leads to increased ACL graft failure rate [12], it is surprising that the medial soft-tissue envelope seems to have been overlooked.

There has been remarkably little work on the medial ligament complex. Although the basic lesion present in all patients with anteromedial rotatory instability (AMRI) is rupture of the dMCL, sometimes in isolation but more commonly with lesions of the sMCL and ACL [11], most surgical studies have ignored it, despite its contribution to knee stability. Isolated studies have, for example, described the attachment points of the deep MCL [9] and its reconstruction to stabilise the meniscus [5]. One of the authors of this present article has, for some years, been routinely employing

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a deep MCL repair, and reconstruction when needed [6, 10]. Whilst the deep MCL has not really been considered as important, surprisingly perhaps, a significant overemphasis of the importance of the posterior oblique ligament seems to have occurred. These imbalances in the literature suggest areas where more work is required, to obtain objective evidence that could aid surgical decision-making.

There is clearly some need to increase anatomical and biomechanical understanding, and for the development of evidence-based surgical techniques for dealing with injuries of the medial collateral ligament complex. Whilst major formal reconstructive techniques are well described, many surgeons find them complex, and hard to perform accurately. Recently, the use of synthetic tape to approximate the femur and tibia whilst the MCL heals has been promoted. Whilst this can certainly be useful, we have seen a surprising number of cases in which the synthetic tape has been fixed at inappropriate positions on the femur and tibia, leading to loss of range of movement and/or a lack of control of laxity. The risk of this seems greatest when minimally invasive techniques are used.

It is arguable that only the central fibres of the sMCL and dMCL come close to exhibiting isometry in knee motion [13] and, therefore, even minor mal-placement of attachment points for augmentation as described, or graft insertion or re-fixation of avulsed ligamentous tissue, can lead to very poor outcomes.

Later, in this issue, we present recent work regarding the MCL complex. It defines the femoral and tibial attachments of the components of the MCL complex [3], introduces the concept that the dMCL is slack in neutral rotation, and describes an inverted fan shape passing from a small femoral attachment to a wide tibial attachment coursing anteriorly as well as distally. This orientation is shown to resist tibial external rotation [4]. The anterior dMCL on the medial side of the knee seems analogous to the ALL on the lateral side... perhaps an ‘anteromedial ligament’!

We hope that these articles add to the understanding of this part of the knee and stimulate interest and further study.

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