Anterolateral Ligament: Let's Stick to the Facts!

We read with great interest the Editorial Commentary by Andy Williams, "The Anterolateral Ligament: The Emperor's New Clothes?"[1] After all, it was Mr. Williams who recently reported that in knees with a combined anterior cruciate ligament (ACL) and anterolateral injury (an injury pattern reported in most acutely ACL-injured knees), ACL reconstruction cannot restore normal knee kinematics unless concomitant modified Lemaire or anterolateral ligament (ALL) reconstruction is also performed: "The combined ACL and ALL procedure restored intact knee kinematics when tensioned in full extension."[2] This study was conducted at the Department of Orthopaedic Biomechanics at Imperial College, a renowned laboratory that we congratulate for this important cadaveric research and also on the recent award of funding from industry, which will allow them to continue their excellent work.

Given the scientific kudos of this laboratory, we were surprised to discover that Mr. Williams' opinion, as expressed in the editorial, is in complete contradiction to the findings of his own publication and a very large number of other anatomic, histologic, and biomechanical studies. In contrast to this, Mr. Williams expresses his considerable skepticism regarding both the existence of the ALL and the value of its reconstruction, instead emphasizing his personal preference for the "modified Lemaire procedure."[2,3] We consider both procedures to have important roles and do not believe that there is any need to aggressively promote one over the other. When an extra-articular tenodesis is indicated, it is our first choice to perform ALL reconstruction and reserve the Lemaire procedure for situations when an ipsilateral gracilis autograft is no longer available (e.g., revision). However, we greatly respect Mr. Williams' honesty in accepting that the "rush from anatomy to surgical techniques without the appropriate testing in between has been an embarrassing period for us," as well as his declaration of concern regarding the lack of clinical results.[1] Although he cites his work reporting "significant improvement in reducing abnormal pivot shift on clinical examination from 9% to 2%," it should be noted that no comparative statistical analyses were performed in his study, and that the minimum follow-up period was less than 1 month (range, 0.8-29 months). Sufficient data are reported for the reader to perform Fisher's exact test, which reveals a nonsignificant *P* value (.19).[4] As Mr. Williams notes, "the devil is always in the detail."[1]

In contrast to Mr. Williams' statements in his editorial commentary, clinical results of ALL reconstruction have been published since 2015. In fact, a comparative clinical series of 502 patients with a mean follow-up of 38 months (range, 24-54 months) received the Richard O'Connor award from the Arthroscopy Association of North America in 2017.[5] To our knowledge, this is the largest comparative study of any type of lateral extra-articular procedure published to date. The study demonstrated that combined ACL and ALL reconstruction is associated with a statistically significant 2.5- to 3-fold reduction in graft rupture rates in a high-risk population compared with isolated hamstring tendon or bone-tendon-bone autograft. Furthermore, in a forthcoming article in the *American Journal of Sports Medicine*, we demonstrate for the first time, in a series of more than 383 medial meniscal repairs performed at the time of ACL reconstruction, that the reoperation rate for failed repair is more than 2-fold lower in those who undergo ALL reconstruction at a mean follow-up of 37 months. This statistically significant finding is attributed to improved knee kinematics conferring a protective effect on the repair.[6]

Although we agree with Mr. Williams that "due diligence" is required, we disagree that this diligence should be laboratory-based. The literature contains an abundance of biomechanical studies demonstrating the importance of the ALL, and we are now beyond that stage. We must not lose track of our main focus—the clinical outcomes of our patients.[7] Lateral extra-articular tenodesis was abandoned 30 years ago not because of the results of cadaveric series[8] but because of a lack of proven efficacy in clinical studies, as well as complications that cannot be assessed in the laboratory, such as infection, postoperative stiffness, and donor site morbidity.[9-11] To our knowledge, since this widespread abandonment and subsequent resurgence in popularity, only 1 study has specifically evaluated reoperation rates and complications after any type of lateral extra-articular tenodesis. In that study of 548 consecutive combined ACL and ALL reconstructions, we demonstrated that the reoperation rate was broadly comparable to that published for isolated ACL reconstruction, and that there was no evidence of

the concerns that led to the abandonment of iliotibial band–based procedures.[12] It is surprising to see that Mr. Williams, despite these large series reporting significantly improved clinical outcomes of combined ACL and ALL reconstructions, promotes the Lemaire over ALL reconstruction on the basis of biomechanical studies. For us, the strength of evidence of a laboratory study of a small number of amputation specimens, often without intact proximal and distal attachments, with artificially created injury patterns, and loading that does not replicate what happens in vivo, is quite limited compared with actual clinical outcomes in a large series of patients. Of course, we recognize that collecting clinical outcomes is very hard work, but it is these large studies that provide the most important data that allow us to understand the true value of a procedure. Consequently, we urge Mr. Williams to move away from these cadaveric studies and focus on clinical results.

As a final note, we must state that we were surprised by the use of emotive language in this editorial commentary, which is quite uncharacteristic of scientific publications.[1] We have nothing against the modified Lemaire and in fact would encourage its proponents to share their clinical results so that its role can be more clearly defined. However, the tone of the editorial reminded us of the following quote from the German philosopher Arthur Schopenhauer: "All truth passes through three stages. First, it is ridiculed. Second, it is violently opposed. Third, it is accepted as being self-evident." This was certainly the case with medial patellofemoral ligament reconstruction. The first clinical series was published in 1992, but it took more than 15 years to gain acceptance by the orthopedic community, despite the major benefits for our patients compared with more invasive surgeries.[13]

Although this commentary may give the reader the impression that we are passing through Schopenhauer's second stage, the wealth of historical,[14] anatomic,[15-25] biomechanical,[26-36] and clinical evidence[5,6,12,37-40] cited in our response, in contrast to a personal opinion of an individual, demonstrates the transition to the third stage. One has to wonder what really influences the opinion of those who choose to ignore the fact that recent studies from numerous groups worldwide have shown reliable identification of the ALL at dissection and on magnetic resonance imaging and ultrasound[41-54]; have characterized its true nature as a ligament based on microscopy, histologic staining, and biomechanical testing; and have demonstrated the significant benefits of ALL reconstruction for patients. We welcome their opinions and encourage open discussion but believe that the clinical results speak for themselves.

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