

Letter to the Editor

Author Reply: “H-Plasty Repair Technique Improved Tibiofemoral Contact Mechanics After Repair for Adjacent Radial Tears of Posterior Lateral Meniscus Root: A Biomechanical Study”

We thank the authors for their interest in our study titled “H-Plasty Repair Technique Improved Tibiofemoral Contact Mechanics After Repair for Adjacent Radial Tears of Posterior Lateral Meniscus Root: A Biomechanical Study.”¹ We would like to respond as follows.

Forkel et al.² classified posterior lateral meniscal root tears (PLMRTs) into 3 types: type 1, avulsion injury of the posterior lateral meniscal root with stable fixation of the meniscal posterior horn to the femur via the menisofemoral ligament (MFL); type 2, radial tear of the lateral meniscal posterior horn close to the root (between the root and the meniscal origin of the MFL); and type 3, complete detachment of the lateral meniscal posterior horn from its tibial and femoral attachments (root tear and rupture of the MFL, as well as functional loss of the meniscal ring). We suggested that the preferred surgical treatment for each patient varied based on the root tear types. For type 2 injuries in which there is enough material on both sides of the tear to place the suture, side-to-side repair techniques are suitable.³ We have developed an all-inside side-to-side repair technique using the Fast-Fix system (Smith & Nephew, Andover, MA): “H-plasty” suture repair.⁴ In our previous retrospective study, 47 patients underwent repair of type 2 PLMRTs with concomitant anterior cruciate ligament reconstruction and were followed up for an average of 30.7 months.⁴ At final follow-up, there were significant improvements in the Lysholm score, International Knee Documentation Committee score, knee stability assessment findings, and lateral meniscal extrusion compared with the preoperative values. Among the 38 of 47 patients who underwent second-look arthroscopy after an average of 17.5 months (range, 14-19 months), all repairs (100%) were completely healed. No iatrogenic injury to the posterolateral meniscus was detected.

Satisfactory clinical results were obtained with this modified repair technique for the following reasons: First, we acknowledged that there were oblique fibers traveling through the meniscus in the posterior root areas. Therefore, an additional vertical mattress suture was used to anchor the repair construct to the posterior knee capsule and meniscotibial ligament, thereby

reducing the cutting of meniscal fibers by stitching or a suture device needle. Compared with traditional side-to-side repair with a horizontal configuration, the 2 vertical stitches in the H-plasty repair worked as “stabilizers” to provide a more stable environment, leading to less displacement of the tear limbs. Dragoo et al.⁵ performed stabilizing suture repair of radial meniscal root tears, similar to the technique we have described. An additional vertical mattress suture tethered the meniscus to the posterior capsule, thereby strengthening the repair.

Next, for radial or oblique tears within 9 mm of the posterior root, an all-inside suture technique can be used to preserve the meniscus when there is a root remnant of adequate tissue quality and the MFL is intact. With this technique, repair of the meniscus is performed anatomically without changing its native physiological properties. As Jiang describe, the diameter of the adult posterolateral meniscal root is approximately 7 mm. However, with the increase in the tear distance from the posterior root insertion, the histologic and anatomic properties (richer in proteoglycans and type II collagen⁶ and higher and wider in the posterior horn⁷) were most likely to be suitable for this modified side-to-side suture. In terms of biomechanics, with the increase in the tear distance from the posterior root insertion, the biomechanical properties were less likely to be improved by a pullout repair.⁸ The use of an in situ pullout suture may lead to “over-retention” of the lateral meniscal posterior horn into the joint space, as it has previously been certified that a nonanatomic position of the root insertion strongly affects conversion of femorotibial loads into circumferential tension. There is no consensus on which meniscal repair technique is most suitable for PLMRTs based on the different classifications.^{2,3,9} For a posterior root avulsion injury or root remnant of poor tissue quality, with or without MFL rupture, transosseous pullout repairs are most often used.

Finally, it should be noted that our study was meant only to evaluate and compare the biomechanical properties of repairs of type 2 PLMRTs with different methods, far from determining the precise approach for all types of PLMRT patients. Animal studies and/or

better-designed prospective clinical studies with more patients are needed in the future.

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