Novel Meniscus Transplant Technique: A Case Series

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In the orthopedic community, there are various meniscus allograft transplant techniques in use. While soft tissue techniques have been filled with complications and have largely fallen out of favor, other techniques involving bone plugs and bone bridges have become popular. Bone bridges are considered the gold standard with a success rate of 85-90%, with failures frequently progressing to total knee arthroplasty. Most literature demonstrates that in ten years, over 70% of these implants remain intact without requiring total knee arthroplasty. However, roughly 23% of the patients who undergo the meniscus transplant will have a complication that requires surgical intervention. Current issues with the most favored techniques today include extended operating time and high complication rates.

The indications for a meniscus transplant include patients under 50 years old with no chondral defects or advanced osteoarthritis with a segmental defect or prior failed meniscus repair attempts and no mechanical abnormalities or instability.

The senior author's novel technique for lateral meniscus allograft transplantation involves soft tissue fixation and fiber wire run through anterior and posterior drill tunnels. Both an arthroscopic and a mini-open partial inside-outside technique are utilized. Patient-specific MRIs and X-rays are used to properly size the transplant and calculate the exact size of the allograft. All allografts used are from RTI Surgical and are sterilized using the BioCleanse graft processing algorithm which removes bacteria, viruses, fungi, and spores.

First, the torn meniscus must be excised and the beds of the anterior and posterior horns of the graft must be prepared. An ACL guide and a flip cutter are used to drill thin bone tunnels through the anterior and posterior roots of the menisci. #2 FiberWire sutures are passed through the posterior and anterior horns of the size-matched allograft via a horizontal mattress configuration to form security loops. Once the graft is passed into the knee joint, the posterior and anterior security loops are then shuttled through the posterior and anterior tunnels respectively. Once shuttled, the anterior and posterior limbs are tied together through a small anteriorly placed incision.

Next, the meniscus is repaired circumferentially with vertical mattress sutures. The body is first secured with an all-inside technique using vertical mattress spanning meniscus sutures. The graft is secured anteriorly with an outside-in technique using a spinal needle and 0 Proline. The portal incisions are closed using simple nylon sutures. A mini-open incision and a small access incision anteriorly are closed using 0 Vicryl, 2-0 Vicryl, and a running subcuticular biosyn suture.

Once the surgery is complete, polar care is applied and the patient is discharged. The patient is given a hinged knee brace which is locked in extension and applied post-operatively.

The post-operative course includes wearing the hinged-knee brace in extension and remaining non-weight bearing on the transplant side until six weeks postoperatively. The patient is given aspirin (325 mg daily) for venous thromboembolism prophylaxis. At six weeks, the patient may progress to weight-bearing as tolerated with the help of formal physical therapy. At two weeks postoperatively, the patient may begin motion at the transplant site from 0 to 90 degrees of flexion to extension.

Although this technique has only been used by one attending surgeon in a limited case series, we believe there is applicability to any patient in need of a lateral meniscus transplant. In this case series, there have been favorable outcomes in all but one patient in which failure was due to non-compliance. Overall, the novel technique has offered decreased blood loss, decreased surgical time, and decreased intraoperative trauma when compared to other transplant techniques.