Background
Meniscal allograft transplantation is a suitable option to treat meniscal insufficiency. Restoring anatomical reconstruction is critical to recover the proper function of the meniscus in its chondroprotective and stability role. In this regard, anatomic positioning and fixation of the attachment sites are appreciated to be of critical importance. For medial meniscus transplant two different techniques have been describe: one two bone plugs are routinely utilized, one for each meniscal root is placed within bone tunnels in the anatomical footprint of the medial meniscus. An alternative technique is to remove the attachment of the meniscal root from bone graft and use suture only fixation through drill holes in the tibia. There is debate on whether the suture only fixation technique reproduces the same rigidity in fixation as compared to the bone plug technique.

Material and Methods

Study design: controlled laboratory study.

Specimen
Used fresh-frozen human cadaveric knee. All the specimens was evaluated using MRI and XR. Only cadaveric specimens without evidence of significant degenerative changes were included in the study.

Meniscal Sizing

Size- and side-matched medial meniscus allografts were obtained based on XR measurements (Pollard method). The mismatch between the meniscal allograft size and radiographic measurement did no exceed 1mm.

Results

Meniscectomy significantly increased mean contact pressure and the contact area was significant reduced in comparison with the native condition at 0, 30 and 60 degrees (p<0.0001). Although the peak contact pressure was higher in the meniscectomy group, it was not statistically significant. Suture only resulted in higher contact pressure and smaller contact area than bone plug fixation and native condition. The difference was statistically significant in 0 and 30 degrees of flexion. Regardless of technique, no significant differences were found between transplanted meniscus and native condition in 60 degrees of flexion.

The following graphs shows the mean contact area, mean contact pressure and mean peak pressure in each group in 0, 30 and 60 degrees of flexion.

Conclusion

This study demonstrated that meniscal allograft transplantation can restore load parameters close to the native condition. Bone-plug technique has demonstrated improved femorotibial contact pressure than isolate soft-tissue fixation. This study is unique in utilizing size-matched meniscal transplants and using the same transplant for bone plug and suture-only fixation, thus reducing confounding factors.