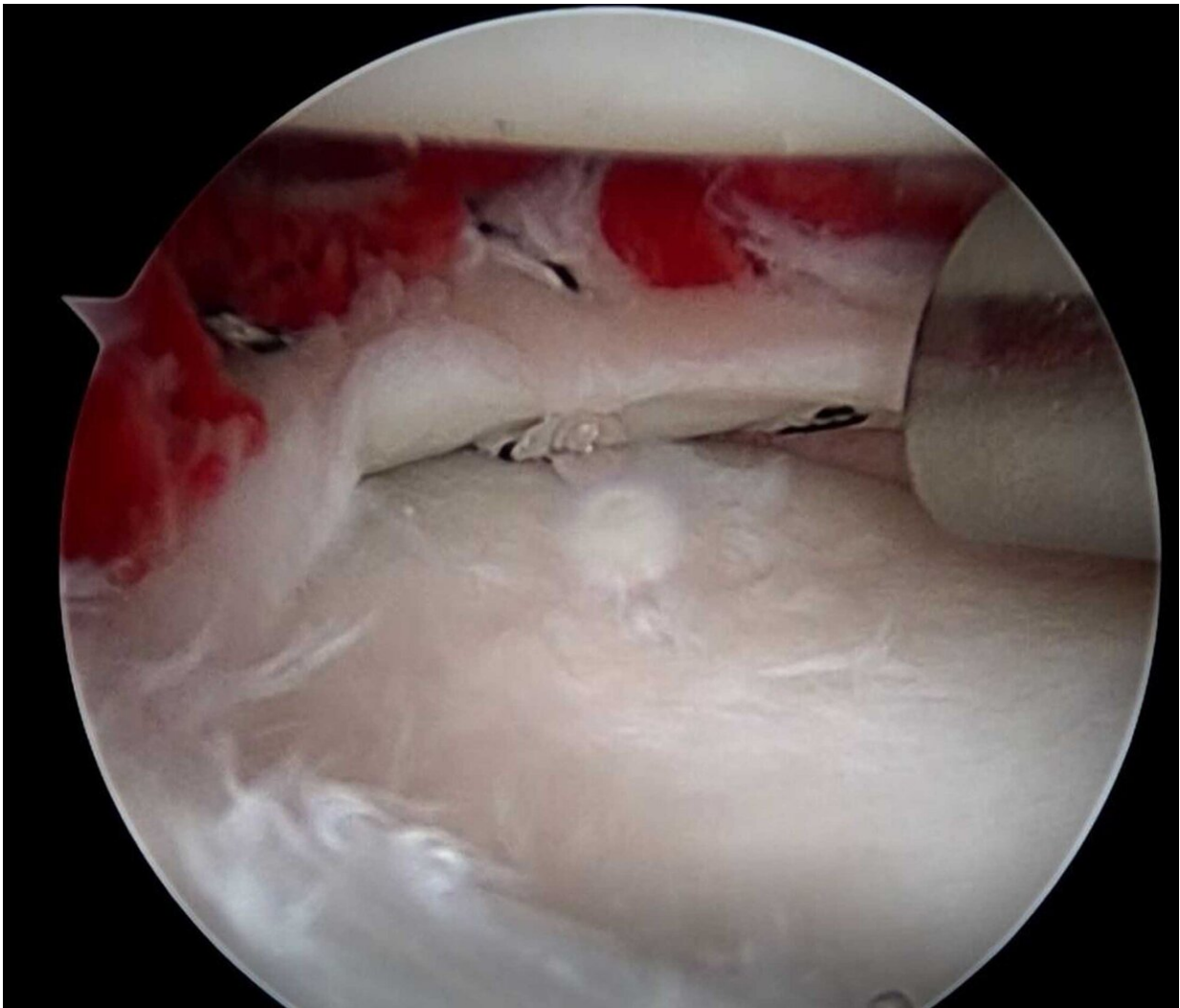


Bone marrow-derived fibrin clot is better source for meniscal repair

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Arthroscopic view after implanting the bone marrow derived fibrin clot and repairing the meniscus of the right knee. Credit: Osaka City University

While this isn't the fountain of youth, scientists may have improved healing in joints—even in areas that become weaker with age. The meniscus is a durable, yet flexible tissue found in joints like wrist and knees that helps them absorb shock during movement. Occasionally tears can occur in the meniscus due an awkward movement or structural weakness from old age. When people are young, there is plenty of blood flowing to this area allowing for quick healing, but with age, the meniscus receives less and less blood—with the inner most area becoming avascular. Tears in this area do not heal normally, often requiring surgery. Surgeons can draw fibrin, a protein involved in blood clotting, from peripheral blood (PB) or bone marrow aspirate (BMA), and implant a fibrin blood clot into the injured area to help with healing. However, little was known about the differential effectiveness of fibrin from the PB and BMA areas.

Scientists from the Graduate School of Medicine, Osaka City University, have evaluated the clinical results of a meniscal repair using BMA-derived [fibrin](#) clots and found that rates of clinical and anatomic failure, and re-tear were 10%, 6.7%, and 3.3% respectively—well below their PB counterpart. The results were published in *Arthroscopy: The Journal of Arthroscopic & Related Surgery*.

"There are various methods of meniscal repair that try to prevent re-tear" states Lecturer Yusuke Hashimoto, "but the re-tear rate still exceeds 20%." To see if BMA can bring this number down, the research team had to first understand the levels of growth factors involved in tissue repair found in BMA and then see the effects BMA-derived fibrin clots had when sutured into tissue during meniscal surgery.

Collecting [bone marrow](#) fluid and peripheral [blood](#) from five patients undergoing meniscal surgery, the team prepared fibrin clots for cytokine measurement. "Cytokine are proteins that stimulate the reparative process" states Professor Hiroaki Nakamura, "and through them, we are

able to gauge the levels of growth factors like bFGF, TGF β , and SDF-1." Cell count evaluations found that BMA was more abundant in these growth factors than PB.

Next, as a two-year follow-up post-surgery, they examined pre- and post-operative clinical results and the healing rate of meniscus in 30 cases of meniscal surgery that was combined with a BMA fibrin [clot](#). MRI results showed significant improvements in the condition of the meniscus compared to the preoperative results and X-ray evaluation showed no significant progression of knee deformity.

"PB clots have been widely reported as a material to enhance meniscal healing," states Hashimoto. However, with a reported 20% of meniscal repairs having reoperation at long-term follow up, "our method of introducing BMA-derived fibrin clots into the injured area may become a treatment for meniscus injuries that until now have not been curable."

More information: Yusuke Hashimoto et al, Biochemical Characteristics and Clinical Result of Bone Marrow–Derived Fibrin Clot for Repair of Isolated Meniscal Injury in the Avascular Zone, *Arthroscopy: The Journal of Arthroscopic & Related Surgery* (2021). [DOI: 10.1016/j.arthro.2021.05.026](https://doi.org/10.1016/j.arthro.2021.05.026)

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