

Bone graft substitute for tunnel filling improved ACL reconstruction outcomes

Patients who received silicate-substituted calcium phosphate had a shorter operative time vs autologous bone graft.

von Recum J, et al. *Arthroscopy*. 2020;doi:10.1016/j.arthro.2019.07.035.

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Use of silicate-substituted calcium phosphate bone substitute had equivalent knee laxity and clinical function outcomes compared with autologous bone graft 3 years after two-stage ACL reconstruction, according to published results.

Researchers randomly assigned 40 patients undergoing two-stage revision ACL reconstruction to receive either autologous iliac crest cancellous bone graft for tunnel grafting (control group; n=20) or silicate-substituted calcium phosphate in the form of sculptable microgranules (Actifuse MIS System, Baxter) as a bone graft substitute for tunnel augmentation (intervention group; n=20). Researchers assessed the patients' functional outcomes using KT-1000 arthrometry, the Tegner score, the Lysholm score and the IKDC score after a minimum follow-up period of 2 years.

At 3.4 years, researchers followed up with 37 patients for a follow-up rate of 92.5%. Results showed no side-to-side differences in the KT-1000 measurements between the bone graft group and the silicate-substituted calcium phosphate group.

Researchers noted there was a side-to-side difference greater than 5mm in 5% of patients in the silicate-substituted calcium phosphate group. From preoperative assessment to final follow-up, both groups had significant improvements and no differences in the Tegner score, Lysholm score and IKDC score, according to results.

Researchers found 22% and 11% of patients in the control and intervention group, respectively, experienced complications that required revision. However, researchers did not find any complications related to the use of silicate-substituted calcium phosphate bone substitute.

The control group had nearly double the average operative time compared with the intervention group, and the researchers noted more patients in the control group needed a second ACLW of the femoral tunnel, as well as additional cartilage meniscus procedures.

“Using the bone graft substitute [silicate-substituted calcium phosphate] Si-CaP is a technically less demanding procedure than using harvested cancellous bone from the iliac crest,” the authors wrote. “The bone substitute material is applied with a syringe, similarly to bone cement, which enables precise, easy and fast filling of the tunnels.” – by Casey Tingle

Disclosures: Schnetzke reports he received grants from Fa. Baxter and AO Foundation. Please see the study for all other authors’ relevant financial disclosures.

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PERSPECTIVE



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This paper was a well done study in 37 patients by our German colleagues demonstrating that two-stage revision ACL reconstructions performed with either an autologous iliac crest bone graft or silicate-substituted calcium phosphate to bone graft large or malpositioned ACL reconstruction tunnels resulted in good outcomes with a re-revision ACL reconstruction rate of 22% in the autograft patients and 11% in the allograft patients. Overall, this study adds further confirmation to the fact that one of the best treatment options for complicated revision ACL reconstructions is to bone graft large or a malpositioned tunnels, let the bone grafted area heal sufficiently for an average of 4 to 6 months and then ream virgin revision ACL reconstruction tunnels in the correct anatomic locations to improve clinical outcomes. Our own similar study on 88 patients found the failure rate for the 49 patient two-stage

ACL reconstruction group that received allograft bone graft was 6.1% and the patients had similar Lysholm scores to the current authors' findings.

Overall, we recommend that all patients who require a revision ACL reconstruction have a work-up that includes an evaluation of tunnel malposition or osteolysis, preferably with a CT scan. If the patient has significantly malpositioned tunnels, whereby a new correctly positioned tunnel would break into the malpositioned tunnel, or where the original correctly placed tunnel is greater than 12 mm to 14 mm in diameter, it is recommended these patients have a bone grafting, either with autograft, allograft or silicate-substituted calcium phosphate, as the first stage of a planned two-stage revision ACL.

Reference:

Mitchell JJ, et al. *Am J Sports Med.* 2017;doi:10.1177/0363546517698684.

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Disclosures: LaPrade reports he is a consultant for and receives royalties from Arthrex, Ossur and Smith & Nephew and is a consultant for Linvatec.