

Editorial Commentary: Synthetic ACL Grafts Are More Important Than Clinical Nonbelievers May Realize



Abstract: Artificial ACL grafts are structural ties, designed to resist tension, but not designed to undergo biologic ligamentization by the host. Strategically, an artificial ACL graft may be used as reinforcement to augment ACL repair, ACL autograft, ACL allograft, or tissue-engineered ACL. Most artificial ACL grafts have had poor reported outcomes. However, the Ligament Augmentation and Reconstruction System (LARS) artificial ACL graft shows positive clinical outcomes.

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Artificial ACL grafts have a very bad name in the United States and Canada, based on clinical experience, and we loosely quote AANA past president, and *Arthroscopy* journal Associate Editor emeritus, Donald Johnson, M.D., who we have heard on multiple occasions insist that Gortex anterior cruciate ligament grafts have a 100% failure rate and that we should remember the lessons of the past. However, recently and anecdotally, we saw a patient who claimed to have a Gortex graft who was doing well and felt stable, more than 20 years later, so maybe the failure rate is 99%, but who knows what graft, if any, that patient actually had implanted? The patient was a good historian, but could not provide a copy of the operative report. At any rate, a synthetic ACL is an artificial ACL graft, not a biologic, tissue-engineered graft, and an artificial graft is not expected to be replaced, is not expected to be remodeled, and is not expected to undergo a ligamentization process initiated by the host. In other words, a synthetic device for reconstruction of the ACL is a structural tie. Next, it is important to note that a tie, which is designed to resist tension, like a railroad tie, may be used on its own or in combination with a traditional ACL graft, or with ACL repair. All options are considered in the article “Synthetic devices for reconstructive surgery of the cruciate ligaments”¹ by Batty, Norsworthy, Lash, Wasiak, Richmond, and Feller, from Melbourne, Australia, and we concede that the second option, synthetic in combination with reconstruction or repair, seems more of biologics. We are keen on a tissue-engineered, biological, off-the-shelf, ACL

replacement,²⁻⁵ because we believe that ligamentization will result in the best durability and survivorship. We also understand that the most promising scaffold technologies for ACL tissue-engineering are weak, i.e., structurally not able to withstand tensile force at time zero, so in 2015, we believe that the future of ACL tissue engineering may necessitate a tie combined with a scaffold, in addition to other requirements. Therefore, if we think of a synthetic ACL as a structural tie, then from an academic standpoint, a synthetic ACL may be more relevant than clinical nonbelievers realize. More importantly, Batty, Norsworthy, Lash, Wasiak, Richmond, and Feller show that, while Gortex was a disaster as were all early synthetic ACL devices, by and large, the Ligament Augmentation and Reconstruction System (LARS, Arc-sur-Tille, France) has IKDC scores equal to bone–patellar tendon–bone autograft with minimum 2-year follow-up in one prospective study, and equal to BPTB or hamstring autograft, with a minimum 4-year follow-up in two retrospective, comparative studies.¹ LARS may not be perfect,⁶⁻⁷ but LARS clinical outcomes are (surprisingly) impressive.⁸⁻⁹

James H. Lubowitz, M.D.
Editor-in-Chief

References

1. Batty LM, Norsworthy CJ, Lash NJ, Wasiak J, Richmond AK, Feller JA. Synthetic devices for reconstructive surgery of the cruciate ligaments: A systematic review. *Arthroscopy* 2015;31:957-968.
2. Kon E, Roffi A, Filardo G, Tesei G, Marcacci M. Scaffold-based cartilage treatments: With or without cells? A systematic review of preclinical and clinical evidence. *Arthroscopy* 2015;31:767-775.