

Collagen-Platelet Rich Plasma Hydrogel Enhances Primary Repair of the Porcine Anterior Cruciate Ligament

Martha M. Murray,¹ Kurt P. Spindler,² Eduardo Abreu,¹ John A. Muller,³ Arthur Nedder,⁴ Mark Kelly,⁴ John Frino,¹ David Zurakowski,¹ Maria Valenza,⁵ Brian D. Snyder,^{1,3} Susan A. Connolly⁵

¹Department of Orthopaedic Surgery, Children's Hospital Boston, 300 Longwood Avenue, Harvard Medical School, Boston, Massachusetts 02115

²Vanderbilt Sports Medicine, Department of Orthopaedic Surgery and Rehabilitation Vanderbilt University, Nashville, Tennessee

³Orthopedic Biomechanics Laboratory, Beth Israel Deaconess Medical Center, Boston, Massachusetts

⁴Charles River Laboratories International, Inc., Wilmington, Massachusetts

⁵Department of Radiology, Children's Hospital Boston, 300 Longwood Avenue, Harvard Medical School Boston, Massachusetts

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ABSTRACT: The anterior cruciate ligament (ACL) fails to heal after suture repair. One hypothesis for this failure is the premature loss of the fibrin clot, or provisional scaffolding, between the two ligament ends in the joint environment. To test this hypothesis, a substitute provisional scaffold of collagen–platelet rich plasma (PRP) hydrogel was used to fill the ACL wound site at the time of suture repair and the structural properties of the healing ACLs evaluated 4 weeks after surgery. Bilateral ACL transections were performed in five 30-kg Yorkshire pigs and treated with suture repair. In each animal, one of the repairs was augmented with placement of a collagen–PRP hydrogel at the ACL transection site, while the contralateral knee had suture repair alone. In addition, six control knees with intact ACLs from three additional animals were used as a control group. No postoperative immobilization was used. After 4 weeks the animals underwent in vivo magnetic resonance imaging to assess the size of the healing ACL, followed by biomechanical testing to determine tensile properties. The supplementation of suture repair with a collagen–PRP hydrogel resulted in significant improvements in load at yield, maximum load, and linear stiffness at 4 weeks. We conclude that use of a stabilized provisional scaffold, such as a collagen–PRP hydrogel, to supplement primary repair of the ACL can result in improved biomechanical properties at an early time point. Further studies to determine the long-term effect of primary repair enhancement are needed. © 2006 Orthopaedic Research Society. Published by Wiley Periodicals, Inc. *J Orthop Res* 25:81–91, 2007

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