Full Thickness Anterior Cruciate Ligament Repair with Autologous Stem Cells

Marc Raj DO, Jameel Khan MD, David Suarez MD, Marko Bodor MD

CASE DESCRIPTION:
A 48 year old former professional cyclist presented for evaluation and treatment of a complete tear of the left anterior cruciate ligament (ACL) incurred 6 weeks prior while downhill skiing. He had anterior tibial translational instability and severe impairment of functional mobility. He was offered an ACL reconstruction but desired a less invasive approach.

SETTING
Outpatient Private Practice Clinic

RESULTS
MRI showed a complete proximal third mid-substance ACL tear and partial PCL tear (Fig 1.) Bone marrow aspirate concentrate (BMAC) was obtained from the posterior iliac crests, 3 x 10^6 total nucleated cells/ml x 5 ml. Using C5-1 MHz curvilinear ultrasound visualization in the short axis (Figs. 2 & 3), BMAC was injected using an in-plane approach into and immediately adjacent to the proximal and distal ACL. He wore a functional knee orthosis for 6 weeks and started physical therapy at 4 weeks. He was able to do a single left leg squat at 6 weeks.

At 6 months he reported no pain and return to in-line sports. There was no anterior tibial laxity. MRI at 6 and 12 months showed complete healing of the anteromedial but not posterolateral bundle of the ACL (Figs 4-5).

DISCUSSION
The standard approach for ACL injuries in high-performing athletes is surgical reconstruction using autograft or allograft. Biologic treatments are being investigated as alternatives.1,2 This case demonstrates the potential for complete healing of at least one of the bundles of the ACL. In the future, we hope to do a randomized controlled trial of BMAC and rehabilitation versus rehabilitation only for ACL disruptions.

CONCLUSION
Ultrasound-guided BMAC injection may potentiate healing of complete rupture of the ACL in which the fibers are aligned and within 1 cm of each other.

REFERENCES:

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