

THE JOURNAL OF BONE & JOINT SURGERY

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J Bone Joint Surg Am. 87:1890-, 2005. doi:10.2106/JBJS.8708.ebo3

This information is current as of August 29, 2005

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Publisher Information

The Journal of Bone and Joint Surgery
20 Pickering Street, Needham, MA 02492-3157
www.jbjs.org

EVIDENCE-BASED ORTHOPAEDICS

FUNCTIONAL BRACING WAS NO BETTER THAN NONBRACING
AFTER ANTERIOR CRUCIATE LIGAMENT REPAIR

McDEVITT ER, TAYLOR DC, MILLER MD, GERBER JP, ZIEMKE G, HINKIN D, UHORCHAK JM, ARCIERO RA,
ST. PIERRE P. FUNCTIONAL BRACING AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION:
A PROSPECTIVE, RANDOMIZED, MULTICENTER STUDY. AM J SPORTS MED. 2004 DEC;32:1887-92.

Question: Is functional bracing more effective than nonbracing after anterior cruciate ligament (ACL) reconstruction in patients with a high level of physical activity?

Design: Randomized (allocation not concealed), unblinded, controlled trial with a mean 29-month follow-up.

Setting: 3 United States military academies.

Patients: 100 cadets and midshipmen with ACL injury, no previous knee injury to the affected knee, no significant chondral injury, no grade-III posterior cruciate or collateral ligament injuries, no serious meniscal injury, surgical reconstruction within 8 weeks of injury, and available for follow-up for ≥ 2 years.

Intervention: Patients were allocated to wear (n = 47) or not wear a brace (n = 48). The braced group wore a DonJoy IROM brace (dj Orthopaedics, Vista, California) locked in extension for 3 weeks after surgery (removed 2 to 3 times daily for physical therapy) and adjusted to allow for increasing range of motion during the 3 to 6 weeks after surgery. At 6 weeks, patients wore an off-the-shelf functional knee brace daily for 6 months and for rigorous activities for ≥ 1 year. Patients in the nonbrace group wore a knee immobilizer for 3 weeks after surgery (removed for physical therapy). Postoperative rehabilitation for all patients included range-of-motion exercises, cycling on a stationary bicycle, pool exercises, strengthening exercises, and functional training.

Main outcome measures: Measures of stability, function, and strength of the affected knee (range of motion, prone heel height difference, isokinetic testing, single-legged hop for distance, Lysholm score, KT-1000 arthrometer testing, International Knee Documentation Committee score, Lachman test, pivot shift test, and knee radiographs). The study was powered to detect a 20% difference in Lysholm score.

Main results: Patients who were braced and those who were not braced did not differ for any outcomes (Table). Knee radiographs were normal in both groups of patients. One patient in the nonbraced group could not return to the same level of sport activity. Two braced and 3 nonbraced patients had re-injury to the affected knee.

Conclusion: In patients with a high level of physical activity, the outcomes with regard to stability, function, and strength were not significantly different between patients who did or did not wear a brace after anterior cruciate ligament reconstruction.

Source of funding: Not stated.

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doi:10.2106/JBJS.8708.ebo3

Bracing vs nonbracing after anterior cruciate ligament repair at mean 29 months*

Outcomes	Braced	Nonbraced
Range of motion (proportion with loss of knee extension)	4.3%	2.1%
Prone heel height difference (mean)	2.3 cm	2.9 cm
Isokinetic testing (proportion with knee extension concentric peak torque $\geq 90\%$ of opposite knee)	90%	90%
Single-legged hop test (mean)	96%	95%
Lysholm score (mean)	94	93
KT-1000 arthrometer (maximum side to side differences [range])	-4 to 5 mm	0 to 5 mm
IKDC (proportion normal or nearly normal)	98%	98%
Lachman test (range)	0 to 2+	0 to 2+
Pivot shift test (range)	0 to 2+	0 to 2+

*IKDC = International Knee Documentation Committee. Differences were not significant.

Commentary

McDevitt and colleagues presented a well-done randomized trial of brace use following ACL reconstruction with the central third patellar tendon in cadets and midshipmen from the United States Army, Navy, and Air Force academies. The nonbraced group wore a knee immobilizer for 3 weeks (except for 2 to 3 times each day during physical therapy), while the braced group wore the brace for an additional 3 weeks, with the brace adjusted to allow range of motion, followed by a functional brace. The investigators elected to use a knee immobilizer for the first 3 weeks in the group that was not treated with a functional brace because they believed that an immobilizer would prevent loss of knee extension.

It is worth noting that these patients were extremely active and were required to participate in sports and military activities, including aggressive jumping, cutting, and pivoting. While many of the patients in the braced group preferred to use the brace because it

made them feel more confident and gave them a sense of security, others believed that it negatively affected sports performance, and 8 of 38 questionnaire respondents (21%) stopped using the brace before the end of the follow-up period.

As always with prospective ACL research, sample size sufficient to detect a difference in complication or re-injury rates is difficult to achieve. However, the levels of function and knee stability following ACL reconstruction in a very active population were found to be similar with and without the use of a functional brace. This finding is consistent with previous research and should be considered when caring for patients after ACL reconstruction.

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