Global Variations in Surgical Techniques for Primary Anterior Cruciate Ligament Reconstruction at Minimum 2-Year Follow-up: A Systematic Review of Randomized Clinical Trials

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INTRODUCTION: Regional differences in primary anterior cruciate ligament (ACL) reconstruction (ACLR) remain largely unknown. The purpose of this investigation was to systematically review the literature examining Level I and II studies to identify global differences in surgical techniques associated with primary ACLR.

METHODS: A literature search was conducted following 2020 Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines using keywords and Boolean phrases in Embase, Cochrane, and PubMed. Inclusion criteria: Level I and II human studies reporting on primary ACLR with minimum 2-year follow-up. Studies were categorized into four regions (Europe, Asia, North/South America, Africa) while patient demographics, surgical details, and graft failure/revision rates were compared between regions.

RESULTS: In the 143 studies (n=11,127 patients) identified, mean patient age (28.8 years) and follow-up (53.8 months) did not differ by region. Hamstrings tendon (HT) autograft was utilized more often in Asia, while bone – patellar-tendon – bone (BPTB) and quadriceps tendon (QT) autografts were utilized more often in Europe and North/South America. Suspensory fixation was the most common femoral fixation method (44%, n=4,774/10,748 patients), especially in Asia and with HT autografts, while bioabsorbable screws represented the most common tibial fixation method (44%, n=4,643/10,580 patients). Graft failure (4.8%, n=410/8,583) was reported less often in Asia than North/South America. Revision surgery (3.7%, n=228/6,238) was reported less often in Asia than Europe and North/South America.

DISCUSSION AND CONCLUSION: Primary ACLR utilizing BPTB and QT autograft was more common in Europe and North/South America, while HT autograft was more common in Asia. Suspensory fixation was the most common femoral fixation (44%), while bioabsorbable screw was the most common tibial fixation (44%). Reported graft failure was higher in North/South America, while revision surgery was higher in North/South America and Europe.

Country	Prevalence	Proportion
USA	16	11.2%
UK	14	9.8%
Canada	13	9.1%
Finland	11	7.7%
Japan	11	7.7%
Italy	10	7.0%
Australia	10	7.0%
South Korea	8	5.6%
Germany	7	4.9%
Canada	6	4.2%
Norway	5	3.5%
India	4	2.8%
Spain	3	2.1%
Greece	3	2.1%
France	3	2.1%
Turkey	2	1.4%
Denmark	2	1.4%
Iran	2	1.4%
Kuwait	2	1.4%
Poland	2	1.4%
Taiwan	2	1.4%
Austria	1	0.7%
Egypt	1	0.7%
Brazil	1	0.7%
Czech Republic	1	0.7%
Serbia	1	0.7%
Slovenia	1	0.7%
South Africa	1	0.7%
Switzerland	1	0.7%
Overall	**143**	**100.0%**

Figure 2b. Frequency of Publications by Country
Legend: prevalence, number of studies by country; proportion, percentage of total studies published by country; USA, United States of America