Role of Age on Failure Rates of Anterior Cruciate Ligament (ACL) Primary Repair, Dynamic Intraligamentary Stabilization, and Bridge Enhanced ACL Restoration in Comparison to ACL Reconstruction: A Systematic Review and Meta-Analysis

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INTRODUCTION:
Age has been shown to be an important risk factor to be considered for anterior cruciate ligament (ACL) preservation. However, a thorough systematic analysis differentiating available techniques and analyzing outcomes by different age groups is lacking.
METHODS:
A systematic literature review was performed according to the PRISMA guidelines in PubMed, Embase, and the Cochrane Library. Patients treated with Anterior Cruciate Ligament Primary Repair (ACLPR), Dynamic Intraligamentary Stabilization (DIS), and Bridge Enhanced ACL Restoration (BEAR) were compared to ACLR. Additional access to data of 11 raw data sets was granted by the respective authors, which made it possible to evaluate age-differentiated failure rates (≤21 and >21 years of age) at minimum of 2- and 5-year follow up (FU). Methodological study quality was assessed using the Methodological Index for Non-Randomized Studies (MINORS).
RESULTS:
A total of 23 studies (range of mean follow up, 2.0 – 6.1 years) were included. The MINORS criteria score indicated high risk of bias for most ACLPR studies, whereas a trend toward a higher level of evidence research was shown for BEAR and DIS studies. Age-differentiated failure analysis, available for ACLR, ACLPR and DIS, revealed significantly more failure in patients ≤21 years of age at 2-year FU (ACLPR-SA, 29%; DIS, 20%) compared to ACLR (6%). At 5-year FU similar outcomes for ACLR (25%), ACLPR-SA (25%), and DIS (22%) were presented. Contrary, patients >21 years of age showed low failure rates at 2-year FU for all techniques (ACLR 0%, ACLPR-SA 4%, DIS 0%) and increased rates at 5-year FU (ACLR 6%, ACLPR-SA 12%, DIS 9%).
DISCUSSION AND CONCLUSION: Age-differentiated failure analysis reveals significantly increased failure rates in patients ≤21 years of age at 2- and 5-year FU. In contrast, patients >21 years of age showed high survival at 2-year and 5-year FU.

Figure 1

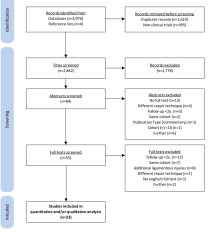

Figure 2

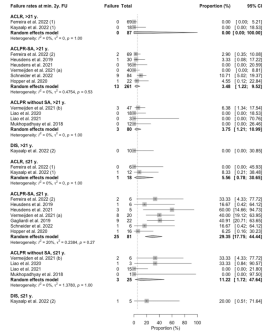

Figure 3