International Clinical and Medical Case Reports Journal
Review Article (ISSN: 2832-5788)

Outcomes of Arthroscopic Hip Labral Reconstruction Using Allograft Versus Autograft Tissue for Chronic Labral Tears: A Systematic Review

Ryan Marra, OMS-2*, Matthew Marling, OMS-2, Justin Chen, OMS-2, David Handron, OMS-2, Andrew Seyler, OMS-2, Timothy Adams, OMS-2 and Mark Sangimino, MD

Duquesne University Nasuti College of Osteopathic Medicine, Pittsburgh, PA, USA

Citation: *Ryan Marra, Matthew Marling, Justin Chen, David Handron,; Andrew Seyler, Timothy Adams, Mark Sangimino. Outcomes of Arthroscopic Hip Labral Reconstruction Using Allograft Versus Autograft Tissue for Chronic Labral Tears: A Systematic Review. Int Clinc Med Case Rep Jour. 2026;5(6):1-22.*

Received Date: 08 June 2026**; Accepted Date:** 11 June 2026**; Published Date:** 15 June 2026

***Corresponding author:** Ryan Marra, Duquesne University Nasuti College of Osteopathic Medicine, Pittsburgh, PA, USA

ABSTRACT

Introduction: Chronic acetabular labral tears are a significant source of hip pain, mechanical dysfunction, and progressive joint degeneration in young and active patients. Arthroscopic labral reconstruction has emerged as an effective hip preservation strategy for irreparable labral pathology; however, optimal graft selection remains controversial. This systematic review evaluated clinical outcomes, survivorship, and complications following arthroscopic hip labral reconstruction using allograft versus autograft tissue in patients with chronic labral tears.

Methods: A systematic review was performed according to PRISMA guidelines using PubMed/MEDLINE, Embase, Scopus, and Cochrane Library databases. Studies published after 2001 evaluating arthroscopic labral reconstruction with either autograft or allograft tissue were included. Eligible investigations reported at least one quantifiable postoperative outcome, including patient-reported outcome measures (PROMs), revision surgery, complications, graft failure, or conversion to total hip arthroplasty (THA). Data extraction and study screening were independently performed by multiple reviewers. Owing to heterogeneity in graft types, surgical techniques, and outcome reporting, qualitative synthesis was primarily conducted.

Results: Thirteen studies encompassing 614 patients met inclusion criteria. The predominant indication for reconstruction was femoroacetabular impingement–associated irreparable labral pathology. Common autografts included iliotibial band, hamstring tendon, rectus femoris tendon, and capsular tissue, whereas allografts included hamstring tendon, fascia lata, tibialis anterior tendon, peroneus longus tendon, and meniscal grafts. Both graft types demonstrated substantial postoperative improvement in validated PROMs, including modified Harris Hip Score, Hip Outcome Score, and iHOT measures. Comparative studies consistently demonstrated no

significant differences in functional outcomes between allograft and autograft reconstruction. Patient satisfaction was higher with allograft reconstruction in one comparative cohort. Overall revision and THA conversion rates remained low at mid-term follow-up, although one large comparative study demonstrated a higher revision rate in allograft patients (23.6% vs 7.3%). Complication rates were low across all studies, with no reported graft rejection or disease transmission. Autograft reconstruction introduced potential donor-site morbidity, while local capsular autograft techniques appeared to mitigate harvest-related complications.

Discussion: Arthroscopic hip labral reconstruction provides reliable improvement in pain, hip function, and joint preservation in patients with chronic irreparable labral tears regardless of graft source. Current evidence demonstrates comparable clinical outcomes between autograft and allograft reconstruction, suggesting that restoration of hip biomechanics and correction of underlying pathology may be more important determinants of success than graft selection alone. Although allograft use may reduce donor-site morbidity and operative burden, potential differences in revision risk warrant further investigation. High-quality prospective comparative studies with long-term follow-up are needed to better define graft-specific durability and optimize patient selection.

Keywords: Labral reconstruction; Arthroscopic hip; Allograft; Chronic hip

INTRODUCTION

Chronic hip labral tears are a well-recognized cause of hip pain, mechanical symptoms, and functional limitation, particularly in young and athletic populations. The acetabular labrum plays a critical role in maintaining hip joint stability by preserving the suction seal, enhancing joint lubrication, and distributing contact stresses across the articular cartilage [1]. Disruption of labral integrity alters hip biomechanics and has been associated with increased cartilage degeneration and progression toward osteoarthritis[2]. When labral tissue becomes irreparable due to chronic degeneration, calcification, hypoplasia, or prior failed repair, arthroscopic labral reconstruction has emerged as an effective treatment option aimed at restoring native hip function and joint homeostasis[3].

Arthroscopic labral reconstruction has demonstrated favorable clinical outcomes, including improvements in pain, function, and patient-reported outcome measures, when compared with labral debridement alone[4]. Multiple studies have shown that restoration of the labral suction seal through reconstruction improves joint stability and may reduce the risk of early degenerative changes[5]. Indications for reconstruction have expanded as surgical techniques and graft options have evolved, allowing surgeons to address complex labral pathology in both primary and revision settings[6]. As a result, labral reconstruction has become an increasingly utilized procedure within hip preservation surgery[7].

Labral reconstruction may be performed using either autograft or allograft tissue, with commonly described grafts including iliotibial band, hamstring tendon, and fascia lata[8]. Autograft reconstruction offers potential biologic advantages related to graft incorporation but introduces concerns regarding donor-site morbidity and increased operative time[9]. Allograft reconstruction avoids donor-site complications and provides consistent graft sizing but raises considerations related to cost, availability, and biologic integration[10]. Although both graft sources have demonstrated successful outcomes, comparative data evaluating differences in functional outcomes, complication rates, revision surgery, and conversion to total hip arthroplasty remain limited and

heterogeneous[11]. Therefore, the purpose of this systematic review is to compare outcome rates following arthroscopic hip labral reconstruction using allograft versus autograft tissue in patients with chronic labral tears.

METHODS

Literature Search

A systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to evaluate outcomes following arthroscopic hip labral reconstruction using autograft versus allograft tissue in patients with chronic labral tears. A comprehensive search of PubMed/MEDLINE, Embase, Scopus, and the Cochrane Library databases was performed. The search strategy incorporated combinations of the following keywords and Boolean operators: "hip labrum," "acetabular labrum," "chronic labral tear," "labral reconstruction," "arthroscopic labral reconstruction," "hip arthroscopy," "allograft," "autograft," "iliotibial band," "fascia lata," "hamstring tendon," "gracilis," "semitendinosus," "hip preservation," "revision hip arthroscopy," and "total hip arthroplasty." Searches were limited to studies published in English.

Reference lists of all included studies and relevant review articles were manually screened to identify additional investigations not captured during the initial database search. This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. A predefined protocol outlining the research question, eligibility criteria, outcomes of interest, and analytic approach was established prior to study initiation. A completed study selection flow chart identifying new studies via databases and registers was prepared (Figure 1).

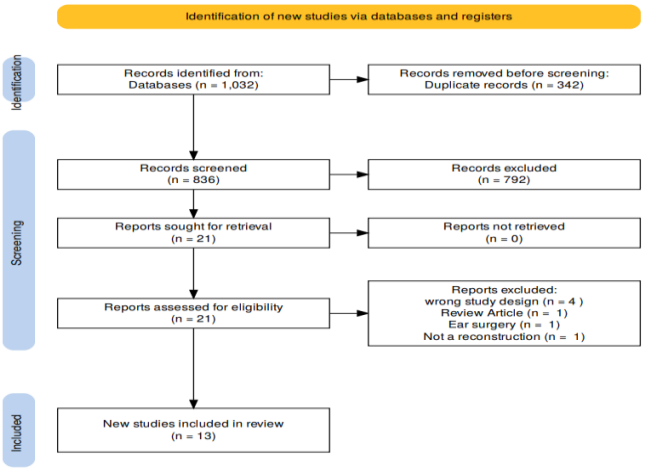

Figure 1: Identification of New Studies via Databases and Registers

Study Selection

Studies were excluded if they were published in a language other than English or before the year 2001. Titles and abstracts were independently screened by four reviewers to determine relevance. Full-text review was subsequently performed using predefined inclusion and exclusion criteria. Eligible studies included randomized controlled trials, prospective cohort studies, and retrospective cohort studies evaluating patients undergoing

arthroscopic labral reconstruction for chronic acetabular labral tears. Studies were required to clearly specify graft type and to report clinical outcomes separately for each graft category when both were included. Eligible investigations were required to report at least one quantifiable outcome, including patient-reported outcome measures, return to sport, complication rates, revision hip arthroscopy, graft failure, or conversion to total hip arthroplasty. A minimum follow-up duration of 6 months was required to ensure adequate assessment of mid-term outcomes.

Studies were excluded if they evaluated labral repair or debridement without reconstruction or included acute labral injuries without chronic pathology. Case reports, review articles, expert opinion pieces, technical notes without outcome data, cadaveric investigations, and biomechanical-only studies were excluded. When multiple studies from the same institution reported overlapping patient populations, the study with the most comprehensive dataset or longest follow-up was included to minimize duplication. For each included study, data were extracted regarding study design, sample size, mean age, patient injury etiologies, graft(s) used, and significant clinical outcomes. The extracted data can be seen in **Table 1**.

Author Last Name (year)	Design	Sample Size (n)	Mean Age	Patient etiologies	Graft(s) Used	Significant Clinical Outcomes
Maldonado et al (2019)	Retrospective Cohort	29	N/a	Patients underwent primary hip arthroscopic labral reconstruction due to irreparable labral tears identified during surgery, typically in the setting of femoroacetabular impingement or labral insufficiency that could not be addressed with primary repair. Inclusion criteria specified no prior ipsilateral hip surgery, no	Allograft Group: Hamstring tendon allograft Autograft Group: Hamstring tendon autograft harvested from the patient	At minimum 2-year follow-up, both the autograft and allograft groups demonstrated significant improvements in patient-reported outcomes, including the modified Harris Hip Score (mHHS), Non-Arthritic Hip Score (NAHS), and Hip Outcome Score-Sports Specific Subscale (HOS-SSS), with no statistically significant differences between groups at baseline or follow-up. Pain scores (VAS) also improved in both groups. Patient satisfaction was higher in the allograft group (mean 8.8 vs 6.6, $P = .03$). Rates of revision arthroscopy and conversion to total hip arthroplasty were not

				significant preoperative osteoarthritis (Tönnis grade ≤1), and no workers' compensation status. The decision to proceed with reconstruction using either a hamstring autograft or allograft was based on surgeon preference and graft availability.		significantly different between groups. Overall, this small series suggests that both hamstring allograft and autograft reconstructions yield comparable functional improvements, though allograft may be associated with higher patient satisfaction and avoids donor-site morbidity.
Lee et al (2022)	Retrospective Cohort	11	32 ± 5.9 years	Femoroacetabular impingement (FAI) with irreparable acetabular labral tears or poor labral tissue quality after failed conservative treatment	Peroneus longus tendon allograft	Mean VAS pain score improved from 4.91 ± 2.17 preoperatively to 3.87 ± 2.05 postoperatively (not statistically significant, *P* = .26). No postoperative complications, graft failures, or infections reported during follow-up (mean 227 days).
Geyer et al (2013)	Retrospective Case Series	75	38.5 years	Labral deficiency due to femoroacetabular impingement, dysplasia, trauma, prior labral debridement or repair, capsulolabral adhesions	Iliotibial band autograft (tubularized ITB graft)	mHHS improved from 58.9 → 83 (p=0.0001); HOS-ADL and HOS-Sport significantly improved; median patient satisfaction = 8/10; 19/76 hips progressed to THA at mean 28 months; survivorship 80% at 3 years, 77% at 4 years; mean survivorship 59.1 months
Deng et al. (2021)	Retrospective Cohort	21	46.7 ± 5.7	Patients included in the study had	Local articular hip capsule	At a mean follow-up of 25.4 months, all functional outcome

	Study		years	labral pathology that was not amenable to simple repair, including unrepairable or severely degenerative labral tears and labral dysplasia with a width less than 5 mm. Many patients also had associated femoroacetabular impingement, including cam, pincer, or mixed types, and several exhibited mild cartilage lesions	autograft harvested arthroscopically and fixed to the acetabular rim with bio-absorbable suture anchors to reconstruct the deficient labrum.	measures improved significantly. The modified Harris Hip Score increased from 61.3 ± 5.5 preoperatively to 87.5 ± 4.2, the Hip Outcome Score improved from 52.5 ± 5.1 to 87.3 ± 3.8, and the HOS-ADL subscore rose from 48.5 ± 5.8% to 75.2 ± 3.5%. No major complications occurred, and no patients required revision surgery. Postoperative MRI demonstrated healing of all reconstructed labra without anchor loosening or labral avulsion.
Cook et al. (2024)	Retrospective Cohort Study	27	30.7 ± 9.2 years	Patients in this study underwent open acetabular labrum reconstruction for symptomatic labral insufficiency that was irreparable, commonly associated with conditions such as femoroacetabular impingement (FAI), developmental dysplasia of the hip (DDH), and	Fresh-frozen tendon allograft (TAT) from anterior tibialis tendon. Fresh meniscus allograft transplant (MAT) prepared from medial/lateral meniscus trimmed to the size and shape of the labral defect.	88.9% of patients avoided revision surgery or conversion to total hip arthroplasty, with 80% success in the tendon allograft group and 90% in the meniscus allograft group. Patients in the meniscus cohort showed significant improvements in pain, hip function, and physical performance scores, with MRI confirming good graft integration. Improvements in the tendon cohort were less sustained, and MRI showed some graft heterogeneity, but no failures were directly attributed to the labrum

				other hip joint pathology leading to pain and dysfunction.		reconstruction.
Abdelaal et al (2023)	Comparative Cohort Study	48.	31.3 ± 13.6	Both groups underwent surgery for symptomatic femoroacetabular impingement with irreparable or severe acetabular labral pathology not amenable to simple repair or refixation.	**Reconstruction group:** Semitendinosus tendon allograft for labral reconstruction. **Refixation group:** Standard labral repair with sutures/anchors without graft. Both were performed via a mini-open anterior approach as part of femoroacetabular impingement correction.	Both groups experienced significant improvements in functional outcomes, including increases in modified Harris Hip Scores and SF-36 physical scores at follow-up. There was no statistically significant difference in conversion to total hip arthroplasty between groups (25% recon vs 8.3% refix; $P > 0.05$), but time to conversion was longer in the reconstruction group. Overall, mini-open labral reconstruction with allograft showed comparable functional outcomes and longer survivorship compared with labral refixation at two-year minimum follow-up.
Carriera et al (2018	Prospective Cohort Study	34	43.7 ± 9.2 years	Patients in this study underwent arthroscopic hip surgery for persistent hip pain refractory to conservative treatment with imaging-confirmed femoroacetabular impingement and	Fascia lata allograft prepared and tubularized, then inserted and fixated arthroscopically using a shuttle technique to reconstruct the deficient segment of the	At a minimum of two-year follow-up, most patients showed significant improvements in functional outcomes. The mean modified Harris Hip Score increased from 64.0 preoperatively to 84.6 postoperatively, SF-12 Physical from 38.9 to 49.0, SF-12 Mental from 49.5 to 55.6, iHOT-12 from 36.4 to 68.1, HOS-ADL from 62.6 to

				labral tearing that was judged irreparable at arthroscopy, including complex tears, intrasubstance degeneration, hypoplastic labral tissue, segmental deficiency from prior surgery, ossification, or other conditions leading to labral insufficiency requiring reconstruction.	acetabular labrum.	81.6, and HOS-Sports from 32.9 to 65.7 (*all P* < 0.01). 12.9% converted to total hip arthroplasty at an average of approximately 28 months after surgery. No major adverse events were reported.
Rathi et al (2017)	Retrospective Case Series	10	35 years	Patients underwent arthroscopic labral reconstruction for symptomatic acetabular labral tears that were judged irreparable at arthroscopy, typically in the context of femoroacetabular impingement and labral insufficiency with associated acetabular cartilage changes; all patients had clinical pain and functional	A fascia lata tendon allograft was used to reconstruct the acetabular labrum arthroscopically, with fixation to the acetabular rim using suture anchors.	At a mean follow-up of 22.9 months (minimum 12 months), all patients reported subjective improvements in pain and function. The mean modified Harris Hip Score (mHHS) improved significantly from 58 (55–60) preoperatively to 95 (91–98) postoperatively, with an average patient satisfaction score of 9.5 out of 10. There was no radiological progression of arthritis and no patients required revision surgery including total hip arthroplasty in this cohort.

				limitation refractory to conservative treatment before surgery.		
Kucharik et al (2019)	Retrospective Case Series	94	39 years	Patients underwent arthroscopic capsular autograft labral reconstruction predominantly for irreparable or degenerated acetabular labral tears identified intraoperatively, including labra with hypoplastic tissue (<5 mm width), complex tearing, or frank degeneration that could not be repaired by standard techniques; all patients presented with hip pain and functional limitations that were refractory to conservative management and were confirmed by preoperative and intraoperative assessment.	arthroscopic capsular autograft tissue harvested from the hip capsule to reconstruct the deficient labrum.	At mean final follow-up of 28.2 months, significant improvements were observed in patient-reported outcomes. Mean *International Hip Outcome Tool-33* (iHOT-33) scores improved from 40.4 preoperatively to 76.6 at final follow-up ($P < .001$), and a majority of patients exceeded thresholds for the minimal clinically important difference (MCID), patient-acceptable symptomatic state (PASS), and substantial clinical benefit (SCB) at 2 years. These results suggest that capsular autograft labral reconstruction yields favorable midterm functional outcomes in patients with irreparable labral pathology.
Locks et al	Retrospectiv	22	35	patients had focal	Capsular tissue	t an average follow-up of

(2017)	e Case Series		years	acetabular labral defects measuring less than 1 cm that were not amenable to repair. These segmental deficiencies were identified during arthroscopy in the setting of hip pain and dysfunction, typically associated with femoroacetabular impingement pathology, and necessitated reconstruction using locally available tissue (capsular or nearby tendon) to restore labral continuity and the suction seal mechanism of the hip joint.	autograft harvested arthroscopically Indirect head of rectus femoris tendon segment preserved and used as a local graft Both grafts were fixed with suture anchors to reconstruct segmental labral defects arthroscopically.	62 months (range 9–120 months), patients demonstrated statistically significant improvements in hip function. The *modified Harris Hip Score (mHHS)* increased from 66 preoperatively to 89 postoperatively, the *Hip Outcome Score – Activities of Daily Living (HOS-ADL)* improved from 73 to 89, and the *Hip Outcome Score – Sports Scale (HOS-SS)* improved from 52 to 79 ($P < 0.05$ for all). No patients required revision hip arthroscopy or conversion to total hip arthroplasty, and the median patient satisfaction score was 9 out of 10.
Rathi et al (2018)	Retrospectiv e Case Series	7	35 years	Patients underwent arthroscopic labral reconstruction due to irreparable labral tears identified intraoperatively in the setting of hip pain and dysfunction that was not amenable	Patients were treated with arthroscopic reconstruction of the acetabular labrum using an autograft from the indirect head of the rectus femoris tendon, which was harvested,	At a mean follow-up of 15 months (range 12–18 months), all patients reported subjective improvements in pain and function. The mean modified Harris Hip Score (mHHS) significantly improved from 56 (range 54–60) preoperatively to 93 (range 90–97) at latest follow-up, with an average postoperative patient satisfaction score of 9.1 out of

				to repair. Most patients also exhibited concomitant cartilage changes on the acetabular side that were addressed intraoperatively, and the reconstruction was indicated in a young population without significant osteoarthritis.	prepared, and fixed to the acetabular rim using suture anchors in a standard arthroscopic technique.	10. No patients showed radiological progression of arthritis, and none required revision surgery or conversion to total hip replacement during the follow-up period.
Kocaoglu et al (2022)	Retrospective Comparative Cohort	42	37.5 2years	Patients in this study presented with symptomatic irreparable segmental labral tears of the hip that were identified during arthroscopy in the setting of femoroacetabular impingement. These defects were treated with segmental labral reconstruction because the native labral tissue was insufficient for repair alone, and the goal was to restore the functional suction seal of the	Autograft Group: Iliotibial band autologous tissue prepared and fixed arthroscopically. Allograft Group: Tibialis anterior tendon allograft prepared and fixed arthroscopically. All reconstructions were performed arthroscopically with suture anchors to secure the graft to the acetabular rim.	At a minimum 2-year follow-up, both graft groups exhibited significant improvements across all patient-reported outcome measures, including modified Harris Hip Score (mHHS), Non-Arthritic Hip Score (NAHS), and Hip Outcome Score–Sports Specific Subscale (HOS-SS). However, no statistically significant differences were found between the autograft and allograft groups postoperatively in terms of pain (visual analog scale), functional hip scores, or overall clinical improvement, indicating that both graft choices provided comparable outcomes in segmental labral reconstruction at mid-term follow-up.

				acetabular labrum and improve hip pain and dysfunction.		
Cooper et al (2021)	Retrospective Comparative Cohort	205	N/a	Patients included in the study underwent arthroscopic labral reconstruction or augmentation due to deficient or irreparable acetabular labral tissue identified intraoperatively, typically in the setting of femoroacetabular impingement or labral insufficiency that could not be managed by repair alone. The surgical intent was to restore labral function and improve hip pain and dysfunction.	Iliotibial band autograft (ITB autograft) harvested from the patient Iliotibial band allograft (ITB allograft) sourced from donor tissue	At a minimum 2-year follow-up, both autograft and allograft groups demonstrated significant improvements in patient-reported outcome measures, such as Hip Outcome Score–Activities of Daily Living and Sports-Specific Subscale, with no significant differences in postoperative scores or patient satisfaction between groups. However, the allograft group had a significantly higher revision surgery rate (23.6%) compared with the autograft group (7.3%), and multivariable analysis showed the odds of revision were significantly higher for allograft patients even after adjusting for sex, type of procedure, and prior surgery. There were no significant differences in conversion to total hip arthroplasty between groups.

Table 1: Overview of Primary Operative Study Characteristics and Outcomes

Footnote:

Values are presented as reported in the original studies. Sample size (n) refers to the number of hips undergoing arthroscopic acetabular labral reconstruction included in each study. Mean age is reported in years when available. Patient etiologies refer to the primary indications for labral reconstruction, including chronic

degenerative labral tears, femoroacetabular impingement–associated labral pathology, failed prior labral repair, or other structural hip abnormalities when specified. Graft type includes autograft or allograft sources used for reconstruction. Significant clinical outcomes represent key reported postoperative findings, including improvements in patient-reported outcome measures, return to sport, complication rates, revision hip arthroscopy, graft failure, or conversion to total hip arthroplasty when available.

Risk of Bias Assessment

Screening and eligibility assessment were performed independently by three reviewers in a blinded manner, with discrepancies resolved by a senior fourth reviewer to reduce selection bias. Levels of evidence were assigned according to established orthopaedic evidence hierarchies. Randomized controlled trials were assessed using the Cochrane Risk of Bias 2 tool, while non-randomized studies were evaluated using the Methodological Index for Non-Randomized Studies (MINORS) criteria. Given the anticipated predominance of retrospective cohort studies in hip preservation literature, Levels I through IV evidence were included. Study quality and risk of bias were considered during data interpretation.

Data Synthesis and Analysis

Given expected heterogeneity in patient populations, surgical techniques, graft types, outcome measures, and follow-up duration, a primarily qualitative synthesis was performed. Studies were stratified according to graft source, including autograft and allograft reconstructions. When three or more studies reported comparable outcome measures using similar reporting metrics, outcomes were summarized descriptively and pooled estimates with 95% confidence intervals were calculated using a random-effects model where appropriate.

The primary outcomes of interest were improvements in patient-reported outcome measures and rates of revision hip arthroscopy. Secondary outcomes included complication rates, graft-related failures, return to sport, and conversion to total hip arthroplasty. This methodological approach was designed to directly compare clinical outcomes between autograft and allograft tissue in arthroscopic labral reconstruction for chronic labral tears, with emphasis on functional recovery, durability, and need for further surgical intervention.

RESULTS

Study Selection and Characteristics

The initial database search yielded 1,032 records from PubMed/MEDLINE, Embase, Scopus, and the Cochrane Library. Following removal of 342 duplicates, 815 unique titles and abstracts were screened. Of these, 815 studies were excluded due to irrelevance, including investigations of nonoperative management, diagnostic-only studies, review articles, technical notes without outcomes, or studies reporting labral repair or debridement without reconstruction. Full-text review was conducted for 21 articles, with 13 meeting all inclusion criteria for this systematic review. Included studies predominantly consisted of retrospective cohort analyses and prospective cohort studies, with additional retrospective case series. Sample sizes varied widely, ranging from 7

patients in the Rathi et al. [22] series to 205 patients in Cooper et al. [25]. Follow-up durations extended from short-term postoperative assessments at approximately 7.5 months [13] to mid- and long-term evaluation up to 62 months [24]. Patient populations were heterogeneous. All included patients had chronic, irreparable labral pathology identified intraoperatively, most commonly in the setting of femoroacetabular impingement (FAI), labral insufficiency, or prior failed labral repair. Additional etiologies included dysplasia, trauma, segmental labral deficiency, hypoplastic or degenerative labral tissue, and capsulolabral adhesions [14, 20, 23]. Across studies comparing graft types, reconstruction was performed in both primary and revision settings, with autograft tissue sourced from hamstring tendon, iliotibial band, rectus femoris tendon, or local hip capsule, and allograft tissue derived from hamstring tendon, peroneus longus tendon, tibialis anterior tendon, medial/lateral meniscus, or fascia lata [12,13,17]. Surgical techniques were arthroscopic in all studies, with graft fixation achieved using suture anchors along the acetabular rim. Concomitant procedures, most commonly correction of FAI, were performed as indicated. Baseline demographic characteristics were generally similar between autograft and allograft cohorts, with mean ages ranging from 30.7 ± 9.2 years [15] to 46.7 ± 5.7 years [14]. Both graft groups were consistently used for segmental or complete labral reconstruction when native labral tissue was deemed irreparable. Studies reporting clinical outcomes consistently assessed functional recovery using validated patient-reported measures, including the modified Harris Hip Score, Non-Arthritic Hip Score, Hip Outcome Score–Activities of Daily Living, Hip Outcome Score–Sports Specific Subscale, and visual analog pain scales [12,18,19]. Follow-up periods were sufficient to evaluate mid-term outcomes and rates of revision hip arthroscopy, conversion to total hip arthroplasty, and patient satisfaction. Overall, the included studies provide a representative sample of current clinical experience in arthroscopic hip labral reconstruction using autograft and allograft tissue, encompassing diverse graft sources, patient populations, and surgical approaches, and establishing a robust foundation for qualitative synthesis of functional outcomes, complication rates, and graft durability.

Patient Etiologies and Injury Mechanisms

Across the 13 included studies encompassing a total of 614 patients, the predominant underlying etiology for labral reconstruction was FAI, which was reported in most cohorts and frequently coexisted with irreparable labral pathology identified intraoperatively [12,13,15,16,18,21,24]. In large comparative and cohort studies, including Cooper et al. [18] and Kocaoglu et al. [23], all patients presented with symptomatic FAI-associated labral insufficiency requiring reconstruction due to segmental or complete labral deficiency not amenable to repair. Similarly, Maldonado et al. and Carreira et al. reported that nearly all patients undergoing primary arthroscopic reconstruction had underlying FAI with associated labral degeneration or insufficiency [12.19]. Across studies that explicitly defined inclusion criteria, over 70–80% of patients demonstrated FAI-related pathology, establishing it as the principal driver of chronic labral failure in this population.

In addition to FAI, several secondary etiologies contributing to labral insufficiency were consistently identified, including developmental dysplasia of the hip (DDH), prior failed labral surgery, trauma, capsulolabral adhesions, and intrinsic labral degeneration or hypoplasia [14,15,18,19]. Geyer et al. [14] reported a heterogeneous cohort in which labral deficiency resulted from FAI, dysplasia, trauma, and prior debridement or

repair, while Cook et al. [15] similarly identified a mixed pathology population including FAI and DDH requiring open reconstruction. Structural abnormalities such as hypoplastic labra (<5 mm width) and complex degenerative tearing were specifically highlighted in Deng et al. and Kucharik et al., representing a substantial subset of patients with biologically insufficient tissue unsuitable for repair [14,22]. Collectively, these findings demonstrate that while FAI remains the dominant pathology, labral reconstruction is frequently indicated in the setting of multifactorial hip disease with both structural and iatrogenic contributors.

Mechanistically, labral injury in these cohorts was largely chronic and degenerative rather than acute traumatic in nature. Many patients presented with progressive hip pain and functional limitation refractory to conservative management, with intraoperative confirmation of irreparable labral damage guiding the decision for reconstruction [1,2,9,12]. Chronic repetitive impingement from cam and/or pincer morphology was the most commonly implicated mechanism, leading to cumulative shear stress, intrasubstance degeneration, and eventual disruption of the labral seal. Segmental defects and labral insufficiency were also frequently observed in revision settings or following prior surgical intervention, as reported in studies by Cooper et al. and Locks et al. [17,23]. Notably, smaller series focusing on segmental reconstruction emphasized focal labral defects (<1 cm) and localized tissue loss, whereas larger cohorts more commonly demonstrated diffuse degeneration or complete labral insufficiency requiring circumferential reconstruction [20,23].

Quantitatively, the distribution of etiologies across studies reflects a consistent pattern: FAI-associated pathology was present in approximately 450–500 of the 614 total patients, while secondary etiologies such as dysplasia, prior surgery, and trauma collectively accounted for the remaining 15–25% of cases [14,15,17,18]. All included patients had failed nonoperative management and demonstrated symptomatic labral pathology with preserved joint space in most cases (Tönnis grade ≤1), indicating early-stage joint disease appropriate for hip preservation strategies [12,16,18]. Importantly, exclusion criteria across studies were highly consistent, typically omitting patients with advanced osteoarthritis, significant joint space narrowing, or contraindications to arthroscopy, thereby reinforcing that labral reconstruction is primarily utilized in a relatively young, active population with mechanically driven, pre-arthritic hip pathology.

Clinical and Functional Outcomes (Pain and patient reported outcomes)

Three studies directly compared patient-reported outcomes following reconstruction using either an allograft or autograft, and all found no significant differences between graft types [7, 17, 18]. Maldonado et al. reported higher overall patient satisfaction with allograft compared to autograft, with mean scores of 8.8 versus 6.6, respectively (P = 0.03) [7], whereas Cooper et al. found no statistically significant difference in patient satisfaction between the two graft types [18]. For allografts, Carriera et al., using a fascia lata graft, demonstrated significant improvements across multiple measures: mean modified Harris Hip Score (mHHS) increased from 64.0 preoperatively to 84.6 postoperatively, SF-12 Physical from 38.9 to 49.0, SF-12 Mental from 49.5 to 55.6, iHOT-12 from 36.4 to 68.1, HOS-ADL from 62.6 to 81.6, and HOS-Sports from 32.9 to 65.7

(all P < 0.01) [19]. Similarly, Rathi et al. reported a significant mHHS improvement from 58 (range 55–60) preoperatively to 95 (range 91–98) postoperatively, with an average patient satisfaction of 9.5 out of 10 [21].

Among autografts, Geyer et al., using a tubularized iliotibial (IT) band autograft, observed mHHS improvement from 58.9 to 83 (P = 0.0001), with significant gains in HOS-ADL and HOS-Sports, and a median patient satisfaction of 8/10 [20]. Deng et al., using a local articular hip capsule autograft, reported increases in mHHS from 61.3 ± 5.5 preoperatively to 87.5 ± 4.2, Hip Outcome Score from 52.5 ± 5.1 to 87.3 ± 3.8, and HOS-ADL subscore from 48.5 ± 5.8% to 75.2 ± 3.5% at a mean follow-up of 25.4 months [14]. Kucharik et al., using a hip capsular autograft, noted improvement in iHOT-33 scores from 40.4 preoperatively to 76.6 at final follow-up (P < 0.001) [23]. Locks et al., also using a capsular autograft, observed increases in mHHS from 66 to 89, HOS-ADL from 73 to 89, and HOS-Sports Scale from 52 to 79 (P < 0.05 for all), with a median patient satisfaction of 9/10 [24]. Finally, Rathi et al., using an autograft from the indirect head of the rectus femoris, reported mHHS improvement from 56 (range 54–60) preoperatively to 93 (range 90–97) at latest follow-up, with an average postoperative patient satisfaction score of 9.1 out of 10 [22].

Revision Hip Arthroscopy and Graft Survival

Revision hip arthroscopy following arthroscopic labral reconstruction was reported infrequently across the included studies, suggesting favorable graft survivorship at short- to mid-term follow-up. Although variability in reporting precluded formal pooled analysis, the overall incidence of revision procedures was consistently low across both autograft and allograft cohorts. In comparative cohort studies, no consistent differences in survivorship were observed between graft types. Maldonado et al. [11] demonstrated significant improvements in all patient-reported outcomes (PROs) in both hamstring autograft and allograft groups at minimum 2-year follow-up, with no statistically significant differences in revision arthroscopy or conversion to total hip arthroplasty (THA). Similarly, Kocaoglu et al. [17] reported comparable functional improvements between autograft and allograft groups; however, Cooper et al. [18] identified a significantly higher revision rate in the allograft cohort (23.6% vs 7.3%), suggesting that graft choice may influence reoperation risk in larger populations despite similar functional outcomes. Studies evaluating allograft reconstruction alone demonstrated generally favorable survivorship profiles. Carriera et al. [19] reported a conversion to THA rate of 12.9% at approximately 2 years, with the majority of patients maintaining improved functional outcomes. Cook et al. [15] observed that 88.9% of patients avoided revision surgery or THA at follow-up, with slightly higher survivorship in meniscal allograft constructs (90%) compared to tendon allografts (80%). Lee et al. [13] reported no cases of graft failure, revision, or infection at short-term follow-up (~7 months), further supporting the short-term safety profile of allograft use. Autograft-based reconstructions similarly demonstrated high survivorship and durable outcomes. Geyer et al. [20] reported survivorship rates of approximately 80% at 3 years and 77% at 4 years following iliotibial band autograft reconstruction, with 19 hips progressing to THA at a mean of 28 months. In contrast, smaller series utilizing local autograft tissue demonstrated even lower revision rates. Deng et al. [14] and Kucharik et al. [23] reported no cases of revision surgery at approximately 2-year follow-up, with all patients demonstrating radiographic graft integrity and significant functional improvement. Similarly, Locks et

al. [24] and Rathi et al. [22] reported 0% revision or THA conversion rates at mid-term follow-up, with consistently high patient satisfaction scores (>9/10).

Across studies, pooled trends suggest that graft survivorship following labral reconstruction is high, with the majority of cohorts reporting revision rates of <10–15% at 2–4 years. Higher rates of secondary procedures, when present, were typically observed in larger or more heterogeneous populations and were more frequently associated with persistent symptoms, residual FAI, or progressive degenerative changes rather than isolated graft failure. Importantly, radiographic and clinical evidence of graft integrity was consistently maintained in studies reporting imaging outcomes. Overall, the available evidence demonstrates that arthroscopic labral reconstruction, using either autograft or allograft tissue, is associated with high rates of graft survival and low rates of revision hip arthroscopy at mid-term follow-up. While most comparative studies suggest equivalent outcomes between graft types, select data indicate a potential increase in revision risk with allograft use in larger cohorts. These findings underscore that factors such as patient selection, underlying pathology, and technical execution likely play a more substantial role in long-term survivorship than graft source alone.

Complications and Donor Site Morbidity

Complication rates following hip labral reconstruction are generally low for both allograft and autograft techniques, though autograft procedures introduce additional risk of donor-site morbidity due to graft harvest.

Studies evaluating allograft reconstruction report low complication and revision rates with few graft specific adverse events. In a series evaluating peroneus longus allograft reconstruction, one study reported no postoperative complications or graft failures in 11 patients at short term follow up [12]. Similarly, arthroscopic reconstruction using fascia lata allograft demonstrated favorable outcomes with no graft related complications and only four patients converting to total hip arthroplasties at minimum two year follow up [18]. Another study also reported no major complications in 10 patients undergoing fascia lata allograft reconstruction at minimum one year follow up [20]. Comparative analyses have likewise demonstrated similar complication profiles between different allograft types, with no graft rejection or disease transmission reported in clinical series [14, 15].

Autograft reconstruction has shown favorable outcomes with lower rates of revision surgery. Iliotibial band autograft reconstruction has demonstrated good survivorship with a minimum three year follow up. Rectus femoris tendon autograft reconstruction has also demonstrated favorable early outcomes. [21]. Capsular autograft reconstruction eliminates the need for a distant harvest site and showed a reduced risk of postoperative scarring [13, 23].

Direct comparisons between graft types demonstrate similar complication rates despite these differences. One study compared tibialis anterior allograft with iliotibial band autograft reconstruction and reported no significant difference in complication rates between groups at minimum two year follow up [16]. Overall, both graft types demonstrate low complication and revision rates in the current literature.

Long-Term Implications and Joint Preservation

Long term implications across the studies, focused primarily on the outcomes following an arthroscopic hip labral repair and what were the positive and negative effects to the joints preservation. Across the included literature, both allograft and autograft hip arthroscopies provided long term benefits to patients with little to no adverse events reported. The average follow up in these studies were at a minimum of 2 years after the initial procedure. Although most studies included in this literature reported significant functional outcome measures and postoperative improvement in pain, these differences were accompanied by long term differences in reoperation.

Overall, both allograft and autograft labral reconstruction showed significant results in postoperative improvement in hip function at long term follow ups. Kocaoglu et al. [17] found both tibialis anterior allograft and iliotibial band autograft groups displayed significant postoperative improvement across patient-reported outcome measures. Comparative studies did not display significant results on whether long term implications were more prevalent in allograft or autograft reconstruction. Maldonado et al. [12] reported to find no significant differences between hamstring autograft and allograft groups. These results were with respect to postoperative functional scores, revision arthroscopy, or pain improvement. In contrast, Cooper et al. [25] found similar results between both groups with allograft patients having a higher revision surgery rate than autograft at 23.6% vs 7.3%. Available evidence suggests both allograft and autograft can show significant preservation of the joint at long term follow up. However, the data does not demonstrate long term preservation advantage of one graft type over another.

DISCUSSION

The findings of this systematic review demonstrate that arthroscopic hip labral reconstruction provides consistent and clinically meaningful improvements in pain and function in patients with chronic, irreparable labral tears, regardless of graft source. Across all included studies, both autograft and allograft reconstructions were associated with significant gains in validated patient-reported outcome measures, including mHHS, HOS, and iHOT scores, with no consistent differences between graft types in comparative analyses [12, 17, 18]. These results underscore a key clinical takeaway: successful restoration of the labral suction seal and hip biomechanics appears to be the primary driver of improved outcomes, rather than the specific graft utilized. For practicing surgeons, this supports a flexible, patient-specific approach to graft selection without compromising expected functional recovery.

An important nuance emerging from the data is that while functional outcomes are largely equivalent, secondary factors such as patient satisfaction and surgical morbidity may influence graft choice. Maldonado et al. [12] reported significantly higher satisfaction in the allograft cohort despite similar functional outcomes, suggesting that the avoidance of donor-site morbidity may translate to improved patient perception of recovery. However, this finding was not consistently reproduced across studies [18], indicating that satisfaction is likely multifactorial and influenced by perioperative experience, rehabilitation, and expectations. Clinically, this suggests that allograft may be particularly advantageous in patients where minimizing operative time and additional surgical sites is prioritized, although this benefit must be weighed against other considerations. One of the most clinically relevant findings of this review relates to revision risk and graft survivorship. While most

studies demonstrated low revision rates across both graft types, typically below 10–15% at mid-term follow-up, the largest comparative cohort identified a significantly increased revision rate in the allograft group (23.6% vs 7.3%) [18]. This divergence is critical, as it suggests that although short-term functional outcomes may be similar, there was not consistently observed in smaller cohorts [12, 17], highlighting that revision risk is likely multifactorial. From a clinical perspective, this reinforces the importance of careful patient selection, meticulous surgical technique, and comprehensive correction of underlying pathology when considering allograft use, particularly in larger or more complex patient populations.

Complication profiles further support the safety of both reconstructive approaches, with consistently low rates of adverse events reported. Allograft reconstruction demonstrated minimal complications, with no reported cases of graft rejection or disease transmission and low rates of infection or failure [12, 14, 15]. Autograft techniques similarly showed favorable safety profiles but inherently introduced the risk of donor-site morbidity, particularly with graft harvest from the iliotibial band or hamstring [20]. Notably, the emergence of local autograft techniques, such as capsular reconstruction, appears to mitigate this concern while maintaining strong clinical outcomes [13, 14, 23]. These findings suggest that both graft types are safe, but the choice of technique can be optimized to minimize patient morbidity without compromising efficacy.

Another key insight is that graft type may be less influential on outcomes than the underlying hip pathology and the adequacy of its correction. The majority of patients across studies presented with FAI–associated labral insufficiency, often accompanied by chronic degenerative changes. Successful outcomes were consistently achieved in the context of comprehensive surgical management, including correction of impingement morphology and restoration of joint mechanics. In contrast, cases requiring revision were more frequently associated with persistent biomechanical abnormalities or progressive degeneration rather than isolated graft failure [17, 23]. This emphasizes a critical clinical principle: labral reconstruction should be viewed as one component of a broader hip preservation strategy, rather than a standalone intervention.

Finally, both autograft and allograft reconstructions demonstrated the ability to preserve the native hip joint and delay progression to total hip arthroplasty in a young, active population. Conversion rates to arthroplasty remained relatively low at mid-term follow-up, and most patients maintained meaningful improvements in function and pain [12, 15, 18, 19]. Importantly, no clear long-term superiority of one graft type over the other was identified, reinforcing that graft selection should be individualized based on patient characteristics, graft availability, and surgeon expertise. This aligns with the broader goal of hip preservation surgery: optimizing joint longevity while maintaining high levels of patient function and satisfaction. Several limitations of this review should be acknowledged. The majority of included studies were retrospective in nature, with inherent risks of selection bias, heterogeneity in surgical technique, and variability in outcome reporting. Sample sizes varied widely, and only a limited number of studies directly compared autograft and allograft reconstruction, reducing the strength of comparative conclusions. Additionally, follow-up durations were predominantly mid-term, limiting the ability to draw definitive conclusions regarding long-term graft durability and joint preservation. Heterogeneity in graft types, rehabilitation protocols, and patient populations further complicates

direct comparison. Future research should focus on high-quality prospective, randomized comparative studies with standardized outcome measures and longer follow-up to better delineate graft-specific differences. In particular, further investigation into the factors influencing revision risk, biologic graft incorporation, and long-term joint preservation will be critical in refining surgical decision-making and optimizing patient outcomes in hip labral reconstruction.

Funding: No funding was received for this project.

Ethics: Human Ethics and Consent to Participate declarations: not applicable

REFERENCES

1. Philippon MJ, Nepple JJ, Campbell KJ, et al. The hip fluid seal--Part I: the effect of an acetabular labral tear, repair, resection, and reconstruction on hip fluid pressurization. Knee Surg Sports Traumatol Arthrosc. 2014;22(4):722-729.
2. Ferguson SJ, Bryant JT, Ganz R, Ito K. The acetabular labrum seal: a poroelastic finite element model. Clin Biomech (Bristol). 2000;15(6):463-468.
3. White BJ, Herzog MM. Arthroscopic Labral Reconstruction of the Hip Using Iliotibial Band Allograft and Front-to-Back Fixation Technique. *Arthrosc Tech*. 2016;5(1):e89-e97. Published 2016 Feb 1.
4. Domb BG, Hartigan DE, Perets I. Decision Making for Labral Treatment in the Hip: Repair Versus Débridement Versus Reconstruction. *J Am Acad Orthop Surg*. 2017;25(3):e53-e62.
5. Dean MC, Cherian NJ, LaPorte ZL, et al. Association Between Chondrolabral Junction Breakdown and Conversion to Total Hip Arthroplasty After Hip Arthroscopy for Symptomatic Labral Tears: Minimum 8-Year Follow-up. *Am J Sports Med*. 2024;52(5):1153-1164.
6. `Jimenez AE, Lee MS, Owens JS, et al. Revision Hip Arthroscopy With Labral Reconstruction for Irreparable Labral Tears in Athletes: Minimum 2-Year Outcomes With a Benchmark Control Group. *Am J Sports Med*. 2022;50(6):1571-1581.
7. Safran N, Rath E, Haviv B, Atzmon R, Amar E. The Efficacy of Labral Reconstruction: A Systematic Review. *Orthop J Sports Med*. 2021;9(2):2325967120977088. Published 2021 Feb 16.
8. Ayeni OR, Alradwan H, de Sa D, Philippon MJ. The hip labrum reconstruction: indications and outcomes--a systematic review. *Knee Surg Sports Traumatol Arthrosc*. 2014;22(4):737-743.
9. Scanaliato JP, Green CK, Salfiti CE, Wolff AB. Hip Labral Reconstruction: Techniques and Outcomes. *Curr Rev Musculoskelet Med*. 2021;14(6):340-350.
10. White BJ, Stapleford AB, Hawkes TK, Finger MJ, Herzog MM. Allograft Use in Arthroscopic Labral Reconstruction of the Hip With Front-to-Back Fixation Technique: Minimum 2-Year Follow-up. *Arthroscopy*. 2016;32(1):26-32.
11. Cooper JD, Dekker TJ, Ruzbarsky JJ, Pierpoint LA, Soares RW, Philippon MJ. Autograft Versus Allograft: The Evidence in Hip Labral Reconstruction and Augmentation. *Am J Sports Med*. 2021;49(13):3575-3581.

12. Maldonado DR, Lall AC, Laseter JR, et al. Primary Hip Arthroscopic Surgery With Labral Reconstruction: Is There a Difference Between an Autograft and Allograft?. *Orthop J Sports Med*. 2019;7(3):2325967119833715. Published 2019 Mar 25.
13. Lee G, Morikawa L, Andrews SN, Livingstone JP, Crawford SN. Outcomes After Hip Labral Reconstruction Using Peroneus Longus Graft: A Novel Graft Experience. *Hawaii J Health Soc Welf*. 2022;81(3 Suppl 1):25-29.
14. Deng Z, Yue J, Zheng Y, et al. Arthroscopic acetabular labrum reconstruction with capsular autograft: clinical outcome and preliminary results. *Am J Transl Res*. 2021;13(11):13183-13191. Published 2021 Nov 15.
15. Cook JL, Rucinski K, Wissman R, Crecelius C, DeFroda S, Crist BD. Outcomes following open acetabular labrum reconstruction: Comparing fresh-frozen tendon with fresh meniscus allograft transplantation. *J Orthop*. 2024;53:13-19. Published 2024 Feb 23.
16. Abdelaal MS, Sutton RM, Atillasoy C, Parvizi J. Allograft reconstruction of acetabular labrum has comparable outcomes to labral refixation. *J Hip Preserv Surg*. 2023;10(1):24-30. Published 2023 Feb 24.
17. Kocaoglu B, Paksoy AE, Kayaalp A, Cerciello S, Ollivier MP, Seil R. *Comparison of Acetabular Labral Reconstruction With 7-mm Tibialis Anterior Allograft and 5-mm Iliotibial Band Autograft at Minimum 2-Year Follow-Up.* Am J Sports Med. 2022;50(5):1291–1298.
18. Cooper JD, Dekker TJ, Ruzbarsky JJ, Pierpoint LA, Soares RW, Philippon MJ. Autograft Versus Allograft: The Evidence in Hip Labral Reconstruction and Augmentation. *Am J Sports Med*. 2021;49(13):3575-3581.
19. Carreira DS, Kruchten MC, Emmons BR, Martin RL. Arthroscopic labral reconstruction using fascia lata allograft: shuttle technique and minimum two-year results. *J Hip Preserv Surg*. 2018;5(3):247-258. Published 2018 Aug 10.
20. Geyer MR, Philippon MJ, Fagrelius TS, Briggs KK. Acetabular labral reconstruction with an iliotibial band autograft: outcome and survivorship analysis at minimum 3-year follow-up. *Am J Sports Med*. 2013;41(8):1750-1756.
21. Rathi R, Mazek J. Arthroscopic Acetabular Labral Reconstruction with Fascia Lata Allograft: Clinical Outcomes at Minimum One-Year Follow-Up. *Open Orthop J*. 2017;11:554-561. Published 2017 Jul 25.
22. Rathi R, Mazek J. Arthroscopic acetabular labral reconstruction with rectus femoris tendon autograft: Our experiences and early results. *J Orthop*. 2018;15(3):783-786. Published 2018 Jun 20.
23. Kucharik MP, Abraham PF, Nazal MR, Varady NH, Meek WM, Martin SD. *Am J Sports Med.* 2021 Aug;49(10):2659-2667.
24. Locks R, Chahla J, Bolia IK, Briggs KK, Philippon MJ. Outcomes following arthroscopic hip segmental labral reconstruction using autologous capsule tissue or indirect head of the rectus tendon. *J Hip Preserv Surg*. 2017;5(1):73-77. Published 2017 Nov 22.

25. Cooper JD, Dekker TJ, Ruzbarsky JJ, Pierpoint LA, Soares RW, Philippon MJ. Autograft Versus Allograft: The Evidence in Hip Labral Reconstruction and Augmentation. *Am J Sports Med*. 2021;49(13):3575-3581.