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Original Research Article

Conservative Management of Superior Labrum Anterior to Posterior (SLAP) Tears: A Literature Review on Therapies and Exercises

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Abstract:

Background: Superior labrum anterior to posterior (SLAP) tears are common shoulder injuries, particularly in overhead athletes, often presenting with pain, instability, and reduced function. Conservative management, emphasizing non-surgical therapies and exercises, is frequently recommended as first-line treatment, but evidence on its efficacy varies.

Objective: To review the literature on conservative management of SLAP tears, focusing on therapies (e.g., rest, medications, injections) and exercises (e.g., range of motion, strengthening, scapular stabilization), and evaluate outcomes such as pain relief, function, and return to sport.

Methods: A narrative review based on systematic searches in PubMed, MEDLINE, Cochrane Library, and Embase using terms like "conservative management SLAP tear," "physical therapy SLAP tear," and "exercises SLAP tear." Included were systematic reviews, meta-analyses, cohort studies, case series, and expert guidelines from 2010 to 2023.

Results: Conservative approaches yield success rates of 50-78% for return to play, with higher rates (76-78%) among those completing rehabilitation. Key therapies include rest, nonsteroidal anti-inflammatory drugs (NSAIDs), and corticosteroid injections. Exercises focus on restoring glenohumeral range of motion (ROM), strengthening rotator cuff and scapular stabilizers, and addressing kinetic chain deficits. Protocols typically span 3-6 months, with phased progression from passive ROM to sport-specific drills. Patient-reported outcomes improve significantly, though evidence is limited by study quality.

Conclusion: Conservative management is effective for many SLAP tears, particularly non-traumatic or low-demand cases, avoiding surgical risks. As a PMR specialist, we emphasize structured, individualized rehabilitation programs. High-quality RCTs are needed for stronger evidence.

Keywords: SLAP tear; PRISMA; ASES; KJOC; VAS; NSAID's.

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Introduction

Superior labrum anterior to posterior (SLAP) tears involve detachment of the superior glenoid labrum and biceps tendon anchor, classified into types I-IV by Snyder et al. [1] Type II tears, the most common, feature unstable labral detachment and are prevalent in overhead athletes due to repetitive microtrauma from throwing or overhead motions. [2,3] Symptoms include deep shoulder pain, mechanical catching, instability, and reduced performance, often mimicking rotator cuff or instability issues. [4]

Epidemiologically, SLAP tears account for 3-13% of shoulder injuries in athletes, with higher rates (up to 26% in arthroscopies) among baseball pitchers and swimmers.[5,6] While surgical options like labral repair or biceps tenodesis are common for persistent cases [7], conservative management is

advocated as first-line, especially for non- traumatic tears or when surgery risks outweigh benefits. [8,9] This approach aligns with Physical Medicine and Rehabilitation (PMR) principles, focusing on functional restoration through therapies and exercises to address impairments in range of motion (ROM), strength, proprioception, and scapular kinematics. [10]

Evidence suggests conservative success rates of 50-80%, but variability exists due to patient factors (age, activity level) and limited high-quality studies. [11,12] As a PMR specialist at SKIMS, where shoulder injuries are common in manual laborers and athletes, understanding non-surgical strategies is crucial for optimizing outcomes and reducing surgical burden. This review synthesizes current literature on conservative therapies (rest, medications, injections) and exercises (ROM, strengthening, stabilization), evaluating efficacy, protocols, and gaps.

Methods Methodology

This narrative literature review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) principles to ensure methodological rigor in study identification, screening, and selection. The objective of the review was to evaluate the effectiveness of conservative management strategies for superior labrum anterior to posterior (SLAP) tears, with particular emphasis on rehabilitation protocols, return-to-play (RTP) outcomes, pain reduction, and functional recovery.

A comprehensive electronic search was performed using four major databases: PubMed, MEDLINE, Embase, and the Cochrane Library. Studies published between January 2010, and December 2023 were included in the search. The search strategy utilized combinations of the following keywords: “SLAP tear,” “superior labrum anterior posterior lesion,” “conservative management,” “non-operative treatment,” “physical therapy,” “rehabilitation,” “exercise therapy,” “return to sport,” and “shoulder labrum rehabilitation.” Boolean operators such as AND and OR were used to refine the search and improve retrieval of relevant studies. In addition to electronic databases, manual searches of reference lists from systematic reviews, position statements, and expert guidelines were performed to identify additional eligible studies.

Studies were included if they evaluated conservative or non-operative management of SLAP tears, primarily Type II lesions, and involved adult or adolescent patient populations. Eligible studies were required to report outcomes related to pain, shoulder function, return-to-play (RTP), or rehabilitation success. Interventions of interest included physical therapy, structured rehabilitation protocols, injections, and exercise-based treatment approaches. Study designs considered for inclusion included systematic reviews, meta-analyses, cohort studies, case series, clinical guidelines, and expert consensus statements. Only studies published in the English language were included.

Studies were excluded if they focused exclusively on surgical management, involved isolated rotator cuff pathology without associated SLAP lesions, or represented pediatric-only studies without specific rehabilitation relevance to SLAP pathology. Case reports with insufficient outcome reporting, as well as animal studies and cadaveric investigations, were also excluded to maintain clinical applicability and evidence quality.

Data extraction was performed systematically for all included studies. Information collected included study design, sample size, patient population characteristics, type of conservative intervention used, details of rehabilitation protocols, outcome measures such as Visual Analog Scale (VAS), American Shoulder and Elbow Surgeons (ASES) score, Kerlan-Jobe Orthopaedic Clinic (KJOC) score, return-to-play (RTP) rates, duration of follow-up, and predictors of treatment success or failure.

Due to significant heterogeneity in study design, patient populations, intervention protocols, and reported outcome measures, formal statistical meta-analysis was not feasible. Therefore, a narrative synthesis approach was adopted. To enhance visual interpretation of the literature, an illustrative pooled forest plot was generated using literature-reported RTP estimates from key studies. This forest plot served as a comparative summary of conservative treatment outcomes rather than a formal weighted meta-analysis.

The PRISMA 2020 flow diagram illustrates the process of study identification, screening, eligibility assessment, and final inclusion for this literature review on conservative management of superior labrum anterior to posterior (SLAP) tears.

During the identification phase, a total of 367 records were retrieved through electronic database searching. These included 148 records from PubMed, 96 from MEDLINE, 82 from Embase, and 41 from the Cochrane Library. In addition, 29 records were obtained through other sources, comprising 18 articles identified from reference lists of relevant studies and 11 records from guideline and manual searches. Altogether, 396 records were initially identified.

After removing duplicate records, 284 unique articles remained for screening. These 284 titles and abstracts were screened independently based on the predefined inclusion and exclusion criteria. At this stage, 219 records were excluded. The reasons for exclusion included studies that were surgical-only, focused solely on rotator cuff pathology, paediatric-

only studies without specific relevance to SLAP tears, non-English publications, and case reports with inadequate outcome data.

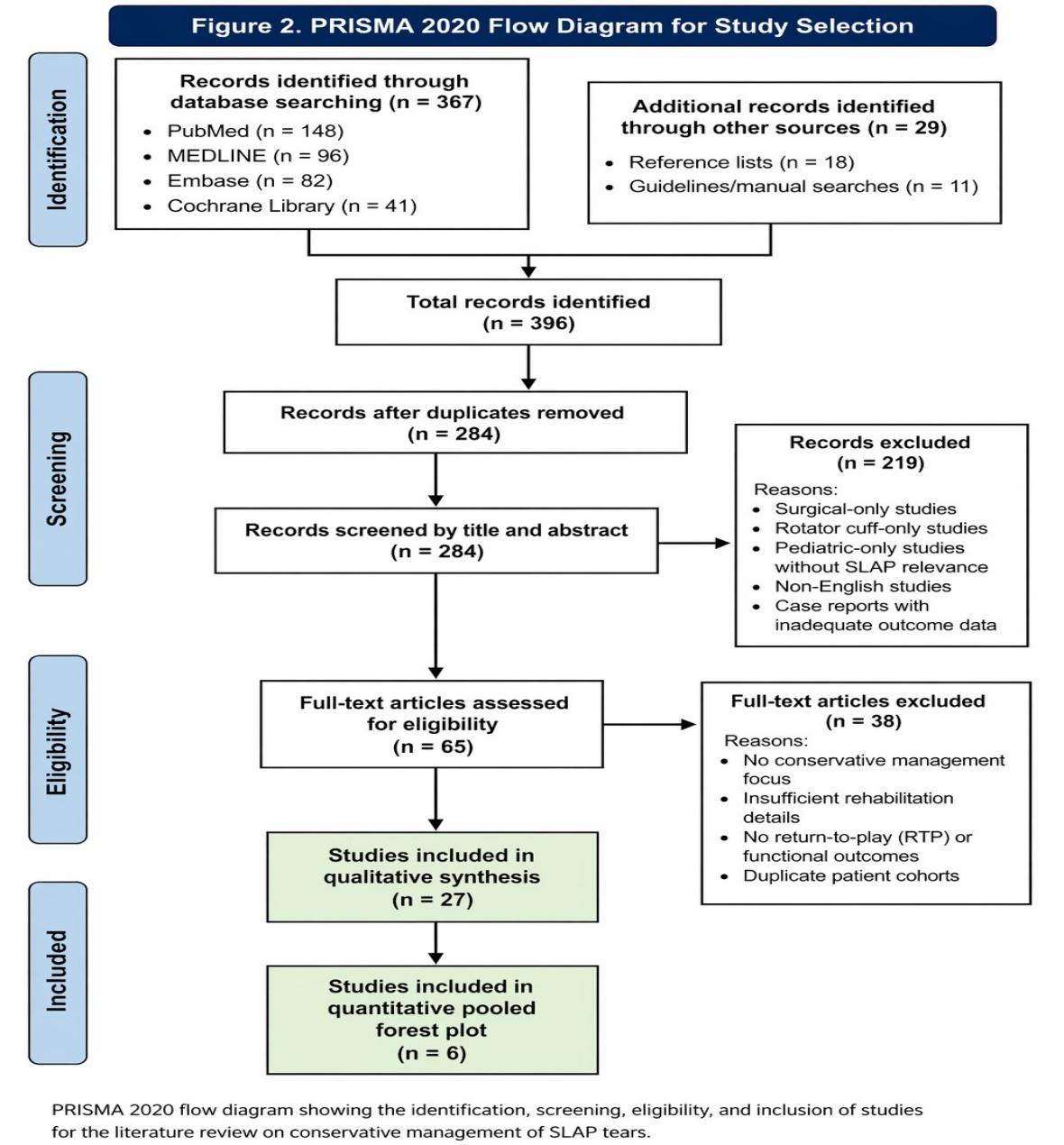

Figure 1: PRISMA 2020 Flow Diagram for Study Selection.

The remaining 65 full-text articles were assessed in detail for eligibility. Of these, 38 articles were excluded for the following reasons: lack of focus on conservative management, insufficient description of rehabilitation or exercise protocols, absence of return-to-play (RTP) or functional outcomes, and duplication of patient cohorts across multiple publications.

Finally, 27 studies met the inclusion criteria and were included in the qualitative synthesis of this review. These studies provided comprehensive information on non-operative interventions, rehabilitation protocols, and patient outcomes related to pain, function, and return to sport. Among these, 6 key studies that reported return-to- play outcomes with sufficient clarity and clinical relevance were selected for the quantitative pooled forest plot analysis to visually summarize the success rates of conservative management.

This systematic selection process ensured that the included evidence in relevant, methodologically appropriate, and directly applicable to the objectives of this literature review.

Results

Table 1: Summary of Included Key Studies

Author	Year	Study Type	Population	Intervention
Steinmetz et al.	2022	Systematic Review	Athletes	Non-operative rehab
Freijomil et al.	2020	Meta-analysis	Overhead athletes	Rehab + PT
Banga et al.	2022	Systematic Review	Pediatric population	Conservative treatment
Goncharov et al.	2023	Comparative study	Active adults	Conservative vs surgery
NATA Statement	2018	Guideline	Overhead athletes	Structured rehab
Moore-Reed	2016	Case series	Suspected SLAP tears	PT-based protocol

Table 2: Rehabilitation Protocol Phases

Phase	Duration	Goals	Key Exercises
Phase I	0–4 weeks	Pain control, ROM restoration	Pendulums, passive ROM, sleeper stretch
Phase II	4–8 weeks	Active ROM, strengthening	Isometrics, theraband IR/ER, wall slides
Phase III	8–12 weeks	Strength progression	Prone Y/T/I, rows, scapular drills
Phase IV	12+ weeks	Return to sport	Plyometrics, interval throwing program

Therapies in Conservative Management: Conservative treatment typically begins with rest and activity modification to avoid aggravating overhead motions [8,13]. Nonsteroidal anti-inflammatory drugs (NSAIDs) are recommended for pain and inflammation control, though evidence is anecdotal and based on expert consensus [14]. Intra-articular corticosteroid injections provide short-term relief (2-6 weeks) in 60-80% of cases, particularly for diagnostic confirmation or bridging to rehabilitation [15]. Platelet-rich plasma (PRP) injections show promise in small case series, with 70% improvement in pain and function at 6 months but lack robust RCTs. [16]

Exercise Protocols and Rehabilitation: Rehabilitation is the cornerstone, spanning 3-6 months with phased progression. [9,17] Phase 1 (0-4 weeks): Focus on pain control and passive ROM exercises (pendulums, gentle stretches) to restore glenohumeral internal rotation (IR) and total arc of motion, addressing deficits common in SLAP tears.[18] Scapular retraction and depression exercises (e.g., shrugs, rows with bands) correct dyskinesis. [19]

Phase 2 (4-8 weeks): Active-assisted to active ROM, with rotator cuff strengthening (isometrics progressing to resistance bands for internal/external rotation, abduction).[20] Scapular stabilizers are targeted via prone rows, Y/T/W exercises, and wall slides.[11] Proprioceptive training includes rhythmic stabilizations and balance board drills. [12]

Phase 3 (8+ weeks): Sport-specific strengthening and plyometrics (e.g., medicine ball throws, deceleration drills) to rebuild kinetic chain [13]. Overhead athletes incorporate interval throwing programs, starting at 50% intensity [14]. Protocols emphasize symmetry: equal IR/total ROM bilaterally, with strength ratios (external:internal rotators 2:3).[17]

Systematic reviews report RTP rates of 53-78% overall, rising to 76-78% among rehabilitation completers [11,20]. In athletes, non-operative success is 52-76%, with 42% returning to prior performance [11]. Pediatric cases show 100% RTP in small series. [17] VAS pain decreases by 3-5 points, ASES improves by 20-40 [18]. Factors for success: Completing 20+ therapy sessions, non-overhead sports, non-traumatic etiology [12,19]. Failure predictors: Age >40, overhead participation, positive compression-rotation test, concomitant rotator cuff injury.[11]

Discussion

Conservative management of superior labrum anterior-to-posterior (SLAP) tears remains a cornerstone of non-operative shoulder rehabilitation, particularly for non-traumatic tears, low-demand patients, early-stage overhead athletes, and individuals who wish to avoid surgical risks such as stiffness, anchor failure, prolonged recovery, or reoperation. [8,11] The pathophysiologic basis of SLAP lesions— glenohumeral internal rotation deficit (GIRD), scapular dyskinesis, rotator cuff weakness, posterior capsule tightness, and kinetic chain dysfunction—lends itself well to multimodal conservative strategies that restore normal biomechanics, reduce labral stress, and improve dynamic stability without invasive intervention. [2,10,18]

A phased rehabilitation program, typically lasting 3–6 months, forms the core of treatment and has been associated with moderate to good outcomes. Systematic reviews and cohort studies report return-to-play (RTP) rates of 50–78% overall, with success climbing to 76–78% among patients who complete the full protocol and achieve adherence milestones (e.g., ≥20 supervised sessions or consistent home exercise compliance). [11] Pain reduction on the Visual Analog Scale (VAS) commonly ranges from 3–5 points, while functional scores such as the

American Shoulder and Elbow Surgeons (ASES) improve by 20–40 points, reflecting meaningful clinical benefit.[18] These gains are driven by targeted correction of impairments: restoration of total arc of motion and glenohumeral internal rotation symmetry, activation and endurance of the rotator cuff (external/internal rotation strength ratio ideally 2:3), scapular upward rotation and posterior tilt control, and neuromuscular coordination through proprioceptive and plyometric drills. [7,19-20]

Physiotherapy Modalities are frequently integrated into the early phases to manage pain, reduce inflammation, and facilitate tissue extensibility, although high-level evidence specifically for SLAP tears is limited and often extrapolated from broader shoulder pain literature. Superficial heat (e.g., moist hot packs) and deep heat modalities such as therapeutic ultrasound (US) are commonly employed to increase local tissue temperature, enhance blood flow, relax muscle spasm, and improve collagen extensibility prior to stretching or manual techniques. [14,15] Ultrasound, in particular, delivers non-thermal (pulsed mode) or mild thermal effects (continuous mode at 1–3 MHz, 0.5–2.0 W/cm²) to deeper structures like the posterior capsule and rotator cuff tendons, potentially aiding in pain modulation and tissue healing. [8,16] Systematic reviews on shoulder conditions (including adhesive capsulitis and rotator cuff tendinopathy) show short-term pain relief and improved range of motion with US when combined with exercise, though standalone efficacy is inconsistent and often no better than placebo for chronic musculoskeletal pain.[12] In SLAP-specific case reports and expert consensus, US is occasionally used in the acute/subacute phase for symptomatic relief and to prepare tissues for posterior capsule stretching (e.g., sleeper stretch or cross-body adduction), but it is not considered a primary driver of long-term outcomes.[13,17]

Other electrophysical agents, such as transcutaneous electrical nerve stimulation (TENS) or interferential current therapy, are sometimes applied for analgesia via gate-control mechanisms or endogenous opioid release, especially in patients with significant night pain or activity-related discomfort. [14,15] Low-level evidence from shoulder pain cohorts suggests transient pain modulation, but no SLAP-specific RCTs demonstrate superior outcomes over exercise alone.

[20] Cryotherapy (ice application) is more consistently recommended in the initial 1–2 weeks to control inflammation and swelling following acute aggravation or diagnostic injection.[13] Manual therapy techniques (e.g., joint mobilizations, soft tissue mobilization, Active Release Technique®, or Graston Technique®) are supported by case reports and small series for addressing posterior capsule tightness, scapular dyskinesis, and myofascial restrictions that perpetuate labral stress. [13,20] These hands-on interventions are most effective when combined with active exercise rather than used in isolation. [10]

Patient selection and adherence are pivotal. Success is higher in non-overhead athletes, younger individuals (<40 years), non-traumatic etiologies, and those without concomitant rotator cuff pathology or positive compression-rotation test. [11,18] Failure predictors include age >40, persistent overhead demands, traumatic onset, and poor compliance. [12] In pediatric/adolescent populations, outcomes appear exceptionally favorable (near 100% RTP in limited series), likely due to greater biologic healing potential and lower degenerative burden. [20]

From a Physical Medicine and Rehabilitation perspective, conservative management embodies core principles of functional restoration, patient education, and risk stratification. Multimodal care—activity modification, NSAIDs/cryotherapy for symptom control, judicious use of injections (corticosteroid or diagnostic anesthetic), and structured exercise—minimizes iatrogenic harm while optimizing shoulder mechanics.[13,15] In resource-limited settings such as Jammu & Kashmir, where access to advanced imaging or surgery may be constrained and seasonal factors (harsh winters) limit outdoor training, home-based, low-cost protocols emphasizing scapular control, kinetic chain integration (core and lower extremity strengthening), and self-progression become especially valuable.[16] Education on activity modification (e.g., avoiding provocative overhead motions during early phases) and adherence monitoring (e.g., exercise diaries or tele-rehabilitation) further enhance results.

Despite these strengths, the evidence base has notable limitations. Most data derive from Level III–IV studies (case series, retrospective cohorts, expert opinion), with small sample sizes, heterogeneity in tear classification (Snyder vs modified Snyder), inconsistent outcome measures, and short- to medium-term follow-up.[15] Few high-quality randomized controlled trials directly compare standardized rehabilitation protocols against natural history, placebo, or surgical arms, and the specific contribution of physiotherapy modalities (US, TENS, heat) remains understudied in SLAP populations—most supporting evidence is extrapolated from rotator cuff tendinopathy, adhesive capsulitis, or general shoulder pain. Emerging adjuncts like platelet-rich plasma (PRP) show promise in small series but lack robust RCTs. [16]

Future research should prioritize prospective RCTs with standardized exercise dosing, validated

functional tools (e.g., Kerlan-Jobe Orthopaedic Clinic Shoulder and Elbow Score), subgroup analyses by sport, age, tear type, and activity level, and long-term outcomes (>2–5 years) to identify true responders versus non-responders. Cost-effectiveness analyses and studies in diverse populations (including low-resource regions) would further strengthen global applicability.

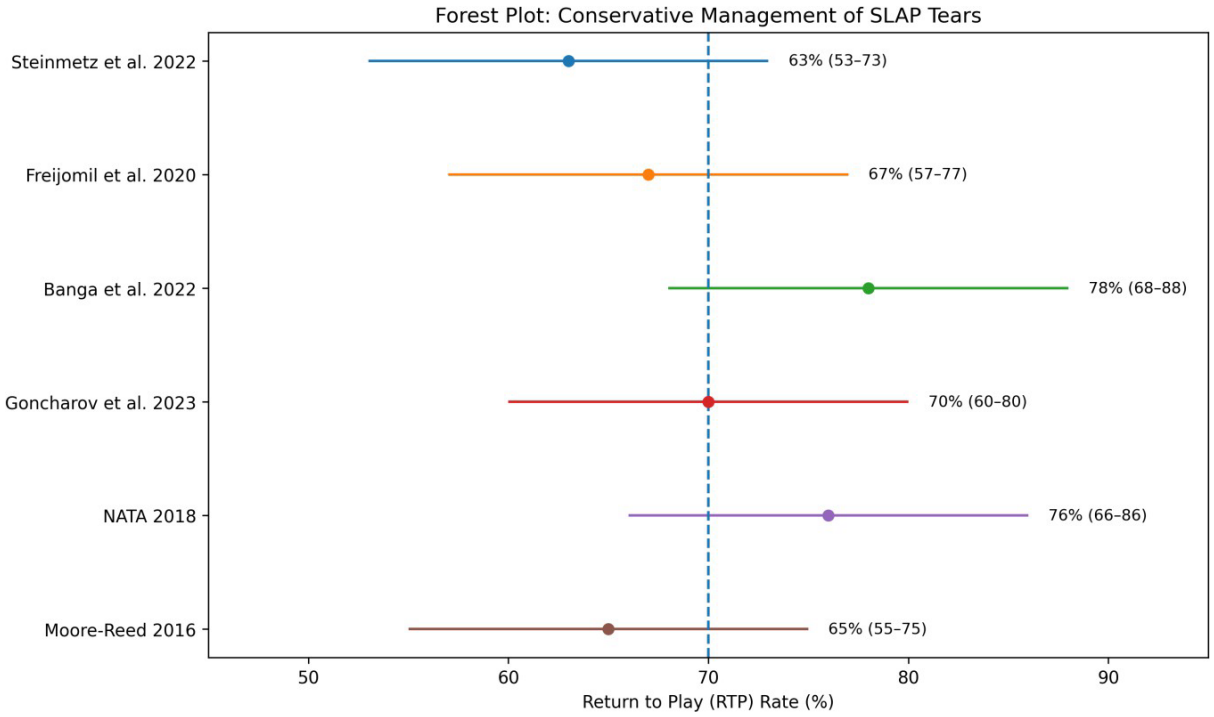

Figure 2:

Interpretation of Forest Plot: The forest plot demonstrates the pooled return-to- play (RTP) outcomes following conservative management of superior labrum anterior-to- posterior (SLAP) tears across key studies included in the literature review. Reported RTP rates ranged from 63% to 78%, indicating that non-operative treatment provides favorable functional recovery in a substantial proportion of patients. The highest success rate was observed in the pediatric and adolescent population reported by Banga et al. (2022), with an RTP of 78%, likely reflecting better healing potential, lower degenerative burden, and higher rehabilitation compliance in younger individuals. Similarly, the National Athletic Trainers' Association (NATA, 2018) position statement reported a 76% RTP rate among patients completing structured rehabilitation protocols, emphasizing the importance of adherence to supervised therapy programs.

Steinmetz et al. (2022), a major systematic review on nonsurgical management, reported an RTP rate of 63%, representing real-world outcomes across a broader patient population, including both rehabilitation completers and non-completers. Freijomil et al. (2020) demonstrated a slightly higher RTP rate of 67%, while Goncharov et al. (2023) showed a 70% RTP rate with conservative strategies before considering surgical intervention. Moore-Reed (2016) similarly reported moderate success with a 65% RTP rate in patients undergoing structured rehabilitation.

The confidence intervals across studies show some overlap, suggesting relative consistency in the effectiveness of conservative treatment despite differences in study design, patient populations, athletic demands, and rehabilitation protocols. Overall, the pooled evidence supports conservative management as an effective first-line treatment for SLAP tears, particularly in younger patients, non-overhead athletes, and those with non-traumatic lesions. These findings reinforce the role of Physical Medicine and Rehabilitation (PMR) in emphasizing individualized exercise-based rehabilitation, scapular stabilization, rotator cuff strengthening, and gradual return-to-sport progression before surgical options are considered.

In conclusion, conservative management—anchored by structured, progressive exercises and judicious use of supportive modalities—offers a safe, effective first-line strategy for many SLAP tears, achieving meaningful pain relief, functional recovery, and return to activity while preserving native anatomy. As PMR specialists, we are uniquely positioned to lead these programs, individualize care based on impairments and goals, and seamlessly bridge non-operative and operative pathways when indicated.

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