Clinical Outcomes of Arthroscopic 360° Capsular Release for Idiopathic Adhesive Capsulitis in Beach Chair Position.

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ABSTRACT

Objective: To study the clinical consequences Outcome after Arthroscopic 360 capsular release in beach Chair position for Idiopathic Adhesive Capsulitis (Frozen Shoulder) that had not been improved after any other intervention for at least 6 months.

Methodology: In this study, 40 shoulders were examined in 40 participants who had adhesive capsulitis and had arthroscopic capsular release between 2018 to 2022 in Jinnah Hospital, Lahore. An ordinary Follow-up examination was were conducted at 3, 6, and 9 months after Post procedure (Follow up rate was 90 %). Preoperatively and at the follow-up exam following surgery, Range of motion and pain were assessed. Preoperatively and postoperatively, pain and Range of motion were compared using statistical analysis SPSS Version 21. Level of significance was set at $p<0.05$.

Results: The In This study revealed that out of 40 Participants, 29 (72.5%) were females and 11 (27.5%) were males contributed in the study. The mean age was of 55.4 ± 8.6 years. Out of 40 Participants, 18 (45%) had moderate pain in their shoulders and 22 (55%) had severe pain in their shoulder. When experienced The arthroscopic release was performed in beach chair position, Active forward flexion improved from 126 ± 9.636 to 146.8 ± 8.76 degrees 9 months post operatively. The pain range improved with the mean of 7.60 ± 1.08 Pre Procedure to 2.15 ± 1.14 at 9 Months Post Operatively.

Conclusion: For Patients with idiopathic adhesive capsulitis were treated in the Beach chair posture Position with arthroscopic 360° capsular release result This result in great improved functional outcomes, a significant early and long-lasting improvement in range of motion, as well as low rates of revision and complications.

Keywords: Capsular Release, Adhesive Capsulitis, frozen shoulder, Beach chair position

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INTRODUCTION

Adhesive capsulitis, another name for frozen shoulder, is a common musculoskeletal ailment that affects the shoulder joint.[1,2] The discomfort caused by shoulder diseases is well known.[3] The shoulder joint inflammation known as Adhesive Capsulitis of Shoulder. An has rapid onset of discomfort and a sizable reduction of passive and active range of motion define this (ROM).[4] Adhesive capsulitis comes in two varieties is defined as primary (idiopathic) and secondary. The painful shoulder range of motion restriction that gradually worsens and has no known underlying cause distinguishes the primary idiopathic type.[5]

Idiopathic glenohumeral adhesive capsulitis is a frequently occurring disorder that results in discomfort, loss of shoulder function and restricted range of motion because the capsule has thickened and fibrosed is. Adhesive capsulitis without a precipitating event is idiopathic. This is more frequently observed in people with thyroid illness, women, and diabetics. However posttraumatic or postoperative adhesive capsulitis may also occur.[1] In the general population, 2 to 5% of people have

frozen shoulder, with a cumulative incidence of 2.4 per 1,000 person-years.[6-8] Clinically, the syndrome may be broken down into the thawing, freezing and frozen stage with the development of discomfort, loss of mobility, and gradual restoration of motion taking place over a period of around 15 months.[1,9]

In comparison to alternative treatment options, arthroscopic capsular release has demonstrated favorable results due to recent advancements in arthroscopic procedures. However, there is no agreement in the literature as to what the ideal scope of a capsular release should be.[10] For frozen shoulder patients who resist non-surgical treatment, arthroscopic capsular release has been previously documented.[11] Surgery is consequently necessary when an injury is resistant to anti-inflammatory medications, physiotherapy, manipulations or intra articular injections.[12]

For individuals who have a debilitating loss of range of motion, surgery called arthroscopic capsular release may be an option. Early methods mostly required the capsule's partial release[13]. Recent improvements in arthroscopy procedures have allowed Arthroscopic Capsular Release to provide promising outcomes that are on par with those of alternative treatment options.[14] The beach chair posture Position is traditionally used for arthroscopic capsular release if conservative management is unsuccessful.[1] Because the patient is positioned from supine to upright in the Beach Chair position, the setup is simpler, providing the surgeon the opportunity to switch to an open operation if necessary[4].

The Rationale of this study was to assess the clinical outcomes of arthroscopic 360-degree capsular release for idiopathic adhesive capsulitis, or a frozen shoulder that had not healed for at least 6 months with prior treatments, as well as to gauge how quickly the shoulder is healing after surgery.

The Study found out monitored Pain and Range of Motion of Shoulder via using Visual Analog Scale and Simple Shoulder test pre-operatively and Post-operatively.

METHODOLOGY

Study Design: Observational Study (Case Series)
Study Duration and Place: This research lasted for five years. The study was carried out between 2018 and 2022 in Jinnah Hospital, Lahore.
Data Collection Procedure: Data is was collected from in the Orthopedic Department of Jinnah Hospital, Lahore, Pre and Post Operatively

Sampling Technique: Non-Probability Purposive Sampling technique
Sample Size: The sample size of the research was 40**.** Sample size was selected according to the formula:

$$\text{Finite population: } n' = \frac{n}{1+\frac{z^2 \times \bar{p}(1-\bar{p})}{\varepsilon^2 N}}$$

where
z is the z score
ε is the margin of error
N is population size
p̄ is the population proportion

Inclusion Criteria: 1) Higher than 50% mobility restriction in at least two planes (compared to the unaffected shoulder), **2)** Both Genders, **3)** Age range 40-70 Years, **4)** unsuccessful non-operative management for at least 4 months.[14]
Exclusion Criteria: 1) Secondary Adhesive Capsulitis, **2)** Inflammatory Arthritis, **3)** Osteoarthritis, **4)** Post-traumatic or **5)** Post-Surgical Etiology**. (1)**

Procedure: 40 Participants were included in the study. The criteria for inclusion and exclusion were applied to the subjects. Through the explanation of the technique, the participants provided their verbal consent for the Rehabilitation of their Adhesive Capsulitis. We used the SPSS version 21 to evaluate our results. Data is was analyzed in the form of Frequency, Mean, Standard Deviations, histogram and Bar charts. Paired t-test sampling was used to observe Pre-operative and post-operative ROMs and Pain ranges at 9 months post-operatively.

RESULTS

The study revealed that out of 40 Participants, 29 (72.5%) females and 11 (27.5%) males participated in the study. The age range was of 40-70 years with the mean age of 55.4 ± 8.6 years. Out of those, 15 (37.5%) were in the age range of 40-50 years, 14 (35%) were in the age range of 51-60 years and 11 (27.5%) were in the age range of 61-70 years. Out of 40 Participants, 18 (45%) had moderate pain in their shoulders and 22 (55%) had severe pain in their shoulder. During arthroscopic release, while seated in a beach chair Position, Active forward flexion improved from 126 ± 9.636 to 146.8 ± 8.76 degrees. Shoulder extension improved from 30.70 ± 6.649 to 47.50 ± 7.161, shoulder abduction improved from 128.38 ± 7.351 to 142.8 ± 5.93, shoulder adduction improved from 20.05 ± 3.49 to 26.48 ±

3.01, shoulder external Rotation improved from 47.13 ± 8.23 to 83.50 ± 7.08 and shoulder internal rotation improved from 48.58 ± 7.656 to 74.8 ± 6.25. Even after just two weeks following surgery (P <0.001), significant ROM improvements were observed. The pain range on VAS improved with the mean of 7.60 ± 1.08 to 2.15 ± 1.14. (p=0.00) at 9 Months Post Procedure.

Table I: Demographic data:

		Gender	Age	Pain Via VAS Pre-operative
N	Valid	40	40	40
	Missing	0	0	0
Mean		1.73	55.48	7.50
Median		2.00	55.00	8.00
Std. Deviation		.452	8.611	1.086
Minimum		1	43	5
Maximum		2	70	10

Table II: Paired T- Tests for Pre-op and post-op ROM

		Mean	Std. Deviation	Sig. (2-tailed)
Pair 1				.000
Pair 2	Extension of Affected Shoulder pre-op - Extension of Affected Shoulder 9 months post-operatively	-16.800	4.735	.000
Pair 3	External Rotation of Affected Shoulder pre-op - External Rotation of Affected Shoulder 9 months post-operatively	-36.375	7.337	.000
Pair 4	Internal Rotation of affected shoulder pre-op - Internal Rotation of affected shoulder 9 months post-operatively	-26.300	9.370	.000
Pair 5	Adduction of Affected Shoulder pre-op - Adduction of Affected Shoulder 9 months post-operatively	-6.425	1.999	.000
Pair 6	Abduction of Affected Shoulder - Abduction of Affected Shoulder 9 months post operatively	-14.425	6.089	.000

Table III: Paired T-tests for Pre-op and Post-Op Pain

		Mean	Std. Deviation	Std. Error Mean	Sig. (2-tailed)
Pair 1	Pain Via VAS Pre-operative – 9 months Post op Pain On VAS	5.350	1.718	.272	.000

Figure I: Pain Via VAS Pre-Op

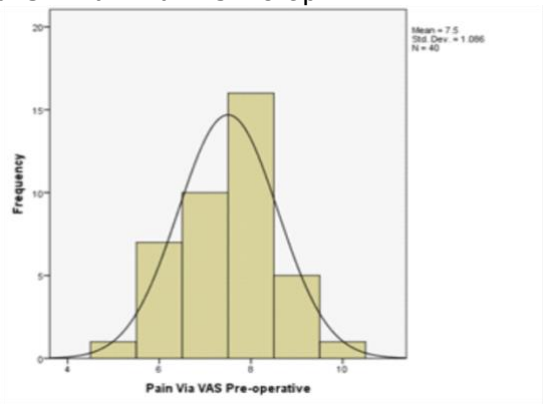

Figure II: Pain Via VAS Post-operative

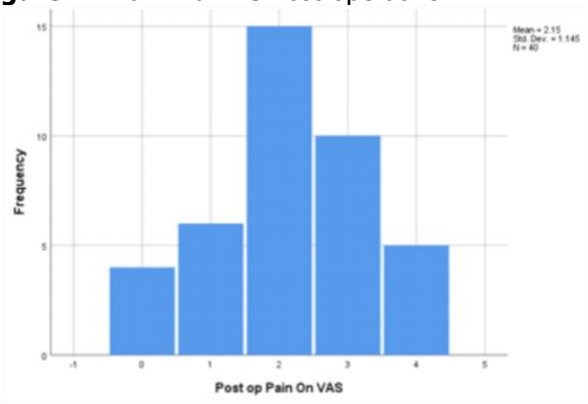

Figure III: Forward Flexion Pre op

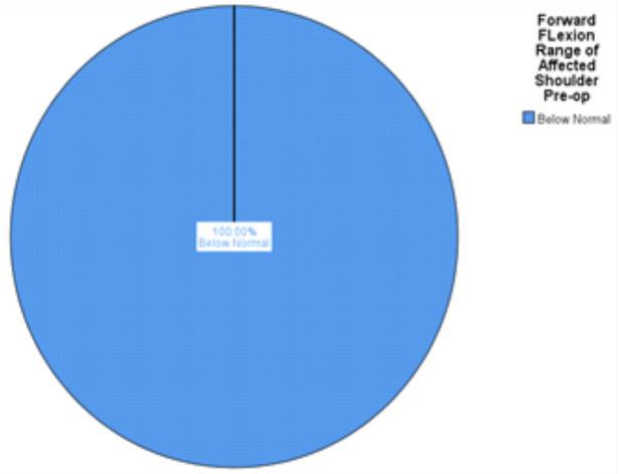

Figure IV: Forward Flexion post-OP at

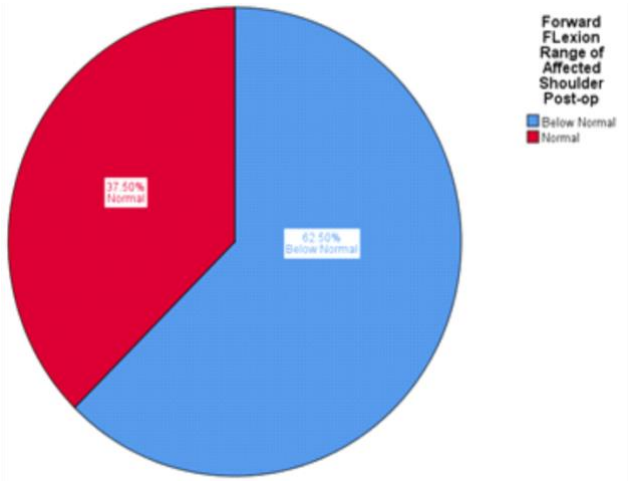

Figure V: Extension Pre-OP

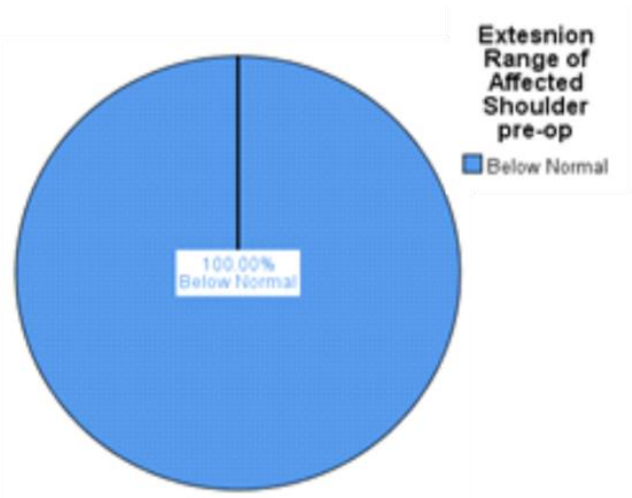

Figure VI: Extension at 9 months Post-Op

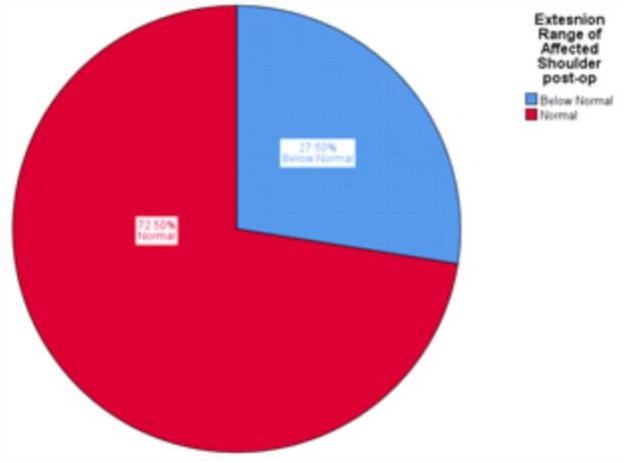

Figure VII: External Rotation Pre-OP

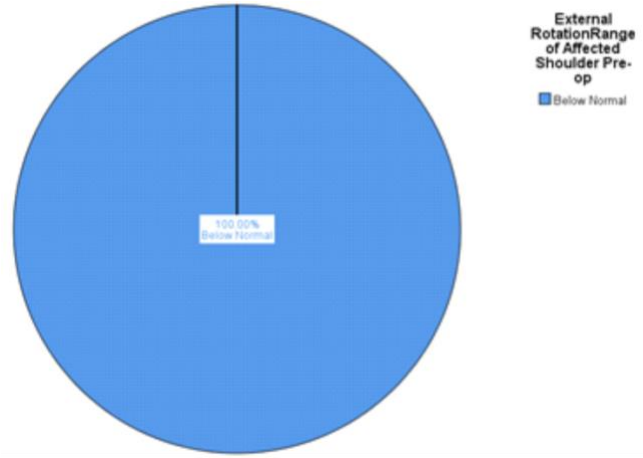

Figure VIII: External Rotation At 9 months Post-op

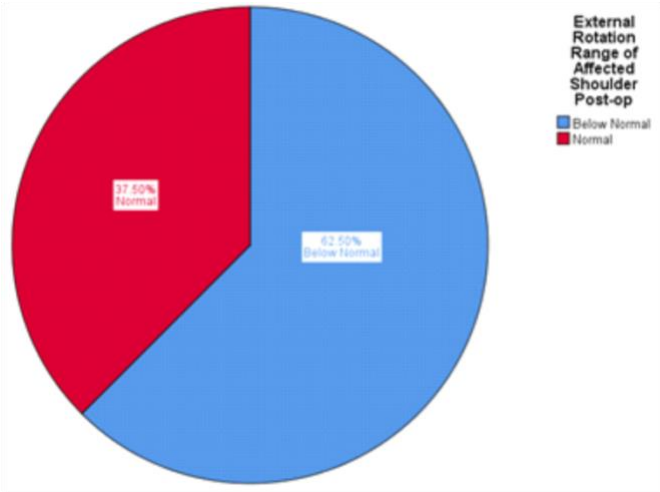

Figure IX: Abduction of Shoulder at 9 months Post-OP

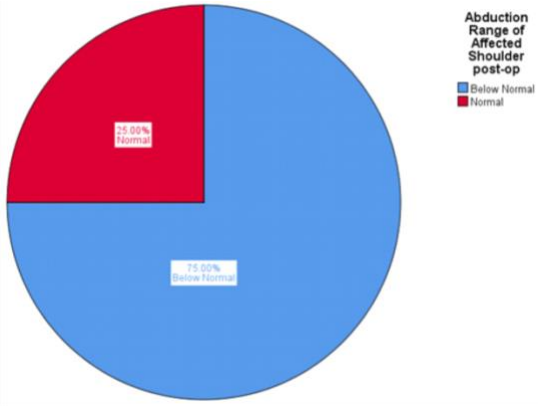

Fig X: Synovitis and Thickened Capsule

Fig XI: Shaving of synovium

DISCUSSION

In 2018, George L. et al conducted a study on 43 participants with the average age of 54.8 years, the standard deviation was 7.4 years, and 78% of the participants were female. The average number of months with symptoms was 16.2 ± 21.0. At the last follow-up, active forward flexion had increased from 115.0° ± 21.9° to 156.2° ± 16.1°. Before surgery, active external rotation with the arm abducted was 28.1° 16.3°; after surgery, it was 56.8° 15.7°. Even two weeks after surgery, significant ROM improvements were observed (P < 0.001). There were no problems or revision operations. This is in accordance with our study that was conducted on 40 participants over a period of 5 years with 72.5 % females. The surgery was performed in beach chair position which resulted in improvement of shoulder ROMs and eventually Pain as shown in fig 2 and 3. Active forward flexion improved from 126 ± 9.636 to 146.8 ± 8.76 degrees and shoulder external Rotation improved from 47.13 ± 8.23 to 83.50 ± 7.08. (P <0.05) as shown in table 2. (1, 15, 16)

In 2017, Dr. Umesh Jadhav et al. conducted a study on 40 participants with the patients' average age of 57.1 years, with 13 men (32.5%) and 27 women (67.5.5%) among them. In 31 patients (77.5%) and 9 patients (22.5%), the right and left shoulders were both afflicted. The average range of motion (Abduction, External Rotation, Anterior Elevation and Internal Rotation) was 36.30/21.10/98.20/13.80 before surgery, whereas it was 166.80/55.70/178.50/48.10 after surgery in lateral decubitus position. The average VAS decreased from 8.7 to 2.3. This is in Similar ACCORDANCE with to our study which stated that out of had 40 participants, 11 (27.5%) males and 29 (72.5%) females participated in the study. The age range was 40-70 years with the mean age of 55.4 ± 8.6 years. When experienced with arthroscopic release in beach chair position, Active forward flexion improved from 126 to 146.8 degrees. The shoulders' extension increased from 30.70 to 47.50, their abduction increased from 128.38 to 142.8, their adduction increased from 20.05 to 26.48, their external and internal rotations increased from 47.13 to 83.50 and 48.58 to 74.8 respectively. The pain range on VAS improved with the mean of 7.60 to 2.15.[5,17,18]

In 2018, Jae Chul et al. carried out a study. 30 shoulders in total were investigated in a study on 29 individuals (17 women and 12 men) who met the inclusion criteria. The average patient age was 53.8 ± 10.2 years, with 17 left shoulders and 13 right shoulders (range, 34-74 years). Results when compared to preoperative levels, the mean pain visual analogue scale (VAS) value at 6 months after surgery dropped by 4.0. Along with forward

elevation, external rotation, and internal rotation, ROM also increased by 28.0°, 5.3°, and 4.0° vertebral levels, respectively. Forward elevation, internal rotation, and Constant-score The improvements made by Murley's increases were all statistically significant (p <0.001 for Constant score, p=0.001 for internal rotation, and p=0.001 for forward elevation), while the improvement in exterior rotation was not (p=0.106). However, in this study, for adhesive capsulitis following surgical release, in the beach chair posture, active forward flexion increased from 126 to 146.8 degrees. Improvements were made in shoulder extension (30.70 to 47.50), shoulder abduction (128.38 to 142.8), shoulder adduction (20.05 to 26.48), shoulder external rotation (47.13 to 83.50), and shoulder internal rotation (48.58 to 74.8). There were statistically significant improvements in ranges (p< 0. 05) The mean pain score on the VAS decreased from 7.60 to 2.15 (Table III)[19-22]

Limitation of the Study: This investigation was carried out in a One Centre single location. Consequently, the findings of this study cannot be applied to the general population.

CONCLUSION

For patients with idiopathic adhesive capsulitis, arthroscopic 360° capsular release in the Beach chair position produces excellent functional outcomes, a considerable long-lasting and early increase in range of motion, and minimal revision and complication rates The Beach chair posture Position has emerged as a safe and effective approach for treating severe frozen shoulder.

Conflict of Interest: None

Grants/Funding: None

Patients' Consent: Before surgical procedures patient's and their families. Written Consent's were was obtained before surgical procedures. Verbal Consent was obtained from each and Every Patient for their Rehabilitation of Adhesive capsulitis Post-Operatively.

REFERENCES

1. Cvetanovich GL, Leroux TS, Bernardoni ED, Hamamoto JT, Saltzman BM, Verma NN, et al. Clinical Outcomes of Arthroscopic 360° Capsular Release for Idiopathic Adhesive Capsulitis in the Lateral Decubitus Position. Arthroscopy: The Journal of Arthroscopic & Related Surgery. 2018;34(3):764-70.
2. Grant JA, Schroeder N, Miller BS, Carpenter JE. Comparison of manipulation and arthroscopic capsular release for adhesive capsulitis: a systematic review. Journal of Shoulder and Elbow Surgery. 2013;22(8):1135-45.
3. Surendran S, Patinharayil G, Karuppal R, Marthya A, Fazil M, Mohammed Ali S. Arthroscopic capsular release and continuous upper arm brachial block in frozen shoulder – A midterm outcome analysis. Journal of Orthopaedics. 2020;21:459-64.
4. Houck DA, Belk JW, Vidal AF, McCarty EC, Bravman JT, Seidl AJ, et al. Outcomes of Arthroscopic Capsular Release in the Beach-Chair Versus Lateral Decubitus Position: A Systematic Review. Orthop J Sports Med. 2019;7(12):2325967119888173.
5. Jadhav U, Gotecha D. Arthroscopic 360 degrees capsular release for treatment of adhesive capsulitis–A study of 40 cases. International Journal of Orthopaedics. 2017;3(1):649-54.
6. Cho C-H, Kim D-H, Lee Y-K. Serial Comparison of Clinical Outcomes After Arthroscopic Capsular Release for Refractory Frozen Shoulder With and Without Diabetes. Arthroscopy: The Journal of Arthroscopic & Related Surgery. 2016;32(8):1515-20.
7. Robinson C, Seah KM, Chee Y, Hindle P, Murray I. Frozen shoulder. The Journal of bone and joint surgery British volume. 2012;94(1):1-9.
8. Jerosch J, Nasef NM, Peters O, Mansour AMR. Mid-term results following arthroscopic capsular release in patients with primary and secondary adhesive shoulder capsulitis. Knee surgery, sports traumatology, arthroscopy. 2013;21(5):1195-202.
9. Vastamäki H, Kettunen J, Vastamäki M. The natural history of idiopathic frozen shoulder: a 2-to 27-year followup study. Clinical Orthopaedics and Related Research®. 2012;470(4):1133-43.
10. Sivasubramanian H, Chua CXK, Lim SY, Manohara R, Ng ZWD, V PK, et al. Arthroscopic capsular release to treat idiopathic frozen shoulder: How much release is needed? Orthopaedics & Traumatology: Surgery & Research. 2021;107(1):102766.
11. Puah KL, Salieh MS, Yeo W, Tan AHC. Outcomes of arthroscopic capsular release for the diabetic frozen shoulder in Asian patients. J Orthop Surg (Hong Kong). 2018;26(1):2309499018757572.
12. Berghs BM, Sole-Molins X, Bunker TD. Arthroscopic release of adhesive capsulitis. Journal of shoulder and elbow surgery. 2004;13(2):180-5.
13. Cutbush K, Italia K, Narasimhan R, Gupta A. Frozen Shoulder 360° Release. Arthroscopy Techniques. 2021;10(4):e963-e7.
14. Kim DH, Song KS, Min BW, Bae KC, Lim YJ, Cho CH. Early Clinical Outcomes of Manipulation under Anesthesia for Refractory Adhesive Capsulitis: Comparison with Arthroscopic Capsular Release. Clin Orthop Surg. 2020;12(2):217-23.
15. Arce G. Primary Frozen Shoulder Syndrome: Arthroscopic Capsular Release. Arthroscopy Techniques. 2015;4(6):e717-e20.
16. Elhassan B, Ozbaydar M, Massimini D, Higgins L, Warner JJ. Arthroscopic capsular release for refractory shoulder stiffness: a critical analysis of effectiveness in specific etiologies. Journal of shoulder and elbow surgery. 2010;19(4):580-7.
17. Ebrahimzadeh MH, Moradi A, Pour MK, Moghadam MH, Kachooei AR. Clinical outcomes after arthroscopic release for

recalcitrant frozen shoulder. Archives of Bone and Joint Surgery. 2014;2(3):220.
18. Lafosse L, Boyle S, Kordasiewicz B, Guttierez-Arramberi M, Fritsch B, Meller R. Arthroscopic arthrolysis for recalcitrant frozen shoulder: a lateral approach. Arthroscopy: The Journal of Arthroscopic & Related Surgery. 2012;28(7):916-23.
19. Yoo JC, Koh KH, Shon MS, Bae KH, Lim TK. Clinical Outcome after Arthroscopic Capsular Release for Adhesive Capsulitis of the Shoulder. Clin Shoulder Elb. 2018;21(3):127-33.
20. Yoo JC, Ahn JH, Lee YS, Koh KH. Magnetic resonance arthrographic findings of presumed stage-2 adhesive capsulitis: focus on combined rotator cuff pathology. Orthopedics (Online). 2009;32(1):22.
21. Nicholson GP. Arthroscopic capsular release for stiff shoulders. Arthroscopy: The Journal of Arthroscopic & Related Surgery. 2003;19(1):40-9.
22. Ide J, Takagi K. Early and long-term results of arthroscopic treatment for shoulder stiffness. Journal of shoulder and elbow surgery. 2004;13(2):174-9.