Juniper publishers
key to the Researchers

Orthopedics and Rheumatology
Open Access Journal

Research Article
Volume 1 Issue 1 - August 2015

Orthop Rheumatol Open Access J

Patient Satisfaction and Patient Reported Outcome Measure Data in Arthroscopic Release of Frozen Shoulder

RK Ray[1], A Patel[1], G Cox[2] and A Cole[2]

[1]*Department of Trauma & Orthopaedics, Basildon & Thurrock University Hospitals NHS Trust, UK*

[2]*Department of Trauma & Orthopaedics, Southampton University Hospitals NHS Trust, UK*

Submission: September 12, 2015; Published: September 23, 2015

***Corresponding author:** Ravi Ray, University of Southampton, Orthopaedic Department Basildon & Thurrock University Hospitals NHS Foundation Trust Nethermayne, Basildon, Essex. SS16 5NL, UK, Tel: 07973544823; Email: raviray@hotmail.com

Abstract

We present a consecutive series of 99 arthroscopic capsule releases with a mean follow-up period of 28 months. This cohort gave patient reported outcome measures and satisfaction scores that reflect an excellent outcome following an anterior capsule and rotator interval release with a manipulation to achieve a full range of movement intra-operatively. Oxford Shoulder Score went from a mean of 23 pre-operatively to 44 post-operatively. At a mean of four months, satisfaction score was 9/10, 88% had returned to work, 92% reported an improvement in the quality of their sleep and 94% stated that they would have the procedure again. No difference was found between those that did receive steroid injections at the time of surgery and those that did not and there was no trend for diabetic patients to do worse than their non-diabetic contemporaries.

Keywords : Frozen Shoulder; Adhesive Capsulitis; Arthroscopic Capsule Release; PROMs

Introduction

Primary frozen shoulder is characterised by pain and global stiffness of the shoulder in the presence of a normal shoulder radiograph, with the histological findings of chronic inflammation and fibrosis [1-3]. With a prevalence of approximately 2% in the adult population [1], it is most commonly seen in middle-aged women [4] and though mainly idiopathic, it is more common in diabetics [5-7] who have a 40% chance of developing a frozen shoulder in their lifetime [1,5,6]. There is an association with Dupuytren's contracture [2,8,9], thyroid dysfunction [10,11] and a genetic role has been implicated [2].

Although the natural history of primary frozen shoulder is believed to be self-limiting, resolution of symptoms may take more than three years and there remains a group of patients with residual pain, stiffness and loss of function in the long-term. Patients with the most severe symptoms at onset carry a worse prognosis [3,12].

Patients who have undergone multiple interventions including bee venom acupuncture, anti-inflammatory medication, corticosteroid injection, manipulation under anaesthesia (MUA) and extensive physiotherapy prior to surgery dilute the understanding of the benefits of arthroscopic capsular release itself. Some would argue that these must be tried prior to the offer of surgical intervention. Several studies have also used outcome measures that have not been validated, making it difficult to derive valid conclusions.

Surgical treatment of primary frozen shoulder has evolved in the last 20 years. Open surgical release of the rotator interval was popularised by Ozaki et al. [13] in 1989 and later by others [14]. Improving arthroscopic techniques in the shoulder have reduced the morbidity of open procedures and arthroscopic capsular release was proposed 15 years ago as a minimally invasive surgical option for treatment of frozen shoulder by Ogilvie-Harris et al. [15]. This procedure has since been reported by a number of authors with reliably good outcomes [16-19]. Many studies have reported small numbers with mixed patient groups, often including cases of secondary frozen shoulder.

In one of the first prospective reports, Reeves [20] followed 41 patients for between 5 and 10 years, reporting significant recovery in range of movement in most patients at a mean of 30.1 months post onset of symptoms. In 1992, Shaffer et al. [21] reported that in a series of 62 patients from an initial cohort of 183 patients, 50% had pain or stiffness at a mean of seven years and 60% had restriction of movement. They had all undergone shoulder rehabilitation exercises supplemented by various treatment regimes, including subacromial injection (84%) and MUA (6.2%). Manipulation under anaesthetic for frozen shoulder

has been shown to be an effective treatment for this condition, but can require excessive force to tear the fibrotic capsular tissue resulting in reported complications such as humeral shaft fracture, brachial plexus or vascular injury, rotator cuff tear and dislocation. Much like cutting half way through a piece of paper before trying to tear it in two, controlled surgical release of the worst affected frozen shoulder tissue in the rotator interval greatly reduces the force required to achieve an effective MUA, thereby reducing the complication rate.

Ogilvie-Harris et al compared MUA with arthroscopic release in a prospective cohort of 40 patients [15]. Their results after a follow-up of between two and five years showed a similar range of movement, but the release had a better outcome in terms of pain and function. The overall outcome was excellent in 15 of 20 patients in the arthroscopic group but in only seven of 18 in the MUA group. Klinger et al. [22] performed arthroscopic release on 36 shoulders after failure of conservative treatment of 6 months duration and reported that 75% of their patients returned back to work within a mean of 8 weeks after release.

In a larger series of 73 patients Watson et al. [23] discharged all their patients with full range of movement and without pain at a mean of 8.9 weeks after release, results which have not been matched in the literature. The mean duration of conservative treatment in their series was 18 months. In a recent retrospective review of 115 patients who underwent arthroscopic release for refractory shoulder stiffness of varying aetiology, Elhassan et al. [24] reported improvement of age- and gender-adjusted Constant score from 35% to 86% at a mean follow up of 46 months. In their study only 41 patients (36%) belonged to primary idiopathic group who had failed a trial of conservative therapy for a mean of 11 months. The authors reported maximum improvement in this subgroup of patients compared to post-surgical and post-traumatic groups.

Controversy exists as to how much of the capsule to release arthroscopically since similar results have been demonstrated in studies where circumferential release has been performed compared to only a rotator interval release. In the above series [24], the authors performed both anterior and posterior release. In a retrospective comparative analysis of data from 48 consecutive patients who underwent capsular release for resistant primary or secondary frozen shoulder, Snow et al. [25] evaluated the benefit of additional posterior release over standard antero-inferior release, concluding that there was no significant difference in the overall outcome with the addition of a posterior release. Jerosch et al. [26] also reported no additional advantage with the extension to a global 360° capsular release compared with a 270° release. Cadaveric study shows that the axillary nerve runs closest to the inferior glenoid rim between the 5:30 and 6:00 o'clock position and that its closest distance from the glenoid rim varied from 10 to 25mm in the neutral arm position [27]. Pearsall et al. [19] described releasing the intra-articular portion of the subscapularis [19]; however, most studies show excellent results without subscapularis release.

Use of intra-articular administration of steroids during frozen shoulder surgery is standard practice in some centres [14,28]. In 25 patients with primary frozen shoulder undergoing arthroscopic release, Bunker et al routinely instilled 10 mL of 0.5% bupivacaine and 25 mg hydrocortisone acetate through the arthroscopic cannula before withdrawal from the joint. 88% reported dramatic improvement in pain and function within the first two weeks of release [14].

Diabetes mellitus is recognized as a poor prognostic indicator in frozen shoulder, however the reported outcome of arthroscopic capsular release in patients with this disease varies in the literature [7,23,24,29]. Some reviews reported a higher recurrence rate after arthroscopic capsular release in diabetic patients, whereas others did not find a difference in the outcome between diabetic patients and non-diabetic patients.

The importance of PROMs in elective orthopedics has been highlighted by the Department of Health in the NHS Next Stage Review and their widespread use has been recommended [30]. The use of PROMs in assessment of surgical results is enormously useful; however combining this with patient satisfaction questions may add significant value to the interpretation of outcome after surgery [2].

Aim

The aim of this study is to report the functional outcome of arthroscopic release in primary frozen shoulder using validated patient-reported outcome measures (PROMs) and a patient satisfaction index.

Methods

Study Population

Between 2002 and 2009, 132 consecutive patients (135 shoulders) identified in a specialist shoulder clinic with a diagnosis of primary frozen shoulder unresponsive to conservative management underwent arthroscopic capsular release and manipulation. Patients with a secondary frozen shoulder, for example post-traumatic, post-surgical or from bony structural abnormalities were excluded from the study, as were all cases in which a secondary procedure was performed to include sub-acromial decompression. All patients were treated with an initial outpatient conservative regimen of intra-articular glenohumeral injection of local anaesthetic and steroid followed by supervised physical therapy. Patients who failed to improve with this treatment, with significant ongoing symptoms of pain and stiffness, were offered arthroscopic capsular release with a manipulation.

Surgical Technique

Arthroscopic capsular release was performed in the beach chair position as a day case procedure under general anaesthesia supplemented by an interscalene regional nerve block. The operations were carried out by either of two fellowship trained shoulder surgeons in the department (ASC & GCH).

Capsular release was performed using a radio-frequency hook (3.0-mm 90° hooked electrode, Depuy Mitek, Raynham, MA) through an anterior arthroscopy portal with a standard posterior portal used for visualization. Release of the rotator interval, the

How to cite this article: RK Ray, A Patel, G Cox, A Cole. Patient Satisfaction and Patient Reported Outcome Measure Data in Arthroscopic Release of Frozen Shoulder. Orthop Rheumatol Open Access J. 2015;1(1): 555553. DOI: 10.19080/OROAJ.2015.01.555553

middle glenohumeral ligament and the anterior capsule between the 2 and 5 O'clock positions was performed under direct vision with arthroscopic scissors used to complete the anterior capsule release between 5 and 6 O'clock. The subscapularis tendon was not released or violated. Arthroscopic release was followed by gentle manipulation of the shoulder using a short lever arm technique to achieve maximal range of movement.

During the study period it became routine practice to perform an intra-articular injection of corticosteroid and local anaesthetic (8ml 0.5% bupivacaine hydrochloride and 80mg methylprednisolone) to the glenohumeral joint. Post-operatively the shoulder was rested in a sling with instructions to remove it once the effect of the interscalene block had ceased in order to initiate early mobilisation.

Patients were seen by a physiotherapist before discharge and given both verbal and written instructions about shoulder exercises. Formal sessions were introduced at two weeks post operatively as per protocol. Patients were followed up in the outpatient clinic at regular intervals until suitable for discharge [31-39].

Data Collection

Patient demographic and comorbidity details were recorded with most Oxford Shoulder Scores (OSS) collected preoperatively. Careful record was made of operative details and any postoperative complications. All patients were followed in the outpatient clinic until discharge. As part of routine postoperative follow-up, patients completed an OSS after surgery at each follow-up. A further OSS was obtained from patients by postal questionnaire at a minimum of 1 year postoperatively. Severity was based on interpretation from Dawson et al. [12] but using the inverted range (0-48) with a greater score representing fewer symptoms.

The last postal OSS was completed together with the Southampton Shoulder Satisfaction Index. The Southampton Shoulder Satisfaction Index contains two primary outcome measures:

a. Overall satisfaction with the outcome of surgery (Response: 10-point visual scale between 1 and 10, from 1 not satisfied to 10 highly satisfied)

b. Whether the patient would choose to have the operation again (Response: Yes/No).

A. Secondary outcome measures included:

i. Time until improvement of shoulder symptoms (Response: 12-point visual scale between 1 and 12 months)

ii. Return to work (Response: Yes/No)

iii. Whether the patient's quality of sleep had improved (Response: Yes/No)

Statistical Analysis

Paired t-tests were performed to compare pre- and post-operative OSS. Unpaired t-tests were performed to assess variation in OSS between different groups.

Results

Arthroscopic capsular release was performed on 135 shoulders in 132 patients with primary frozen shoulder but a certain number had suspicion of a concomitant impingement syndrome. After postal and telephone reminders, a questionnaire response rate of 88% (119/135) was achieved with the remaining 16 patients lost to long-term follow-up.

In 17% (20/119), subacromial decompression was also performed at the time of surgery excluding them from further statistical analysis thus leaving 99 patients suitable for inclusion in the study.

51.5% of this cohort (51/99) received a peri-operative intra-articular injection. The demographic characteristics of these sub-groups were similar to that of the overall cohort.

The mean age of patient was 53 years (range 37 to 70 years) with 53 men and 46 women, of whom 20% (20/99) were diabetic and 53 were right sided operations. Mean follow-up was 28 months (range 4-88 months) with 76% (75/99) having follow-up greater than 12 months.

Complications were seen in 11 of our 99 patients (11%). 6 patients had ongoing pain at final follow-up, two described weakness, two described stiffness, one had recurrence and one had a possible ophthalmic artery infarct, not thought to be directly related to this surgery.

Pre-operative OSS was available for 77 of the 99 (*Subgroup 1*), but only 37% (37/99) had an early post-operative OSS recorded, described as scores recorded within 6 months of surgery (*Subgroup 2*). Thus, 2 sub-groups were identified for analysis from the overall cohort and their demographics are shown in (Table 1).

Oxford Shoulder Scores

In the 99 patients with long-term follow-up (mean 28 months) the mean postoperative OSS was 42 (median 46, range 4-48). 35% (35/99) had a postoperative OSS of 48/48, indicating normal shoulder function. 64% (63/99) had an OSS of 44 or

Table 1: overall cohort and their demographics.

Table 1	All	Subgroup 1 (Pre- and Post-operative follow-up)	Subgroup 2 (Pre- and early/late Postoperative follow-up)	
Follow-up **Mean (months)** **Range (months)**	 28 4-88	 30 4-88	Early 4 1-6	Late 37 8-88
Age **Mean (years)** **Range (years)**	 53 37-70	 53 38-70	53 39-69	
Gender **Males** **Females**	 53 46	 43 34	21 16	
Total (n)	99	77	37	

How to cite this article: RK Ray, A Patel, G Cox, A Cole. Patient Satisfaction and Patient Reported Outcome Measure Data in Arthroscopic Release of Frozen Shoulder. Orthop Rheumatol Open Access J. 2015;1(1): 555553. DOI: 10.19080/OROAJ.2015.01.555553

greater, indicating near normal shoulder function. 32% (32/99) had persistent mild to moderate symptoms (OSS 24-43) and only 4% (4/99) had persistent severe symptoms (OSS under 24).

In the 77 patients with pre-operative and post-operative OSS (after greater than a year) a highly clinically and statistically significant improvement in OSS was seen. Mean pre-operative OSS was 23 (+/- 7.65SD), which improved to 44 (+/- 6.62SD) post-operatively ($p<0.0001$, 95% CI -23.72 to -19.16)

In the 37 patients with pre-operative and both early and late post-operative OSS, an early improvement in OSS was seen within a mean post-operative period of 4 months which was sustained and further improved at long term follow-up (mean 37 months). This was statistically significant $P<0.0001$ (Table 2).

For further analysis the 77 patients were split into two groups by the severity of their pre-operative OSS. A severe group (OSS ≤ 23) (n=38) and a mild to moderate group (OSS 24-43) (n=39). When pre and postoperative OSS were compared, there was a significant difference, suggesting a poorer, but still clinically acceptable, outcome in the presence of more severe symptoms at the time of surgery (Table 3).

Table 2: pre-operative and both early and late post-operative OSS.

Table 2	Pre-Operative	Early Post-Operative (mean 4 months)	Late Post-Operative (mean 37 months)
Mean OSS	**24 (**+/-7.17SD)	**41 (**+/-5.35SD)	**45 (**+/-3.31SD)
		p < 0.0001 95% CI -19.79 to -13.86	p < 0.0001 95% CI -6.82 to -2.70

Table 3: Severity of pre-operative OSS in 77 patients.

Table 3	Mild to Moderate Pre-Operative Group (OSS 24-43) n=39	Severe Pre-Operative Group (OSS ≤ 23) n=38
Post-Operative OSS (mean)	**46 (**+/- 3.75 SD)	**42 (**+/- 8.37 SD)
		p = 0.03 95% CI -6.18 to -0.32

Table 4: The results of the satisfaction questionnaire.

Table 4	Subgroup 1 (n=77)	Intra-articular Injection (n=49)	Diabetic (n=16)
Pre-operative OSS (mean)	23	24 (p=0.066)	23 (p=0.893)
Post-operative OSS (mean)	44	44 (p=0.923)	43 (p= 0.472)
Satisfaction (mean)	9/10	9/10	8/10
Time to symptom improvement (median, months)	3	3.5	3
Returned to Work (%)	87	90	100
Improved Sleep Quality (%)	90	94	100
Would have procedure again (%)	94	90	100

Southampton Shoulder Satisfaction Index

The level of satisfaction was very high. Of the questionnaires returned, mean satisfaction score was 9/10 (range 3-10) with 43% (43/99) scoring 10/10. The mean time reported for symptom improvement was 4 months (median 3, range 1-12). 88% (87/99) had returned to work, 92% (91/99) reported an improvement in the quality of their sleep and 94% (93/99) stated that they would have the procedure again.

Similar satisfaction levels were found in Subgroup 1 who had pre-operative OSS recorded. Table 4 summarizes the results of the satisfaction questionnaire.

Intra-articular injection

There was no statistical difference in post-operative OSS or satisfaction between those patients who received an intra-articular injection and those who did not (Table 4).

Diabetes

In these 99 patients there was no significant difference in post-operative OSS between diabetic (mean OSS 43) and non-diabetic patients (mean OSS 42) ($p=0.6232$). There also appeared to be no significant difference in the severity of symptoms pre-operatively between diabetics (mean OSS 23) and non-diabetics (mean OSS 23) ($p = 0.893$). As a group, their responses to the satisfaction questionnaire questions appeared no different to the overall response (Table 4) and there was no trend for these patients to do worse than their non-diabetic contemporaries.

Discussion

Although some frozen shoulders may spontaneously resolve, patients presenting to our specialist shoulder clinics are generally frustrated with the longevity of their symptoms.

Our study demonstrates good relief of symptoms with anterior capsule and an interval release with an MUA, reducing the risk of axillary nerve or subscapularis tendon damage that may ensue with a more extensive release.

We are able to establish that arthroscopic capsular release for primary frozen shoulder gives significant improvement in shoulder symptoms and function when assessed using a joint-specific PROM such as the OSS and produces a very high level of patient satisfaction. 94% of patients would have the procedure again if required.

In our series, the patients in whom early post operative OSS were available showed a significant early improvement in their OSS with a further improvement at a mean of 30 months post release to a near maximal OSS. These results show that most of the improvement in symptoms occurs within the first few weeks but further improvement occurs several years after the release. This potential for early postoperative recovery is reinforced by

How to cite this article: RK Ray, A Patel, G Cox, A Cole. Patient Satisfaction and Patient Reported Outcome Measure Data in Arthroscopic Release of Frozen Shoulder. Orthop Rheumatol Open Access J. 2015;1(1): 555553. DOI: 10.19080/OROAJ.2015.01.555553

the response to our patient questionnaire where the reported median time for symptom improvement was 3 months. At a recent discussion at the national meeting for shoulder surgeons, early recovery was seen to be the main thrust for surgical intervention and suggestions were made that we should be scoring our patients as early as two weeks post-operatively.

Our complication rate was comparable to that noted in the literature, with only a suspected ophthalmic artery infarct appearing out of the ordinary, but clearly unrelated.

Same day discharge is preferred by most of our patients, and the excellent postoperative pain relief achieved with interscalene block together with concomitant oral analgesia encourages early discharge from hospital.

Throughout the literature, varying comments are made regarding outcomes in diabetics but we did not find a significant difference for those suffering from diabetes mellitus. Their pre-operative & post-operative OSS, satisfaction and improvement was similar to non-diabetics.

Long-term outcome studies of primary frozen shoulder have reported poor outcome to be related to severity of symptoms on initial presentation [2]. In our study a significantly worse postoperative OSS was found in those patients with severe pre-operative OSS (OSS ≤ 23) compared to those with mild to moderate preoperative OSS (OSS 24 to 43). However there was still a clinically acceptable improvement in patients with severe pre-operative OSS with a very high satisfaction amongst all groups.

Though some centers choose routinely to administer steroid intra-operatively, others would suggest the risk of infection is too great. We saw no infections in our cohort and believe that no harm has come as a result of their use in this study, however the data would suggest there was no gain either.

Conclusion

Very few complications were recorded in our series, which concurs with most of the previously published reports.

Arthroscopic capsular release has been established as a highly successful procedure. This study shows excellent results in a large group of patients with the specific diagnosis of primary frozen shoulder, treated with an arthroscopic release, as reported by the patient rather than the clinician.

We have actively moved to offering our patients questionnaires as early as two weeks post-operatively and look forward to publishing further work on early recovery as reported by the patient. Both short and long-term outcomes are clearly of interest here.

Our operative technique is not only safe and reproducible but also allows faster overall recovery from pain and restricted range of movement, permitting this age group to return to their desired activities and their work sooner.

Références

1. Tasto JP, Elias DW (2007) Adhesive capsulitis. Sports Med Arthrosc 15(4): 216-221.
2. Bunker TD, Anthony PP (1995) The pathology of frozen shoulder. J Bone Joint Surg Br 77(5): 677-683.
3. Hand GC, Athanasou NA, Matthews T, Carr AJ (2007) The pathology of frozen shoulder. J Bone Joint Surg Br 89(7): 928-932.
4. Hand C, Clipsham K, Rees JL, Carr AJ (2008) Long-term outcome of frozen shoulder. J Shoulder Elbow Surg 17(2): 231-236.
5. Bridgman J (1972) Periarthritis of the shoulder and diabetes mellitus. Ann Rheum Dis 31(1): 69-71.
6. Lequesne M, Dang N, Bensasson M, Mery C (1977) Increased association of diabetes mellitus with capsulitis of the shoulder and shoulderhand syndrome. Scand J Rheumatol 6(1): 53-56.
7. Massoud S, Pearse E, Levy O, Copeland S (2002) Operative management of the frozen shoulder in patients with diabetes. J Shoulder Elbow Surg 11: 609-613.
8. Smith S, Devaraj V, Bunker T (2001) The association between frozen shoulder and Dupuytren's disease. J Shoulder Elbow Surg 10(2): 149-151.
9. Kay NR, Slater DN (1981) Fibromatoses and diabetes mellitus. Lancet 2: 303.
10. Bowman CA, Jeffcoate WJ, Pattrick M, Doherty M (1988) Bilateral adhesive capsulitis, oligoarthritis and proximal myopathy as presentation of hypothryoidism. Br J Rheum 27(1): 62-64.
11. Wohlgethan JR (1987) Frozen shoulder in Hyperthyroidism. Arthritis Rheum 30(8): 936-939.
12. Dawson J, Fitzpatrick R, Carr A (1996) Questionnaire on the perceptions of patients about shoulder surgery. J Bone Joint Surg Br 78(4): 593-600.
13. Ozaki J, Nakagawa Y, Sakurai G, Tamai S (1989) Recalcitrant chronic adhesive capsulitis of the shoulder. J Bone Joint Surg Am 71(10): 1511-1555.
14. Berghs BM, Sole-Molins X, Bunker TD (2004) Arthroscopic release of adhesive capsulitis. J Shoulder Elbow Surg 13(2): 180-185.
15. Ogilvie-Harris DJ, Biggs DJ, Fitsialos DP, MacKay M (1995) The resistant frozen shoulder. Manipulation versus arthroscopic release. Clin Orthop Relat Res (319): 238-248.
16. Segmuller HE, Taylor DE, Hogan CS, Saies AD, Hayes MG (1995) Arthroscopic treatment of adhesive capsulitis. J Shoulder Elbow Surg 4(6): 403-408.
17. Warner JJ, Allen A, Marks PH, Wong P (1996) Arthroscopic release for chronic, refractory adhesive capsulitis of the shoulder. J Bone Joint Surg Am 78(12): 1808-1816.
18. Harryman DT, Matsen FA, Sidles JA (1997) Arthroscopic management of refractory shoulder stiffness. Arthroscopy 13(2): 133-147.
19. Pearsall AW, Osbahr DC, Speer KP (1999) An arthroscopic technique for treating patients with frozen shoulder. Arthroscopy 15(1): 2-11.
20. Reeves B (1975) The natural history of the frozen shoulder syndrome. Scand J Rheumatol 4(4): 193-196.
21. Shaffer B, Tibone JE, Kerlan RK (1992) Frozen shoulder. A long-term follow-up. J Bone Joint Surg Am 74(5): 738-746.
22. Klinger HM, Otte S, Baums MH, Haerer T (2002) Early arthroscopic release in refractory shoulder stiffness. Arch Orthop Trauma Surg 122(4): 200-203.
23. Watson L, Dalziel R, Story I (2000) Frozen shoulder: a 12-month clinical outcome trial. J Shoulder Elbow Surg 9(1): 16-22.
24. Elhassan B, Ozbaydar M, Massimini D, Higgins L, Warner JJ (2010) Arthroscopic capsular release for refractory shoulder stiffness: a

How to cite this article: RK Ray, A Patel, G Cox, A Cole. Patient Satisfaction and Patient Reported Outcome Measure Data in Arthroscopic Release of Frozen Shoulder. Orthop Rheumatol Open Access J. 2015;1(1): 555553. DOI: 10.19080/OROAJ.2015.01.555553

critical analysis of effectiveness in specific etiologies. J Shoulder Elbow Surg 19(4): 580-587.

25. Snow M, Boutros I, Funk L (2009) Posterior arthroscopic capsular release in frozen shoulder. Arthroscopy 25(1): 19-23.

26. Jerosch J (2001) 360 degree arthroscopic capsular release in patients with adhesive capsulitis of the glenohumeral joint—Indication, surgical technique, results. Knee Surg Sports Traumatol Arthrosc 9(3): 178-186.

27. Yoo JC, Kim JH, Ahn JH, Lee SH (2007) Arthroscopic perspective of the axillary nerve in relation to the glenoid and arm position: a cadaveric study. Arthroscopy 23(12): 1271-1277.

28. Bunker T (1997) Frozen shoulder. Orthopaedic knowledge update. Shoulder and elbow. In: Norris T (ed), American Academy of Orthopaedic Surgeons, Rosemont, Illinois, USA pp. 255-263.

29. Cinar M, Akpinar S, Derincek A, Circi E, Uysal M (2010) Comparison of arthroscopic capsular release in diabetic and idiopathic frozen shoulder patients. Arch Orthop Trauma Surg 130(3): 401-406.

30. High Quality Care For All - NHS Next Stage Review Final Report. Department of Health; CM 7432; June 2008.

31. Pal B, Anderson J, Dick WC, Griffiths ID (1986) Limitation of joint mobility and shoulder capsulitis in insulin- and non-insulin-dependent diabetes mellitus. Br J Rheumatol 25(2): 147-151.

32. Dudkiewicz I, Oran A, Salai M, Palti R, Pritsch M (2004) Idiopathic adhesive capsulitis: long-term results of conservative treatment. Isr Med Assoc J 6(9): 524-526.

33. Levine WN, Kashyap CP, Bak SF, Ahmad CS, Blaine TA, et al. (2007) Nonoperative management of idiopathic adhesive capsulitis. J Shoulder Elbow Surg 16(5): 569-573.

34. Binder AI, Bulgen DY, Hazleman BL, Roberts S (1984) Frozen shoulder: a long-term prospective study. Ann Rheum Dis 43(3): 361-364.

35. Griggs SM, Ahn A, Green A (2000) Idiopathic adhesive capsulitis. A prospective functional outcome study of nonoperative treatment. J Bone Joint Surg Am 82-A(10): 1398-1407.

36. Chen J, Chen S, Li Y, Hua Y, Li H (2010) Is the extended release of the inferior glenohumeral ligament necessary for frozen shoulder?. Arthroscopy 26(4): 529-535.

37. Ide J, Takagi K (2004) Early and long-term results of arthroscopic treatment for shoulder stiffness. J Shoulder Elbow Surg 13(2): 174-179.

38. Baums MH, Spahn G, Nozaki M, Steckel H, Schultz W, et al. (2007) Functional outcome and general health status in patients after arthroscopic release in adhesive capsulitis. Knee Surg Sports Traumatol Arthrosc 15(5): 638-644.

39. Gerber C, Espinosa N, Perren TG (2001) Arthroscopic treatment of shoulder stiffness. Clin Orthop Relat Res (390): 119-128.

How to cite this article: RK Ray, A Patel, G Cox, A Cole. Patient Satisfaction and Patient Reported Outcome Measure Data in Arthroscopic Release of Frozen Shoulder. Orthop Rheumatol Open Access J. 2015;1(1): 555553. DOI: 10.19080/OROAJ.2015.01.555553