



SUBACROMIAL IMPINGEMENT SYNDROME: TREATMENT, BY WHICH THERAPY REGIMEN?

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ABSTRACT Subacromial impingement of shoulder is one of the most common causes of shoulder pain. The exercise therapy is an effective modality of the treatment. There are myriad of exercise regimen available for its treatment but lacking objectivity, specificity, similitude and easy comprehensibility by the patient and therapy provider. The rotator cuff and shoulder conditioning program designed by American Academy of Orthopedic Surgeons was used in this study for the management of subacromial impingement in sixty patients and its efficacy evaluated in terms of change in Constant Murley Score over the period of three months. The improvement in Constant Murley score is found to be statistically and clinically significant. The AAOS shoulder conditioning program is found to be not only comparable and equally effective in the outcome but also easy to understand, executable and reproducible.

KEYWORDS : subacromial impingement syndrome, shoulder conditioning program,

Introduction

Shoulder pain is the most common painful ailment to affect general population after low back pain, with subacromial impingement as the cause accounting for more than fifty percent¹. Impingement, if left untreated may proceed to partial or complete rotator cuff tear. The number of arthroscopic subacromial decompression is increasing despite the evidence available against its superiority in comparison to conservative treatment^{2,3}.

Although there is a range of therapies for the treatment of shoulder impingement syndrome including acupuncture⁴ and therapeutic ultrasound⁵, exercises, both supervised and home-based are most frequently used. The efficiency of physical therapy in SIS is established in the literature¹⁷. However, no universally accepted exercise protocol with specific components (i.e., type, intensity, frequency and duration), associated with best outcomes, is available. The physical therapy in SIS produces a decrease in pain and improvement in mental well-being in the short term but also a long-term improvement in function¹⁷.

Exercises outlined in the literature have addressed various factors i.e. altered muscular activity of the rotator cuff; correct function of the scapular stabilisers; spasm of shoulder girdle musculature; restriction of the glenohumeral joint capsule; restrictions in normal range of motion of the shoulder girdle; promotion of proper scapular kinematics during arm elevation; posture of the thoracic spine and shoulder girdle; nutrition of the rotator cuff; and centering of the humeral head within the glenoid fossa^{6,7,8,9,10,11,12,13,14,15,16}. Among these, the two main contributory factors for SIS are dysfunction of short rotators and scapular stabilizers^{18,19,20,21,22,23}.

Based on the above mentioned derangements various exercise regimen were developed and evaluated in all prior studies^{24,25,26,27,28,29,30,31,32}.

We found lack of homogeneity in the regimen chosen for the treatment of SIS in these studies. We used self-training program developed by American Academy of Orthopedic Surgeons in this study. This program is evaluated in this study for its efficacy and if we can make the treatment delivery and execution simple, lucid, homogenous and easy to comply.

Material and Method

In this study 60 patients, who were diagnosed to have subacromial impingement syndrome were included. The diagnosis of subacromial impingement syndrome was made on the basis of clinical examination only. Patients with minimum duration of 3 weeks of shoulder pain and having involvement of unilateral side were included in the study. Patients who were found to have full thickness rotator cuff tear (drop

arm sign and external rotation lag sign), frozen shoulder, acromioclavicular joint disorders, glenohumeral osteoarthritis, concomitant cervical radiculopathy, glenohumeral instability, more than sixty years old and previously operated for any shoulder condition were excluded. Patients with bilateral shoulder involvement were excluded, to facilitate the comparison between the affected and non-affected side, as no database of Constant Murley Score is available for our population. Only those patients were included in this study, whose, a difference of Constant Murley score, on the affected side was more than 10. In this way, only patients with significant affection were included.

All patients were counselled for conservative treatment, in the form of shoulder conditioning program as advised by the American Academy of Orthopedic Surgeons. The shoulder conditioning program is a home exercise program, consisting of stretching and strengthening of muscles around the shoulder. The compliance to the program was ensured by the diary, which patient was advised to maintain. In the initial phase, patients were educated about the method of exercises, to be done and then asked to demonstrate, the same exercises to ensure accuracy and exactitude. Any discrepancy, if found, was corrected. Patients were reviewed three times in the first fortnight and then after every month. The patients were instructed to do the training at least five times a week for ten to fifteen minutes. A diary was used to document the frequency and the progression of self-training. The locally available, isoelastic bands were used for strengthening exercises. This conditioning program is divided into two types of exercise that are strengthening and stretching exercises, targeting various muscles around the shoulder i.e deltoid, trapezius, rhomboid, teres, supraspinatus, infraspinatus, subscapularis, biceps and triceps. The further details of this program are available at https://orthoinfo.aaos.org/globalassets/pdfs/2017-rehab_shoulders.pdf.

The Constant Murley score was recorded at the time of the first presentation, at 3, 6 and 12 weeks. The subjective variables, i.e. amount of pain, difficulty in daily living and recreational activities, were first recorded by the patient himself, in a questionnaire, provided to the patient, in the local language. The subjective readings were further confirmed verbally by the observer, before recording the objective findings. The generic electronic spring scale was used to measure abduction strength and recorded in pounds.

Results

The mean Constant Murley score of sixty patients, at the time of the first presentation, was compared with the mean score at 3, 6 and 12 weeks. The mean score increased from 41.33 at first presentation to 42.59, 58.51 and 83.96 at 3, 6 and 12 weeks respectively (Table 1). The change in score was evaluated with Pearson Chi-square test, with a p-value of 0.002, The change in Constant Murley score at 3, 6 and 12 weeks is statistically significant (Table 2).

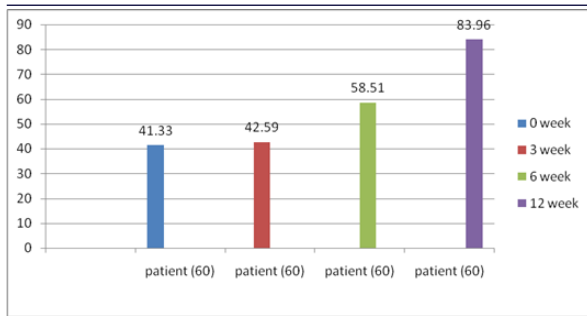


Table 1: Mean Constant Murley score of sixty patients at 0, 3, 6 and 12 weeks

	Value	Df
Pearson Chi-Square	473.562a	9
Likelihood Ratio	462.285	9
Linear-by-Linear Association	207.982	1
N of Valid Cases (60 x 4)	240	

Table 2: Results of Pearson Chi-Square Test. Improvement in Constant Murley Score is significant at p value 0.002.

Discussion

In the recent years, there has been a paradigm shift in the treatment of SIS from conservative modality to the cause-specific surgical intervention. However, there is no convincing evidence proving surgical treatment to be superior to conservative treatment³³. Patients were included in this study solely on the basis of clinical examination as the positive predictive value of clinical tests to diagnose SIS is around 94.4%³⁴. Moreover, even the rotator cuff tears were excluded, on the basis of clinical examination. It becomes very much evident that the cost of treatment can become down with prudent use of costly investigation like magnetic resonance imaging. It is common to have degenerative changes in supraspinatus and infraspinatus in magnetic resonance imaging, even in individuals who are asymptomatic^{35,36}. In this study patients were subjected to self-training program, irrespective of the type of impingement, i.e. primary or secondary SIS. The results of this program are more than satisfactory in both types of impingement. This fact further supports the theory of dysfunction of short rotators and scapula stabilisers as a causative factor of SIS^{18,19,20,21,22,23}.

Our study is based on the biomechanical concept postulated by Buckhart and Halderet et al.^{37,38}, wherein they compared the rotator cuff and rotator cable anatomy as analogous to suspension bridge design wherein the rotator cable attachment on the anterior and posterior parts of the greater tuberosity resembles functionally to the suspension bridge. It can distribute the force couples acting on it directly to the humeral head despite the disruption of cuff tendons. The role of exercise is in improving the scapular kinematics by strengthening the surrounding part of rotator cuff muscles \thereby restoring the function of the rotator cuff, despite a tear in the tendon. The strengthened muscles redistribute the load on rotator cable thereby restoring the function of the depression of humeral head while elevating the shoulder thereby reducing impingement.

The results of this study are coherent, with the various studies done in the past with various exercise regimen. This study has established the efficacy of Rotator Cuff, and Shoulder Conditioning Program advised by American Academy of Orthopedic Surgeons. We found this regimen to be elaborative, simple, easy to follow with a vivid description of endpoints and caveats. The use of shoulder conditioning program advised by AAOS can bring consonance among the treatment providers, in the advice to the patients of SIS.

The results of this study are consistent, with the various studies done in the past with various exercise regimen. This study has established the efficacy of Rotator Cuff, and Shoulder Conditioning Program advised by American Academy of Orthopedic Surgeons. We found this regimen to be elaborative, simple, easy to follow with a clear description of endpoints and caveats. The use of shoulder conditioning program, in the management of shoulder impingement syndrome, can bring consonance among the treatment providers, in the advice to the patients of SIS.

Conclusion

Clinical examination alone is sufficient for the diagnoses of Subacromial Impingement Syndrome. A supervised home exercise programme with regular follow up is an effective method of treatment of Subacromial impingement syndrome in the majority of patients. The exercises are aimed at strengthening of rotator cuff and scapular muscles and improving the shoulder kinematics. The significant improvement in terms of pain relief, muscle strength and range of motion can be achieved easily alone with an exercise programme. Before selecting the patient of Subacromial Impingement Syndrome for a surgical procedure, every patient should be given a trial of 3 months of supervised exercise programme, which may lead to the decreased need for surgery in the majority of patients. The AAOS self-training program is found to be as productive as any other exercise regime available at present, very lucid, self-comprehensible and easy to follow. The further studies may use AAOS self-training program and may help in establishing it as 'criterion standard'.

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