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EVALUATION OF SHOULDER INTERNAL AND EXTERNAL ROTATION BY PERFORMING APLEYS SCRATCH TEST

Physiotherapy

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ABSTRACT

Background: Shoulder mobility plays an important role in musculoskeletal health and may be influenced by age, gender, BMI, and physical activity. This study assessed shoulder flexibility using Apley's Scratch test among young adults. **Methods:** A cross-sectional study was conducted on 55 participants (mean age 18.87 ± 0.88 years; 78.2% female). Demographic details, BMI, and sports participation were recorded. Shoulder mobility was assessed bilaterally using Apley's Scratch test. Data were analyzed using chi-square and t-tests. **Results:** The majority were 19 years old (50.9%), with most having a normal BMI (61.8%). Apley's Scratch test showed a significant difference between right and left shoulders ($p < 0.01$). No significant associations were found between shoulder mobility and age, gender, or BMI. However, sports participation was significantly associated with age ($p = 0.014$) and gender ($p = 0.008$), but not with BMI. **Conclusion:** Shoulder mobility was significantly greater on the dominant side. While age, gender, and BMI did not influence shoulder flexibility, sports activity was strongly linked to age and gender, emphasizing lifestyle factors in musculoskeletal health.

KEYWORDS

Shoulder Mobility, Apley's Scratch Test, BMI, Sports Participation, Young Adults

INTRODUCTION

Shoulder is one of the complex mobile joint which is in Three dimensional pattern and coordinated in between Three disarthrodial articulations. Which are 1.Glenohumeral, 2.Acromioclavicular, 3.Sternoclavicular (The Joint which frequently dislocates in body).Active muscle contraction and glenoid geometry, which Are ultimately responsible for stability, flexibility in Midrange of motion and also the ligaments and capsular Structures mainly responsible for stability.[1]

From a biomechanical perspective the Glenohumeral Joint mainly describe as having 3 degrees of rotational. Which are 1.Plane of motion, 2.Elevation,3.External and internal rotation [2]

Repetitive activities of shoulder movement can gradually Affect the flexibility & Stability Mechanism of shoulder Complex. Primarily the Glenohumeral Joint is affected. Which is mainly rotator cuff muscles, and it gradually lead To instability And Anterior dislocation of humeral head And finally results in tendon impingement of rotator cuff & Biceps brachi muscles (these are most important factor in Causing shoulder pain and disability).[3]

The presence of scapulohumeral motion pattern, the Glenohumeral Joint moves with internal rotation And posterior rotation and. Scapulothoracic Joint moves with anterior tilt together with internal rotation motion of shoulder Joint. Healthy people could provide important references for future research on Various shoulder disorders.[4]

The Evaluation of range of motion and muscle strength Play vital role in diagnosis of GH disorders, Pathologies, treatment progression, effectiveness & to Quantify the amount of change in movement, quality & Force development occurring overtime.[5]

Primarily the stability of Glenohumeral joint depends on soft issues stabilizers, bone morphology such as rotator Cuff and long head of biceps tendon. Shoulder stabilization techniques include anatomic Procedures such as repair of labrum / restoration of Bone loss.[6]

Needed stability for shoulder provided by static and Dynamic factors such as Bony contours, ligaments, labrum, Capsule, etc. Decreased range of motion in internal rotation can leads To posterior capsule tightness which increases both in Magnitude and timing of anterior translation and shear Forces at the Glenohumeral Joint during flexion. Excessive external rotation can lead to eccentric loads on The rotator cuff muscles. This repetitive loading can lead to micro trauma and gradually leads to failure of Tendons [7].

In recent times the opportunities becoming more to treat and handle the shoulder joint, its diseases and disorders. Primarily we should asses and evaluate the patient Before treatment by performing regarding test for pain, Muscle strength, and motion analysis.

The main principle of Apley's scratch test is to perform Active range of motion, to evaluate functional impairment Based on the relationship between pain and range of Motion, it is very convenient method to assess range of Motion in recent clinical practice and also to evaluate Shoulder joint disability. The Apley's scratch test is used to assess the prevalence of shoulder range of motion Limitations. While incidence data for the 16–25 age group Are scarce, fitness and athletic population studies Suggest approximately 5–15% of young adults demonstrate restricted performance on this test."

Apley's scratch test is a simple clinical and functional assessment used to evaluate shoulder range of motion, flexibility, and possible limitations. It involves asking a person to touch the opposite scapula in different ways:

- Superior movement: reaching one hand over the shoulder and down the back.
- Inferior movement: reaching one hand behind the back and upward towards the scapula.[8]

Aim:

Aim is to compare left and right shoulder flexibility in college going students.

Objectives :

1. Analysis of internal and external rotation movements between left and right shoulder by using Apley's scratch test among students population .

MATERIALS AND METHODS :

Materials Used :

Weighing machine
Stadiometer
Measuring tape

METHODOLOGY:

Study Design : observational study

Sample Size : 40 participants
Study Duration: April 1 to July 15
Study Setting : college of physiotherapy, SVIMS, Tirupati.

Inclusion Criteria
- Age group between 16-25 years
- Individuals without any cervical and shoulder pain in both male and female

Exclusion Criteria
- Post traumatic stiffness around shoulder joint in sports person
- Cervicogenic pathology
- Any infections and degenerative diseases
- Cardiac patients
- Any deformities

Table 1: Gender-wise Distribution of Grades on the Left Side Shoulder

Gender	Left				
	Grade 1	Grade 2	Grade 3	Grade 4	Total
Male	0	4	4	4	12
Female	6	6	14	17	43
Total	6	10	18	21	55
Chi-square	X2 = 3.709®; (p = 0.295); df= 3;				

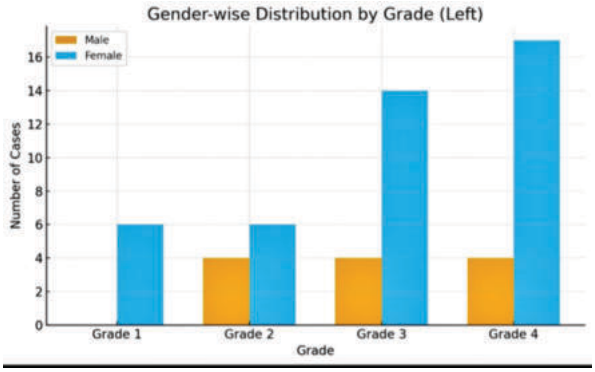
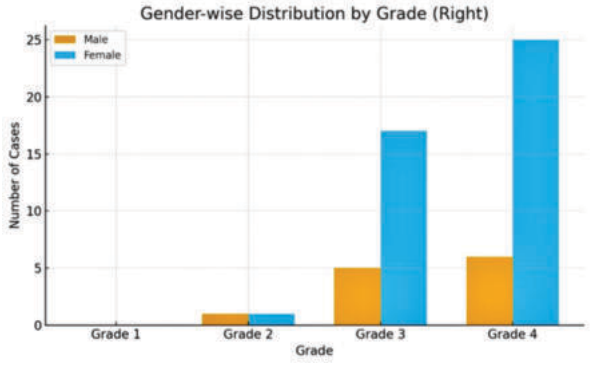


Table 2: Gender-wise Distribution of Grades on the Right Side Shoulder

Gender	Right				
	Grade 1	Grade 2	Grade 3	Grade 4	Total
Male	0	1	5	6	12
Female	0	1	17	25	43
Total	0	2	22	31	55
Chi-square	$\chi 2 = 1.052$@; (p = 0.591); df= 2;				



Procedure :-
- Have the patient simultaneously reach One hand over the shoulder and down the back the other hand under and behind the back and up.
- The goal is for the fingers to touch or overlap behind the back.
- Measure the distance between the fingertips if they do not touch.
- Repeat with arms reversed.

Grades:-
The result of this test is based on the grading system
- Grade-1 : fingers more than 2 inches apart: this is a poor Or non-functional result indicating significant tightness, Immobility, or an underlying issue.
- Grade-2 : Fingers less than 2 inches apart: suggesting mild Tightness.
- Grade -3 : Fingertips touch: good functional result, Adequate mobility.
- Grade -4 : fingertips overlap : superior flexibility.

RESULTS

Group	N	Right mean ± S.D	Left mean ±S.D	Mean difference	t value	Sig (2-tailed)
Grades for Apley's scratch test	55	3.53 ±0.573	2.98 ±1.009	0.545	4.607**	0.001

Significant are 0.01 level ; P > 0.01 (Highly significant)

Grade 1 was observed more in the left shoulder because the flexibility of the shoulder was comparatively less than right shoulder. The results of Apley's scratch test concludes that usage of left shoulder in daily activities was significantly less than right shoulder.

CONCLUSION

Shoulder mobility differed significantly between dominant and non-dominant sides. While age, gender, and BMI did not affect shoulder mobility, sports activity was Strongly linked to age and gender, highlighting the Influence of lifestyle factors on musculoskeletal Performance. Those who had grade 1 can be highly affected with conditions like adhesive capsulitis, frozen shoulder, etc,.

REFERENCES

1. https://doi.org/10.15063/rigaku.KJ00001306430
2. McCully, S. P., Kumar, N., Lazarus, M. D., & Karduna, A. R. (2005). Internal and external rotation of the shoulder: effects of plane, end-range determination, and scapular motion. Journal of shoulder and elbow surgery, 14(6), 602–610. https://doi.org/10.1016/j.jse.2005.05.003
3. Nodehi-Moghadam, A., Nasrin, N., Kharazmi, A., & Eskandari, Z. (2013). A Comparative Study on Shoulder Rotational Strength, Range of Motion and Proprioception between the Throwing Athletes and Non-athletic Persons. Asian journal of sports medicine, 4(1), 34–40. https://doi.org/10.5812/asjsm.34528
4. Koishi, H., Goto, A., Tanaka, M., Omori, Y., Futai, K., Yoshikawa, H., & Sugamoto, K. (2011). In vivo three-dimensional motion analysis of the shoulder joint during internal and external rotation. International orthopaedics, 35(10), 1503–1509. https://doi.org/10.1007/s00264-011-1219-5
5. Cools, A. M., De Wilde, L., Van Tongel, A., Ceyssens, C., Ryckewaert, R., & Cambier, D. C. (2014). Measuring shoulder external and internal rotation strength and range of motion: comprehensive intra-rater and inter-rater reliability study of several testing protocols. Journal of shoulder and elbow surgery, 23(10), 1454–1461. https://doi.org/10.1016/j.jse.2014.01.006
6. Goetti, P., Denard, P. J., Collin, P., Ibrahim, M., Hoffmeyer, P., & Lädermann, A. (2020). Shoulder biomechanics in normal and selected pathological conditions. EFORT open reviews, 5(8), 508–518. https://doi.org/10.1302/2058-5241.5.200006
7. Herrington L. (1998). Glenohumeral joint: internal and external rotation range of motion in javelin throwers. British journal of sports medicine, 32(3), 226–228. https://doi.org/10.1136/bjsm.32.3.226
8. Novotny, J. E., Woolley, C. T., Nichols, C. E., 3rd, & Beynnon, B. D. (2000). In vivo technique to quantify the internal-external rotation kinematics of the human glenohumeral joint. Journal of orthopaedic research : official publication of the Orthopaedic Research Society, 18(2), 190–194. https://doi.org/10.1002/jor.1100180205