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ANATOMICAL AND CLINICAL INSIGHTS INTO ROTATOR CUFF INJURIES: A MODERN AND AYURVEDIC PERSPECTIVES WITH CADAVERIC FINDINGS AND CASE REPORT

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ABSTRACT

Rotator cuff injuries are among the most common musculoskeletal disorders leading to shoulder pain and disability. Modern science attributes these injuries to repetitive strain, degeneration, and trauma, with the supraspinatus tendon being the most frequently involved. Management ranges from conservative physiotherapy to surgical reconstruction, yet functional limitations often persist. Ayurveda interprets such conditions as **Ansa Marma Dushti**, **Snayu Dushti**, and **Vatavyadhi**, emphasizing the role of Vata vitiation and structural damage. This article explores the anatomical and clinical basis of rotator cuff injuries through a modern and Ayurvedic lens, supported by cadaveric insights and a clinical case study, highlighting integrative treatment approaches.

KEYWORDS: Rotator cuff tear, Supraspinatus tendon, Ansa Marma, Snayu Dushti, Ayurveda, Shoulder pain.

INTRODUCTION

Shoulder pain is one of the leading musculoskeletal issues, impacting daily activities and overall quality of life in both older adults and physically active individuals. The likelihood of developing rotator cuff problems rises with age, with studies indicating that around one-

fourth of the elderly population may be affected.[1] The rotator cuff comprises four muscles — **supraspinatus, infraspinatus, subscapularis, and teres minor** which stabilize the glenohumeral joint and facilitate dynamic upper limb movements. In Ayurveda, the shoulder joint corresponds to **Ansa Marma** and **Ansa Sandhi**, classified as **Vaikalyakara Marma**, where injury results in disability. Therefore, linking rotator cuff disorders with Ayurvedic concepts offers a more comprehensive perspective and opens avenues for integrative approaches to management.[2]

Anatomical Considerations of Rotator Cuff

Table 1: Rotator Cuff Muscles and Functions.

Muscle	Function	Common Involvement in Injury
Supraspinatus	Initiates abduction	Most commonly torn
Infraspinatus	External rotation	Partial tears, degeneration
Subscapularis	Internal rotation	Less common tear
Teres minor	External rotation, stability	Rarely involved

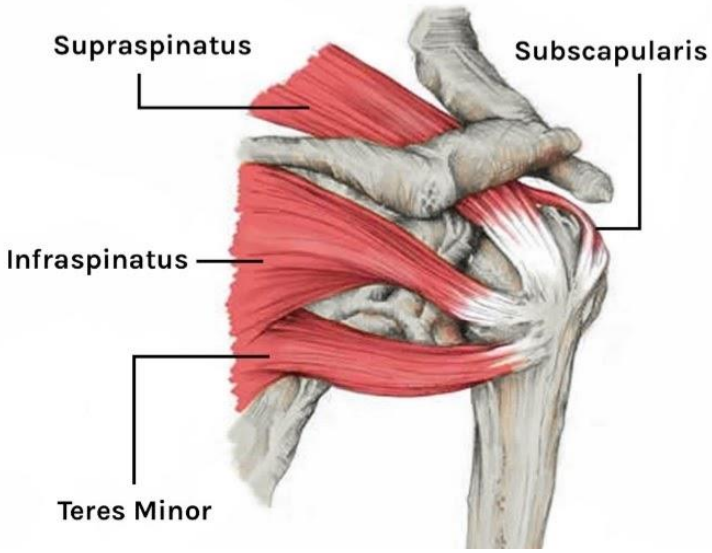


Fig. 1: Normal rotator cuff muscles (supraspinatus, infraspinatus, subscapularis, teres minor) stabilizing the shoulder joint.

Clinical Features (Modern Perspective)

- Pain over lateral shoulder, aggravated by overhead activities or lying on the affected side.
- Restricted abduction and external rotation.
- Weakness and muscle wasting in chronic cases.
- MRI is the gold standard for diagnosis revealing tendon tear, bursitis and associated degeneration.[3]

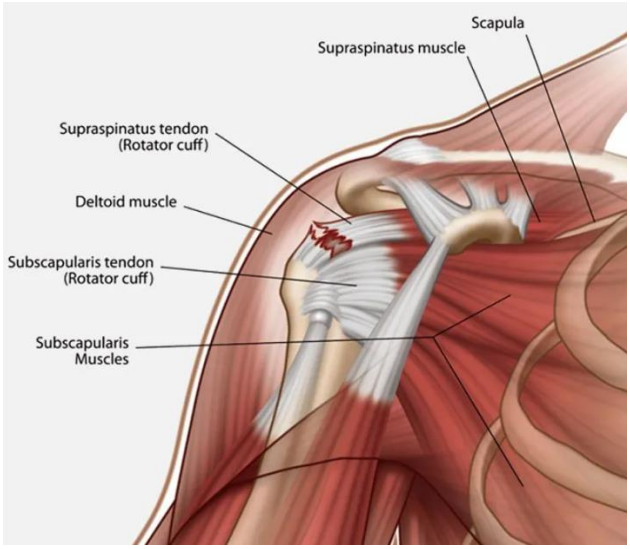


Fig. 2: Injured rotator cuff showing supraspinatus tendon tear with associated inflammation and degeneration, leading to impaired shoulder stability.

Table 2: Clinical Tests in Rotator Cuff Injury.

Test	Positive Finding	Diagnostic Significance
Neer's Test	Pain during forward flexion	Impingement
Hawkins-Kennedy Test	Pain with forced internal rotation	Subacromial impingement
Painful Arc Test	Pain between 60–120° abduction	Supraspinatus pathology
Drop Arm Test	Inability to lower abducted arm smoothly	Full-thickness tear

Ayurvedic Perspective Sushrut has classified **Ansa Marma** under **Vaikalyakara Marma**, injury to which leads to pain and functional disability of the upper limb. This directly correlates with the disability seen in rotator cuff injuries.

अंसौ वैकल्यकरौ प्रोक्तौ तत्र पीडायुतं वपुः ।
भवत्यसंपूर्णकर्म तद्विकारेण जन्तुषु ॥ **(सू .शा.६ /२७)**

Translation

The *Ansa* (shoulder region) is classified as a Vaikalyakara Marma. Injury to this site causes severe pain and results in functional disability of the upper limb. This classical description aligns with the modern understanding of rotator cuff injuries where supraspinatus and associated tendon tears result in pain, restricted motion, and weakness.

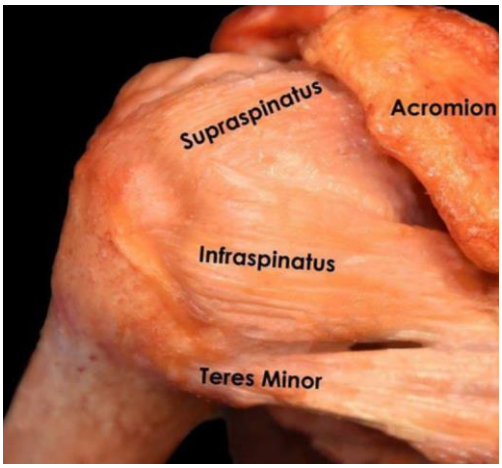
Table 3: Ayurvedic Correlation of Rotator Cuff Injury.

Ayurvedic Concept	Correlation with Modern Pathology	Clinical Manifestations
Ansa Marma Dushti	Structural damage around shoulder joint	Pain, functional disability

Snayu Dushti	Tendon degeneration / tendinopathy	Stiffness, weakness, restricted ROM
Vatavyadhi	Vata aggravation affecting locomotor system	Chronic pain, wasting, degeneration
Ansa Sandhi Vishlisht	Instability of glenohumeral joint	Weakness, reduced lifting power

Cadaveric Study and Anatomical Relevance Findings from cadaveric dissections emphasize the structural susceptibility of the rotator cuff region.

- Narrow **subacromial space** → supraspinatus impingement.
- Distal thinning of the supraspinatus tendon → degenerative tears.
- Near their insertion, merging of supraspinatus and infraspinatus fibers predisposes to multiple tendon tears.
- "Critical zone" of hypovascularity near insertion → poor healing potential.



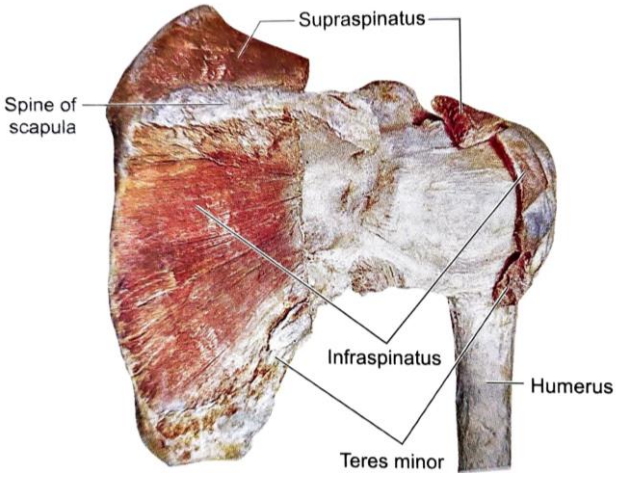


Fig. 3&4: Cadaveric dissection of the shoulder region showing the rotator cuff muscles and their insertions, highlighting the anatomical vulnerability of the supraspinatus tendon.[6]

Table 4: Cadaveric Findings in Rotator Cuff Region.

Cadaveric Observation	Clinical Significance	Ayurvedic Correlation
Narrow subacromial space	Supraspinatus impingement, partial tears	Ansa Marma sensitivity
Thin distal supraspinatus tendon	Prone to degenerative tears	Snayu Dushti
Fusion of cuff tendons near insertion	Multi-tendon pathology in chronic cases	Sandhi–Snayu complex injury
Hypovascular "critical zone"	Poor healing potential, degeneration	Vata prakopa, Dhatu kshaya

DISCUSSION

The development of rotator cuff tears is influenced by multiple factors such as repetitive stress, age-related degeneration, and reduced vascular supply. Observations from cadaveric studies further confirm the structural fragility of the supraspinatus tendon.[3] Clinical findings such as painful arc, positive impingement tests, and MRI correlate with classical descriptions of **Ansa Marma Dushti** and **Snayu Dushti**. This case demonstrates that Ayurvedic management, incorporating both external and internal treatments along with physiotherapy, can provide substantial pain relief and restore functional capacity.[3]

CONCLUSION

Rotator cuff injuries correlate with **Ansa Marma Dushti** and **Snayu Dushti** in Ayurveda. Cadaveric studies explain anatomical vulnerability, while clinical evidence validates functional disability. Integrative management combining modern physiotherapy and Ayurvedic treatment provides promising outcomes, reducing the need for surgical intervention in selected cases.[4, 5]

CASE REPORT

1. Title

Integrative Management of Rotator Cuff Injury Correlated with *Ansa Marma Dushti* – A Case Report.

2. Abstract

Rotator cuff tears are a leading cause of shoulder disability in elderly populations. This case report presents a 62-year-old carpenter with chronic right shoulder pain due to partial supraspinatus tear. Diagnosis was made with clinical examination, MRI, and Ayurvedic assessment. Integrative management using external and internal Ayurvedic therapies, combined with physiotherapy, resulted in significant reduction in pain and improvement in

range of motion.[4,5] This case emphasizes the significance of linking Ansa Marma Dușți and Snayu Dușți with rotator cuff pathology to provide a comprehensive and holistic treatment approach.

3. Introduction

Rotator cuff pathology is one of the most frequent causes of musculoskeletal disability in older adults. Ayurveda describes the shoulder joint as *Ansa Marma*, a *Vaikalyakara Marma*, where injury leads to functional impairment. This case demonstrates the application of Ayurvedic principles in the management of rotator cuff injury.

4. Patient Information

- Age/Sex: 62-year-old male
- Occupation: Carpenter
- Chief complaints: Right shoulder pain and inability to perform overhead activities for 8 months
- Past medical history: No systemic illness or prior trauma
- Family history: Non-contributory
- Lifestyle: Physically active, dependent on shoulder movement for occupation
- Psychosocial history: Pain affected quality of life and work performance

5. Clinical Findings

- Insidious onset pain, aggravated by lifting and overhead activities, associated with night discomfort.
- **Inspection**: Inspection revealed noticeable supraspinatus muscle wasting, loss of symmetry, and a slightly depressed contour of the right shoulder.

Parameter	Right Shoulder	Left Shoulder
Symmetry	Lost (atrophy present)	Normal
Muscle bulk	Reduced (supraspinatus)	Normal
Position	Slightly depressed	Normal

- **Palpation:** Grade 2 tenderness at supraspinatus insertion, crepitus present.

Parameter	Right Shoulder	Left Shoulder
Tenderness	Grade 2 (supraspinatus insertion)	Absent
Crepitus	Present	Absent
Temperature	Normal	Normal

- **Range of Motion (ROM):** Flexion 70°, Abduction 60° (painful arc), External rotation 40° painful, Internal rotation 35°.

Movement	Right Shoulder (Active)	Passive	Left Shoulder
Flexion	70° (painful)	120°	170°
Abduction	60° (painful arc)	100°	180°
External Rotation	40° (weak, painful)	55°	80°
Internal Rotation	35°	50°	70°

Special Tests: Neer's and Hawkins positive; Drop Arm weakly positive.

6. Timeline

Time	Events
0–6 months	Gradual worsening of right shoulder pain
8th month	Clinical assessment + MRI done → supraspinatus tear diagnosed
Treatment phase	4 weeks Ayurvedic + physiotherapy management
After 4 weeks	Pain relief, improved ROM, improved SPADI score

7. Diagnostic Assessment

- **Imaging:** MRI showed partial supraspinatus tear with subacromial bursitis.
- **Clinical:** Positive impingement tests.
- **Ayurvedic diagnosis:** *Ansa Marma Dushti* with *Snayu Dushti*.
- **Differential diagnosis:** Adhesive capsulitis, glenohumeral arthritis (ruled out by clinical exam and imaging).

8. Therapeutic Intervention

Ayurvedic Treatment

- Abhyanga (therapeutic oil massage) using Mahanarayaṇa Taila
- Swedana (sudation therapy) with Jambira Piṇḍa Sweda
- Nasya Karma (nasal administration) with Anutaila
- Upanaha (medicated poultice) using Kottamchukkadi Taila
- Internal medicines: *Lakshadi Guggulu, Balarishta*

Modern Supportive Care

- Physiotherapy: Range of motion and strengthening exercises.

Management Approaches (Summary)

Table 5: Ayurvedic Treatment Modalities for Rotator Cuff Injury.

Treatment Modality	Example/Drugs	Probable Action
Snehana (Oleation)	Mahanarayana taila, Kshirbala taila	Relieves stiffness, nourishes Snayu
Swedana (Sudation)	Choornapinda Sweda, Jambira Pinda Sweda	Improves circulation, reduces pain

Upanaha/Pichu	Kottamchukkadi taila	Local analgesic, anti-inflammatory
Nasya Karma	Anutaila	Strengthens shoulder region, Vatashamana
Basti Karma	Dashmoola-based basti	Systemic Vata pacification
Internal Medicines	Lakshadi Guggulu	Anti-inflammatory, promotes healing

9. Follow-up and Outcomes

- After 4 weeks:
  - Pain intensity, measured on the VAS (Visual Analogue Scale), showed improvement from 8 down to 4.
  - **SPADI (Shoulder Pain and Disability Index):** reduced from 58 → 32
  - **Abduction improved:** from 60° → 140°
  - Patient reported better sleep, improved ability to perform carpentry tasks.

10. DISCUSSION

This case demonstrates the structural susceptibility of the supraspinatus tendon, which can be correlated with the Ayurvedic concept of Ansa Marma Dushti. Cadaveric evidence supports hypovascularity as a cause of degeneration, while Ayurveda attributes chronicity to *Vata vitiation*. Integrative therapy provided significant improvement, supporting the role of Ayurveda alongside physiotherapy in functional restoration.

11. Patient Perspective

The patient reported

"Before treatment, I was unable to lift objects or sleep properly due to shoulder pain. After the therapy, my pain reduced, and I could return to work with much ease."

12. Informed Consent

The patient provided written informed consent for participation in this case study and for the publication of its details.

13. Conflict of Interest & Funding

The authors declare no conflict of interest. No external funding was received for this case report.

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