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Avabahuka As A Musculoskeletal Complication Of *Prameha*: A Clinical Correlation With Frozen Shoulder In Type 2 Diabetes Mellitus.

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Abstract

Background: Frozen shoulder, medically known as adhesive capsulitis, is a condition that appears more frequently in people living with Type 2 Diabetes Mellitus (T2DM). In *Ayurveda*, a closely matching condition has long been described as *Avabahuka*. Both conditions share a common thread they cause shoulder stiffness, pain, and significant loss of movement.

Objective: This paper explores how *Avabahuka* and frozen shoulder overlap in diabetic patients, focusing on their shared disease mechanisms and what *Ayurveda* offers in terms of prevention.

Methods: We reviewed classical *Ayurvedic* texts including *Charaka Samhita*, *Sushruta Samhita*, and *Madhava Nidana*, alongside modern medical literature sourced from PubMed, the AYU journal, and ScienceDirect. We then compared both systems in terms of disease process, symptoms, and treatment approaches.

Results: The review identified clear parallels both conditions involve vitiation of and *Kapha doshas*, damage to *Snayu* (tendons and ligaments), and depletion of *Dhatus* (body *Vata* tissues). On the modern side, collagen glycosylation, chronic low-grade inflammation, and microvascular injury mirror what *Ayurveda* describes as *Kapha Avarana* of *Vata* and *Sandhigata* disorders.

Conclusion: Identifying early *Avabahuka*-like symptoms in diabetic patients opens a window for timely, preventive action. *Ayurvedic* therapies such as *Abhyanga* (oil massage), *Swedana* (sudation), *Basti* (medicated enemas), and targeted dietary changes can meaningfully support standard diabetic care.

Keywords: *Avabahuka*, Frozen Shoulder, *Prameha*, Type 2 Diabetes Mellitus, *Ayurveda*

Introduction

Type 2 Diabetes Mellitus has become one of the most widespread chronic conditions worldwide, and its complications extend well beyond the well-known damage to blood vessels and nerves. Among the less discussed but genuinely debilitating consequences are musculoskeletal disorders, which quietly erode a person's ability to move freely and comfortably. Frozen shoulder or adhesive capsulitis is one such condition. It develops gradually, beginning with pain, progressing to stiffness, and eventually causing severe restriction of shoulder movement due to fibrosis and contracture of the joint capsule. What makes this particularly relevant in the context of diabetes is that people with the condition are two to four times more likely to develop frozen shoulder compared to the general population.

The underlying reasons for this association are not simple. Chronically elevated blood sugar damages connective tissue in multiple ways through a process called glycosylation of collagen proteins, through impaired blood supply to periarticular tissues, and through persistent low-level inflammation that activates fibroblasts and promotes adhesion within the joint capsule. The shoulder joint, with its relatively shallow socket and wide range of motion, is particularly susceptible to these changes.

Ayurveda has recognized a condition that maps closely onto this picture. Known as *Avabahuka*, it falls under the category of *Vata vyadhi* disorders primarily driven by *Vata dosha*, sometimes compounded by *Kapha* . The condition targets the *Snayu* (tendons and ligaments) and *Sandhi* (joints), producing shoulder stiffness and functional loss without the obvious signs of acute inflammation. The mechanism described in classical texts involves both the depletion of tissue nourishment (*Dhatu kshaya*) and a blockage in the normal pathways of *Vata* (*Marga Avarana*), resulting in progressive loss of strength and mobility.

The *Ayurvedic* concept of *Prameha* also deserves attention here. This broad category of metabolic disorders shares substantial ground with Type 2 Diabetes Mellitus. In its early stages, *Prameha* is driven by *Kapha* excess, but as the disease progresses, there is a shift toward *Vata* dominance with gradual wasting of tissues muscle, fat, and *ojas*. This systemic deterioration sets the stage for secondary complications, including musculoskeletal problems like *Avabahuka*. The chronic metabolic environment created by *Prameha* essentially makes joints and connective tissue vulnerable to the kind of degenerative changes seen in frozen shoulder.

Recognizing these connections matters clinically. If *Avabahuka*-like symptoms can be identified early in diabetic patients, there is real potential to intervene before irreversible fibrosis sets in. *Ayurveda* offers a framework for such early intervention through dietary adjustments, lifestyle regulation, and targeted therapies aimed at restoring dosha balance, nourishing tissues, and preserving joint health all of which can complement standard biomedical approaches to diabetes management.

Methods

This study is based on a structured review of both classical *Ayurvedic* literature and contemporary biomedical research. The primary *Ayurvedic* sources consulted were *Charaka Samhita*, *Sushruta Samhita*, and *Madhava Nidana*. For modern evidence, we searched PubMed, the AYU journal, and ScienceDirect using relevant terms. The core of the methodology involved a side-by-side comparison of disease pathology, clinical presentations, and therapeutic strategies across both traditions.

Aims and Objectives

- To examine *Avabahuka* as a musculoskeletal complication arising in the context of *Prameha*.
- To analyze the clinical features, disease progression (*Samprapti*), and *dosha* involvement in *Avabahuka*.
- To identify preventive and management strategies within *Ayurveda* that could benefit diabetic patients at risk of shoulder complications.

Results and Review Findings

The review consistently pointed toward strong parallels between *Avabahuka* and frozen shoulder as it presents in diabetic patients. Both conditions follow a gradual, progressive course. Both primarily involve the *Snayu* and *Sandhi* or in modern terms, the tendons, ligaments, and joint structures of the shoulder. And in both, the end result is the same: stiffness, pain, and a significant reduction in the arm's functional range.

From the *Ayurvedic* perspective, the disease process involves vitiation of *Vata* and *Kapha* *doshas*, damage to *Snayu*, progressive *Dhatu kshaya*, and the phenomenon of *Kapha* obstructing *Vata* 's normal flow. In modern medicine, the parallel mechanisms are glycosylation of collagen, fibroblast activation triggered by chronic inflammation, and microvascular damage impairing tissue repair. These are not merely superficial similarities they reflect genuinely convergent understandings of why the shoulder becomes stiff and painful in metabolically compromised individuals.

Discussion

1. Pathophysiological and Samprapti Correlation

When you look closely at how these three entities *Avabahuka*, frozen shoulder, and Type 2 Diabetes Mellitus develop and progress, the overlaps are hard to ignore. All three are characterized by a slow, insidious course. All three involve the same structural targets: tendons, ligaments, and joint capsules. And all three converge on the same clinical outcome pain, stiffness, and restricted shoulder movement. This is not coincidence. It reflects shared underlying processes that *Ayurveda* and modern medicine, despite their very different vocabularies, are describing from different angles.

Table No 1- Ayurvedic interpretation of *Avabahuka* in relation to Adhesive Capsulitis

Avabahuka	Adhesive capsulitis	Pathophysiological Explanation
Vata-Kapha Dushti	Capsular stiffness and fibrosis	*Vata's* impairment leads to dryness and loss of movement, while *Kapha* causes heaviness, congestion, and fibrosis.
Snayu-Dushti	Tendonitis / capsular fibrosis	Repeated vitiation of *Vata* leads to dysfunction in *Snayu*. Glycosylation and inflammation affect shoulder soft tissues.

Dhatu-Kshaya	Muscle atrophy, tissue loss	Metabolic derangement in diabetes and *Vata* predominance lead to *Mamsa* and *Meda* degeneration.
Kapha Avarana of Vata	Capsular contracture	*Kapha* blocks the movement of *Vata*, causing stiffness and limited joint movement.
Sandhi-Graha	Adhesive capsule stiffening	Refers to mechanical joint restriction seen in adhesive capsulitis.

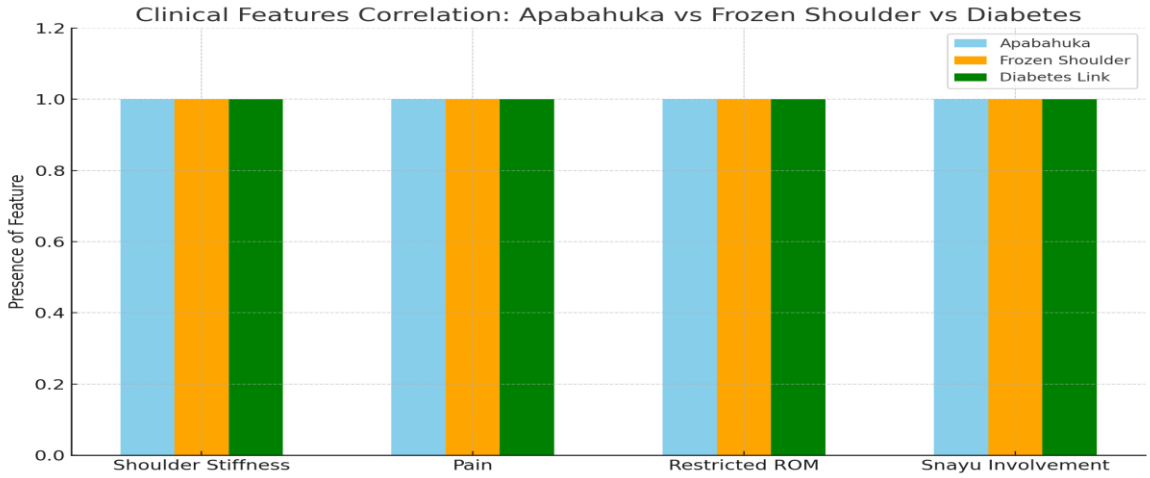
2. Clinical Features Correlation

The classic triad of pain, stiffness, and restricted range of shoulder motion appears consistently across all three frameworks. In *Ayurveda*, this is explained through the combined disruption of *Vata* and *Kapha* affecting the shoulder's structural integrity. In modern medicine, it arises from the mechanical consequences of capsular fibrosis and synovial inflammation. The clinical presentation is so similar that, in a diabetic patient, the two explanations are simply two lenses looking at the same underlying reality.

Table No 2- Clinical feature correlation.

FEATURE	*AVABAHUKA*	FROZEN SHOULDER	DIABETES LINK
SHOULDER STIFFNESS	✔	✔	✔ Due to Collagen crosslinking
PAIN	✔	✔	✔ Inflammatory and ischemic changes.
RESTRICTED ROM	✔	✔	✔ Fibrosis and microvascular changes.
SNAYU INVOLVEMENT	✔	✔ TENDONITIS	✔ Glycosylation affects tendon elasticity.

Graph No 1- Clinical features correlation



3. Biomedical Mechanisms: How Diabetes Causes Frozen Shoulder

The prevalence of adhesive capsulitis in people with T2DM can reach as high as 30%, which is strikingly higher than in the general population. Several well-established mechanisms account for this:

- **Glycosylation of Collagen**: When blood sugar stays elevated over time, collagen and other extracellular matrix proteins undergo non-enzymatic glycosylation. The resulting cross-linking stiffens these proteins, thickens the joint capsule, and progressively limits movement.

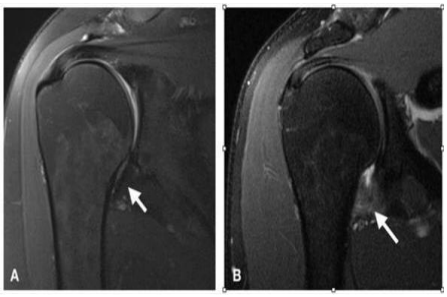
- **Microvascular Damage**: Diabetes impairs the small blood vessels supplying periarticular tissues. The resulting ischemia and hypoxia create an environment that promotes synovial inflammation, activates fibroblasts, and ultimately leads to capsular fibrosis.

- **Chronic Inflammation**: Diabetes maintains a state of low-grade systemic inflammation. The release of inflammatory cytokines particularly IL-6 and TNF-α fuels fibroblast proliferation and the formation of adhesions within the joint.

- **Disrupted Connective Tissue Remodeling**: Insulin resistance and the accumulation of advanced glycation end-products (AGEs) interfere with the normal maintenance and repair of tendons and ligaments, making them prone to degenerative change and stiffness.

- **Shoulder Anatomy as a Risk Factor**: The shoulder joint is inherently vulnerable its shallow socket allows for exceptional mobility but also makes it susceptible to repeated microtrauma. In diabetic individuals, even minor mechanical stress or inflammatory triggers can be enough to set off the cascade toward capsular fibrosis.

4. Imaging Findings in Frozen Shoulder



Frozen Shoulder on MRI (T2-Weighted Images):

- The joint capsule and coracohumeral ligament appear thickened (3–7 mm or more).
- The subcoracoid fat triangle is obliterated — a finding sometimes called the subcoracoid triangle sign.
- Increased signal intensity (hyperintensity) is seen in the axillary recess and rotator interval, reflecting underlying inflammation and fibrotic change.
- The axillary pouch appears contracted, with no normal fluid distension.

Normal Shoulder on MRI:

- The joint capsule is thin and elastic, with a normal fluid-filled axillary recess.
- The subcoracoid fat triangle is clearly preserved, and the coracohumeral ligament measures less than 3 mm.
- Tissue planes around the rotator interval and synovium are clean and well-defined.

5. *Ayurvedic* Preventive and Management Strategies

Ayurveda does not treat *Avabahuka* in isolation. It views the condition within the broader context of the patient's metabolic state, and in *Prameha* patients, prevention begins early. The goal is to keep *doshas* balanced, nourish the tissues that are under metabolic stress, and maintain joint function before stiffness becomes entrenched.

Key preventive and therapeutic approaches include *Abhyanga* (regular medicated oil application to nourish *Snayu* and reduce *Vata*), *Swedana* (steam-based heat therapy to ease stiffness and improve local circulation), *Basti* (medicated enemas that act systemically on *Vata* and support tissue health), *Rukshana* therapy in cases of *Kapha* excess, and *Langhana* (lightening measures) where metabolic accumulation is driving the pathology. Dietary guidance focuses on foods that support tissue nourishment without aggravating metabolic imbalance avoiding heavy, sweet, and cold foods while emphasizing warm, easily digestible preparations. Lifestyle measures such as gentle, regular movement of the shoulder, avoidance of sedentary habits, and stress reduction all contribute to preventing the progression seen in both *Avabahuka* and frozen shoulder.

Table no 3-Ahara (Diet) Recommendations

Type	Recommendations	Inference
Dosha-pacifying	Warm, light, freshly cooked food Old rice, green gram, barley, millets	*Vata-Kapha* balancing, reduces stiffness and heaviness
Ama-pachana	Ginger, black pepper, trikatu, panchakola Avoid curd, cheese, fried food	Improves digestion, prevents *srotorodha*
Medo-dhatu regulation	Reduce sugar, dairy, and wheat Include bitter vegetables (neem, methi, karela)	Checks *Kapha-Meda vriddhi* and high blood sugar
Snigdha but *laghu*	Cow ghee in moderation Warm soups, vegetable stews with Dashamoola	Lubricates joints, relieves stiffness without increasing *Kapha*
Pathya ahara	Lukewarm water with turmeric *Methi* seeds soaked overnight	Anti-inflammatory and *Vata-Kapha* pacifying
Apathya ahara	Avoid cold, stale, fermented food Avoid excessive sweet, salty, sour tastes	These increase *Vata-Kapha* and *Ama*

Table No 4-*Vihara* (Lifestyle) Recommendations

Aspect	Recommendations	Inference
Daily routine (*Dincharya*)	*Abhyanga* (oil massage) with *Dashamoola/Saindhavadi taila* Light *Swedana* after oiling	Softens stiff tissues and opens up *srotas*
Exercise (*Vyayama*)	Gentle *yoga* (shoulder rotations, *gomukhasana, garudasana*) Avoid overexertion	Prevents frozen joint, maintains mobility without aggravating *Vata*
Sleep and Rest	Early to bed, early to rise Avoid day sleep (*divasvapna*)	Prevents *Kapha* accumulation and metabolic sluggishness
Mental well-being	Avoid stress and excessive worry Include light meditation	Reduces *Vata* aggravation and helps with glycemic control
Avoidance	Cold exposure to shoulder Repetitive overuse or long	Prevents worsening of symptoms

	immobility	

Table 5- Therapy according to stages of disease

Stage	Therapy	Purpose / Mechanism
Early Kapha dominance	*Langhana, Rukshana, Tikta Ahara*	Reduces *Prameha* and *Avarana*, enhances *Agni* and metabolic clearance.
Stiffness onset	*Abhyanga, Swedana*	Improves circulation, reduces stiffness and fibrosis.
Vata predominance stage	*Basti Chikitsa*	Pacifies *Vata*, nourishes joints and *Snayu.*
General maintenance	*Vyayama, Tikta-Katu-Ahara, Rasayana*	Prevents *Dhatu-kshaya*, maintains joint integrity.
Local Pain Management	*Marma Chikitsa* *Agni Karma*	Neuromascular Stimulation in *Ansa marma, Ani marma* Improving blood circulation Relieving stiffness and pacify *vata*

Conclusion

The connection between *Avabahuka* and frozen shoulder in people living with Type 2 Diabetes Mellitus is more than just a theoretical parallel it reflects a genuine convergence of pathological processes that both *Ayurveda* and modern medicine have independently observed. The *Ayurvedic* concept of *Vata - Kaphaja dushti* affecting *Snayu* and *Sandhi* finds its direct counterpart in the modern understanding of collagen glycosylation, chronic inflammation, and microvascular damage driving adhesive capsulitis. Whether described as *Kapha Avarana* of *Vata* or as fibroblast-mediated capsular fibrosis, the end result is the same: a stiff, painful, functionally impaired shoulder.

What makes this recognition practically valuable is the opportunity it creates for early intervention. Frozen shoulder in diabetic patients tends to be more severe and more resistant to treatment than in the general population. Catching the signs early in the language of either tradition allows for timely action that can prevent the condition from progressing to irreversible fibrosis. *Ayurvedic* approaches such as *Langhana, Rukshana, Abhyanga*, *Swedana*, and *Basti* offer practical tools for managing dosha imbalance, maintaining joint flexibility, and slowing the degenerative process. When combined with good glycemic control and appropriate management of systemic inflammation through biomedical means, the outcomes are meaningfully better.

An integrative approach is not just philosophically appealing it is clinically sensible. The two systems address different layers of the same problem, and their combination is more complete than either alone. Future research should focus on validating these *Ayurvedic* interventions through well-designed clinical studies, so their role in diabetic musculoskeletal care can be more clearly defined. Ultimately, recognizing *Avabahuka* as a potential complication of *Prameha* gives clinicians whether trained in *Ayurveda*, modern medicine, or both a practical framework for earlier diagnosis and more personalized, comprehensive care.

Conflict of Interest

None declared.

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