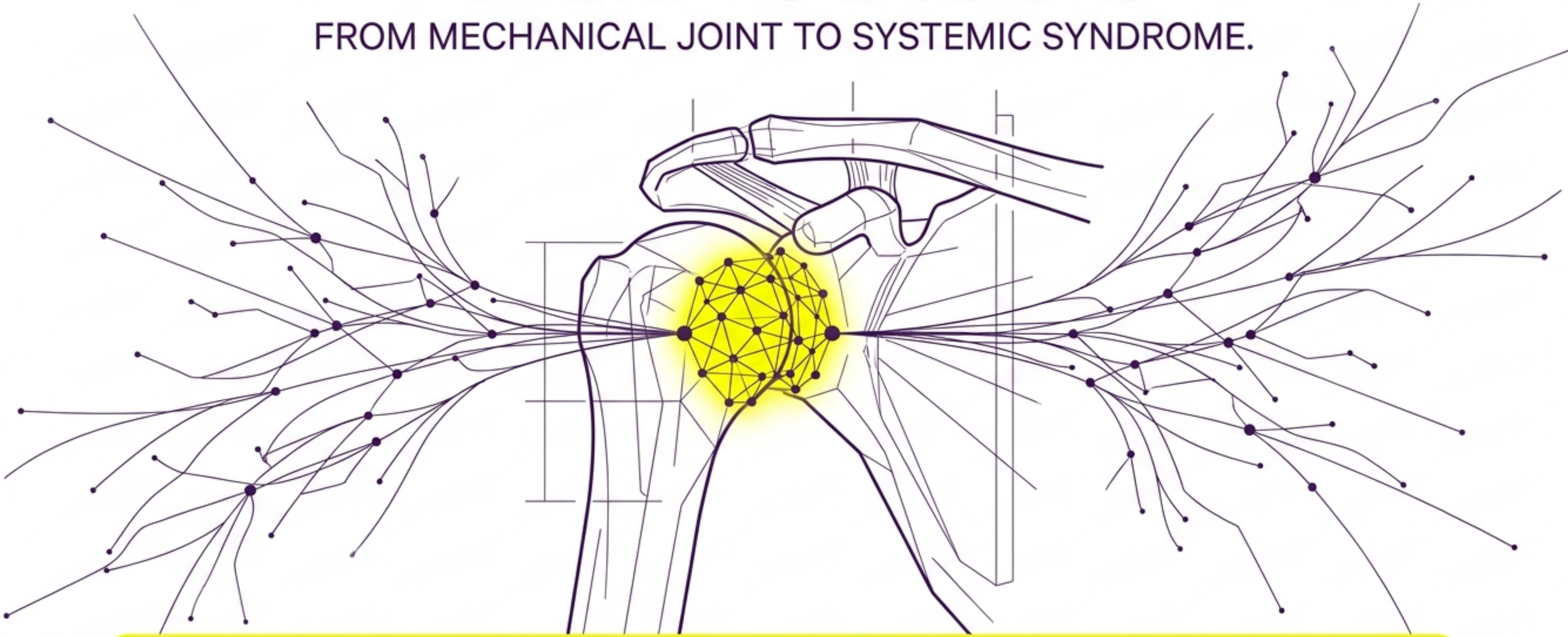
ADHESIVE CAPSULITIS

FROM MECHANICAL JOINT TO SYSTEMIC SYNDROME.



PRACTICAL TAKEAWAY: Read this deck to modernize your clinical understanding of Frozen Shoulder from a localized joint issue to a complex neuro-immune syndrome.

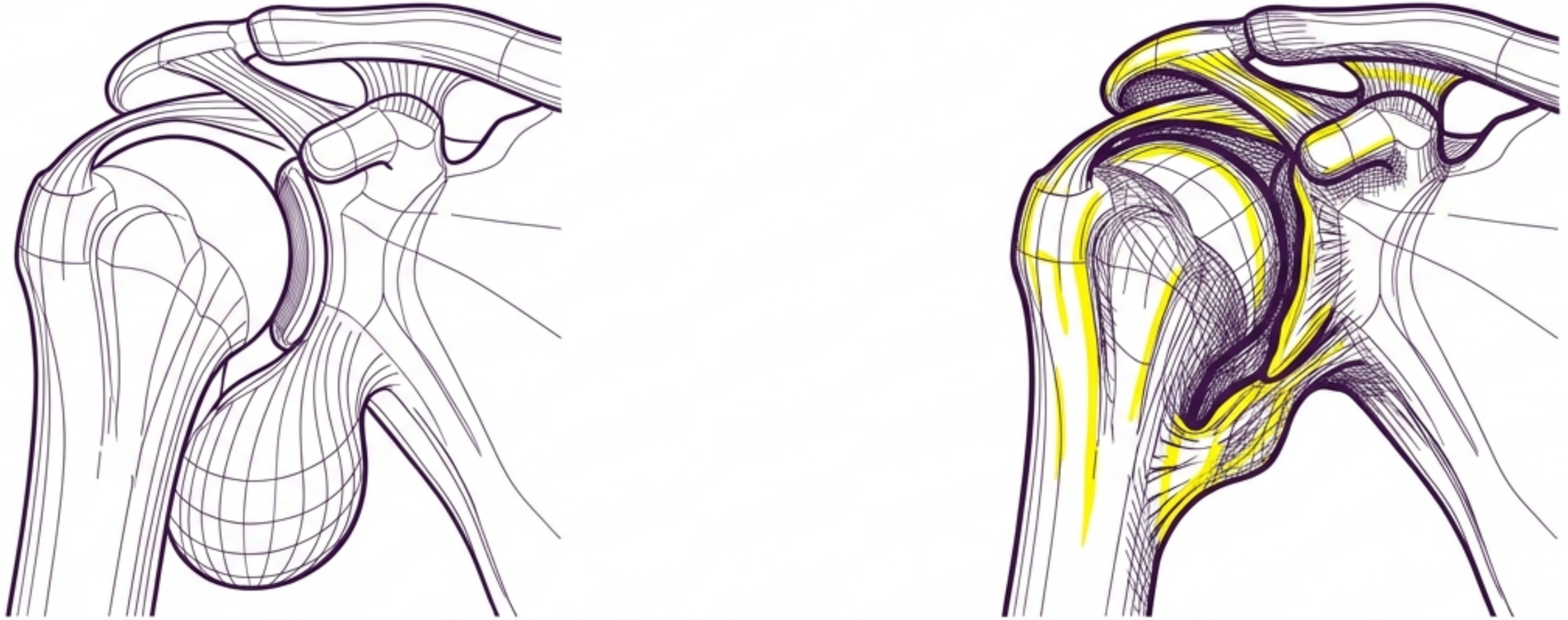
DEFINING THE FROZEN SHOULDER

Adhesive capsulitis is an inflammatory, **fibrotic** process causing **thickening** and **contracture** of the shoulder joint capsule. It results in a severe, progressive loss of both active and passive range of motion.

HEALTHY CAPSULE

Anatomical Zoom

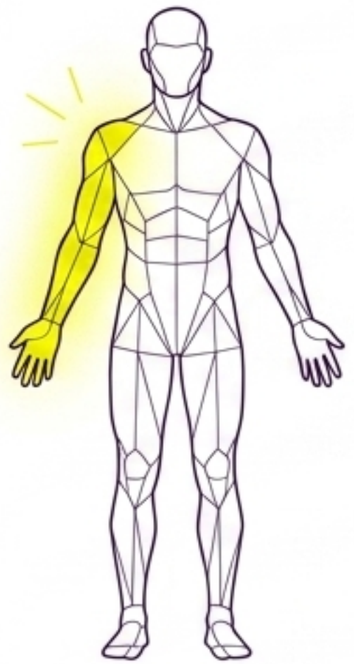
ADHESIVE CAPSULE



PRACTICAL TAKEAWAY: Suspect Adhesive Capsulitis when a patient presents with a significant restriction in BOTH active and passive shoulder movement.

THE EPIDEMIOLOGICAL PROFILE

The condition predominantly affects middle-aged adults, particularly females, and frequently targets the non-dominant arm, suggesting differential use patterns and biomechanical stressors play a role.



Targets Non-Dominant Arm

2-5%

General Population Prevalence

[40-60]

1.4:1 Female to Male Ratio

PRACTICAL TAKEAWAY: Middle-aged females presenting with gradual, unexplained shoulder stiffness on their non-dominant side are the primary demographic.

PRIMARY VS. SECONDARY ETIOLOGY

Secondary cases have a clear **mechanical trigger. Primary cases** appear **spontaneously** and suggest a deeper intrinsic, inflammatory, or autoimmune driver.

PRIMARY ADHESIVE CAPSULITIS

- Idiopathic onset
- No obvious precipitating event
- Highly correlated with systemic and endocrine disorders

SECONDARY ADHESIVE CAPSULITIS

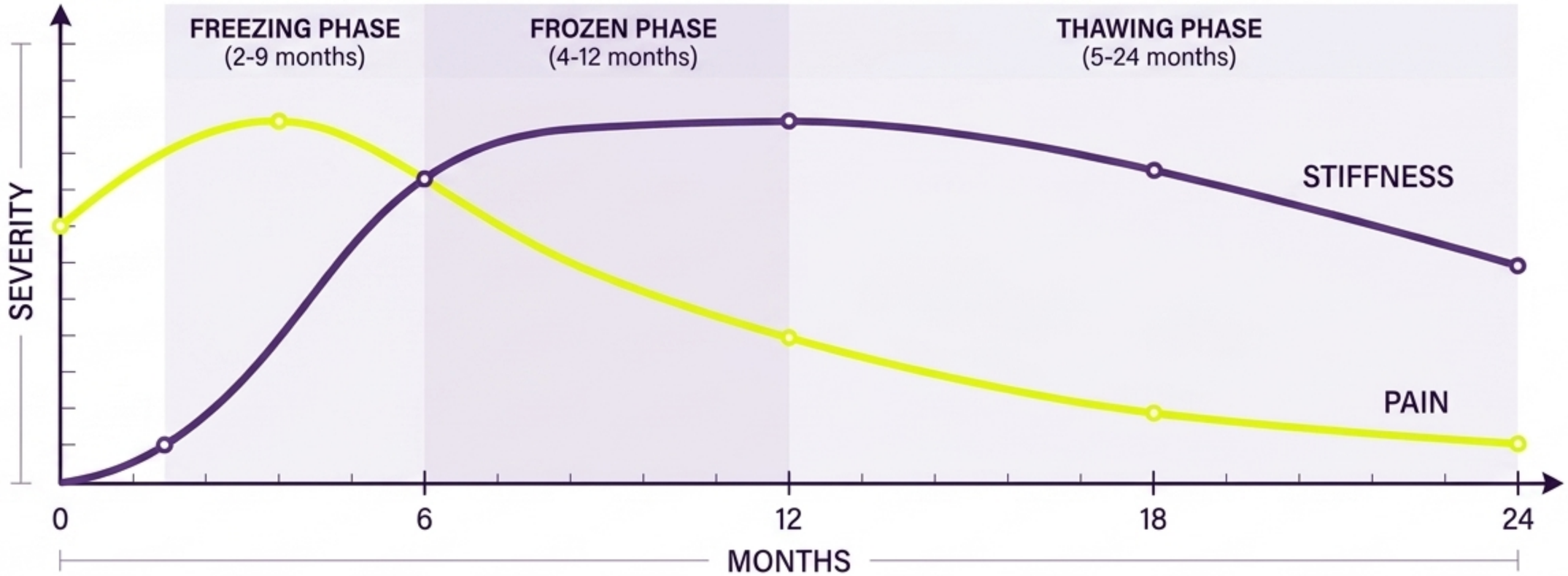
- Triggered by external mechanical event
- Trauma or surgery (chest/shoulder)
- Prolonged immobilization

PRACTICAL TAKEAWAY: Always rule out recent trauma, surgery, or immobilization before diagnosing idiopathic Primary Adhesive Capsulitis.

CLINICAL BLUEPRINT

THE THREE STAGES OF DISEASE PROGRESSION

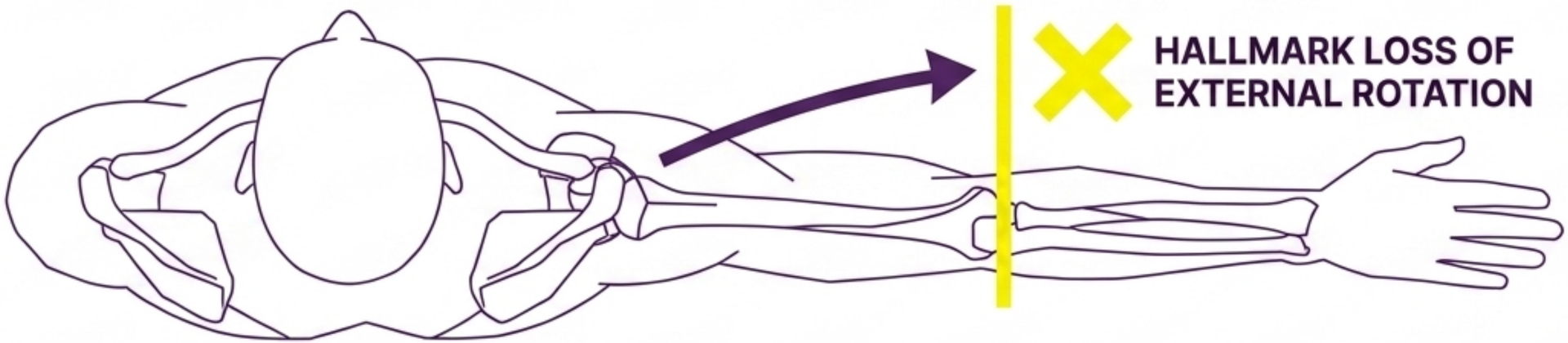
The condition is self-limiting but protracted. As the inflammatory freezing phase transitions to the fibrotic frozen phase, resting pain decreases while capsular rigidity severely impacts functionality.



PRACTICAL TAKEAWAY: Educate patients on this specific timeline; knowing the condition is self-limiting dramatically improves compliance and reduces anxiety.

THE CLINICAL EXAMINATION

Physical examination reveals diffuse tenderness and a hallmark loss of external rotation. Because pain often limits the exam, a 1% lidocaine injection into the subacromial space is used to temporarily eliminate pain and test true mechanical restriction.



SUBACROMIAL LIDOCAINE INJECTION ADMINISTERED (PAIN ELIMINATED)

- **A** — **RANGE OF MOTION IMPROVES** → **DIAGNOSIS: LIKELY SUBACROMIAL BURSITIS/TENDINOPATHY**
- **B** — **RANGE OF MOTION REMAINS RESTRICTED** → **DIAGNOSIS: ADHESIVE CAPSULITIS**

PRACTICAL TAKEAWAY: If a diagnostic subacromial lidocaine injection successfully eliminates pain but does NOT improve range of motion, Adhesive Capsulitis is highly likely.

DIFFERENTIAL DIAGNOSIS MATRIX

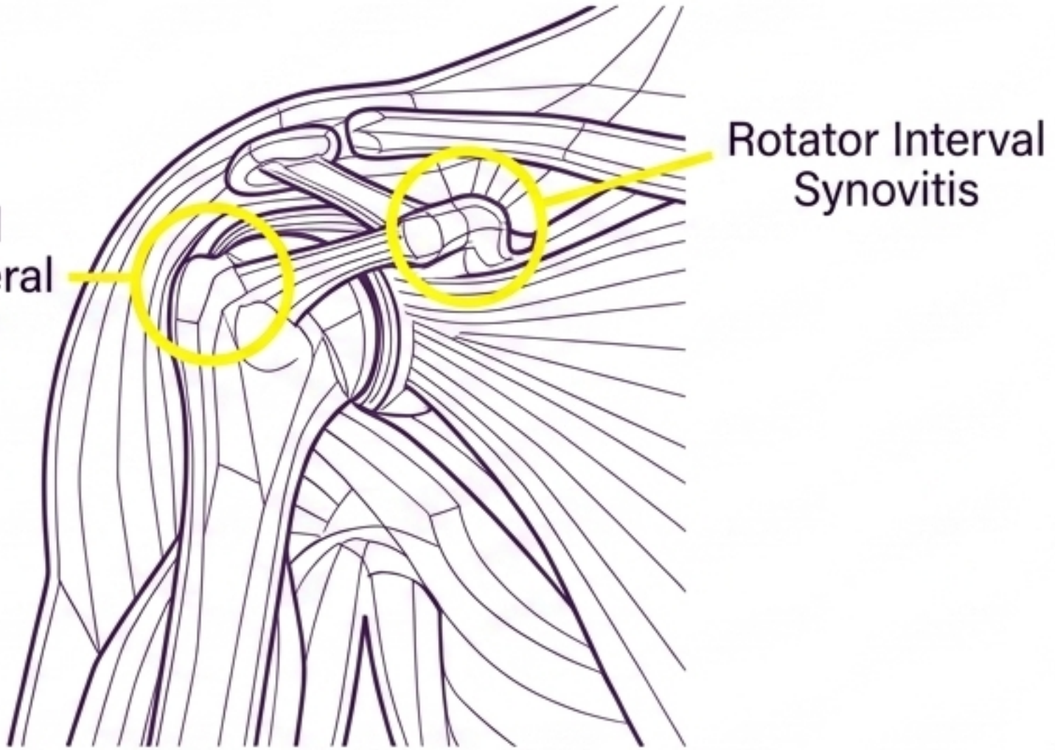
Despite severe pain and restricted movement, distal neurological function remains entirely intact in Frozen Shoulder.

PATHOLOGY	ACTIVE ROM LOSS	PASSIVE ROM LOSS	X-RAY ABNORMALITIES	NEUROLOGICAL DEFICITS
Adhesive Capsulitis	✓	✓	✗	✗
Rotator Cuff Tear	✓	✗	✗	✗
Osteoarthritis	✓	✓	✓	✗
Cervical Radiculopathy	✗	✗	✗	✓

PRACTICAL TAKEAWAY: If a patient exhibits distal numbness, tingling, or radiating pain, pivot the investigation to a cervical spine workup.

THE ROLE OF IMAGING

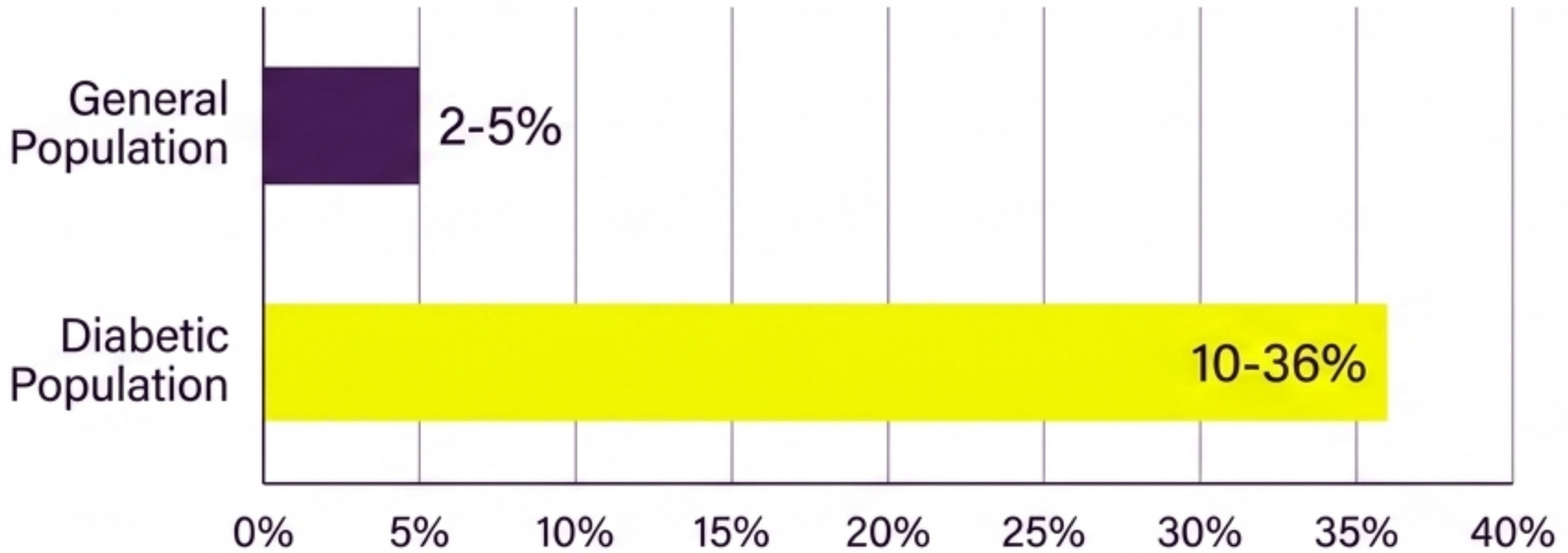
Adhesive capsulitis is primarily a clinical diagnosis. X-rays are utilized strictly to rule out bony abnormalities like osteoarthritis. MRIs may show rotator interval synovitis or a decreased axillary pouch size, but are not definitively diagnostic.

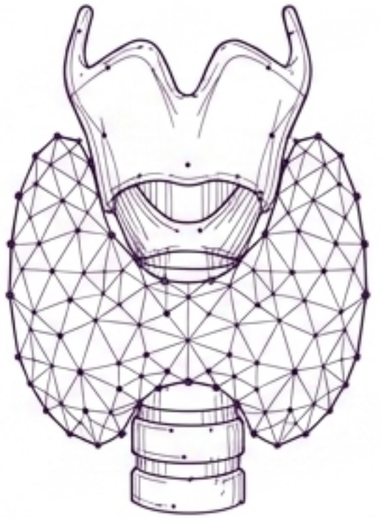


PRACTICAL TAKEAWAY: Do not rely on imaging to diagnose Adhesive Capsulitis; use it strictly to exclude structural damage, tears, or arthritis.

THE SYSTEMIC WARNING SIGNS

Systemic metabolic disorders drastically alter the body's inflammatory and fibrotic responses. Notably, large-scale data shows that HbA1c levels do not fully explain the diabetes link, pointing to deeper immune and metabolic dysfunction beyond simple blood sugar mechanics.



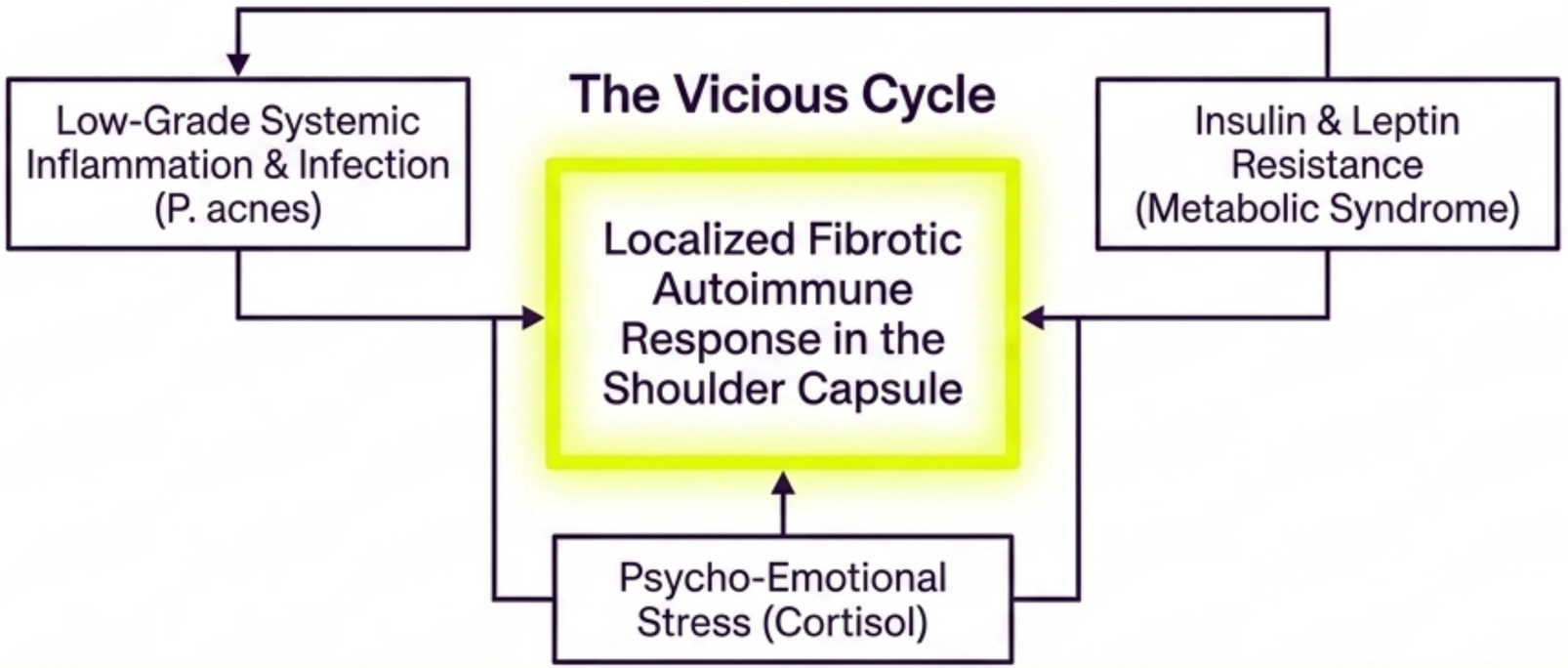


5x Risk Increase for Hypothyroidism

PRACTICAL TAKEAWAY: Screen all patients presenting with idiopathic Primary Frozen Shoulder for undiagnosed metabolic syndrome or endocrine disorders.

Synthesis: The Neuro-Immune Connection

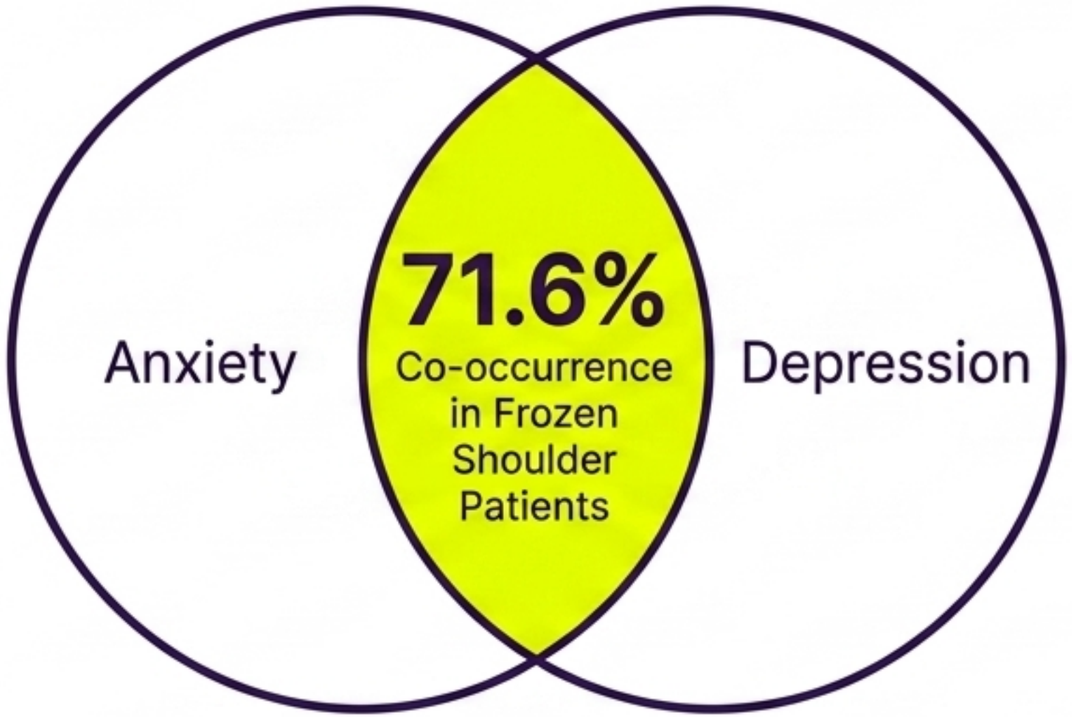
Primary Frozen Shoulder is not an isolated mechanical failure. It is the localized symptomatic expression of overlapping systemic distress, where metabolic dysregulation and chronic stress initiate a fibroproliferative tissue cascade.

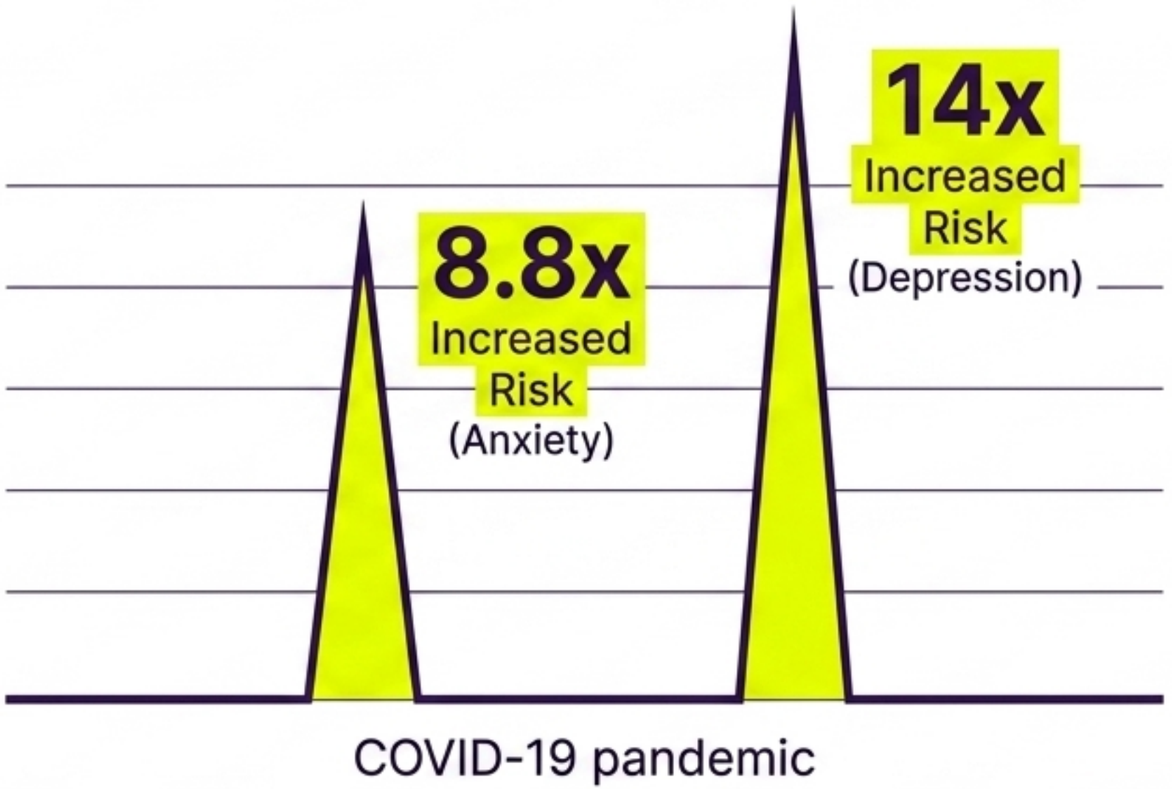


PRACTICAL TAKEAWAY: View Frozen Shoulder as a localized alarm bell for systemic inflammation and metabolic distress.

The Psychological Factor

A binational study reveals a profound mind-body link. The dramatic spike in incidence during the pandemic suggests that severe psycho-emotional distress, combined with immune challenges, directly drives capsular fibrosis.



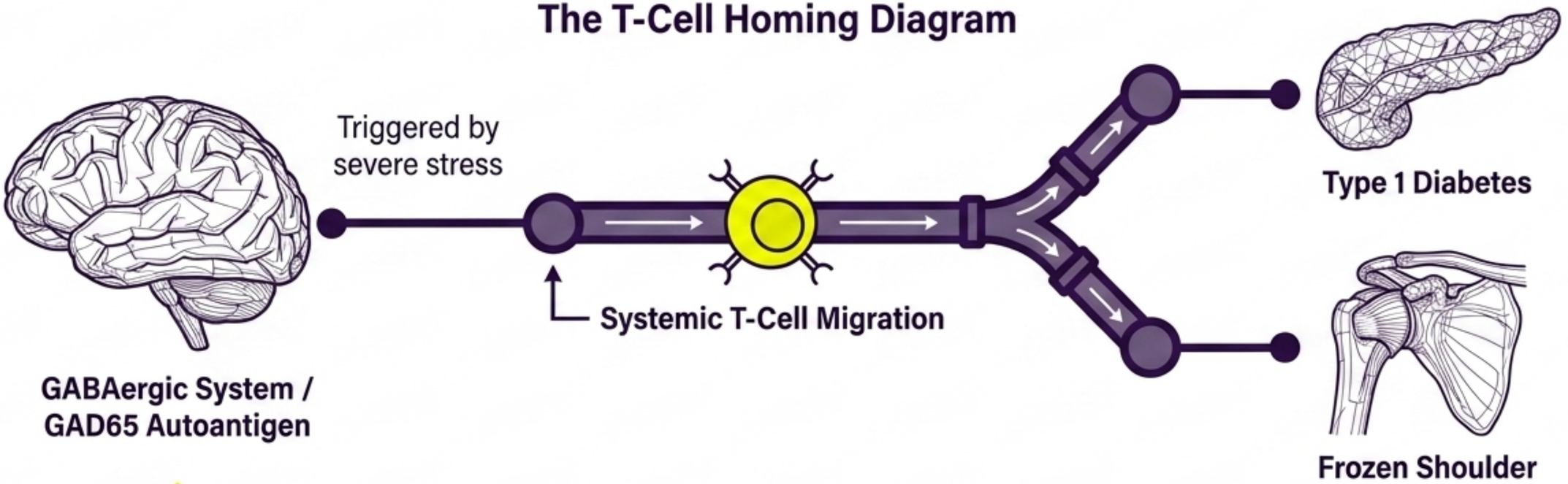


PRACTICAL TAKEAWAY: Psychological screening is a critical component of orthopedic evaluation; “toxic emotions” heavily correlate with physical fibrosis and worse treatment outcomes.

The Autoimmune Hypothesis: GAD65

Emerging science suggests an autoimmune reaction against GAD65 (a super-autoantigen). When psycho-emotional stress meets an immune challenge, T-cells primed against GAD65 in the brain migrate to peripheral tissues, linking Type 1 Diabetes, Hashimoto's, and Frozen Shoulder through a single mechanism.

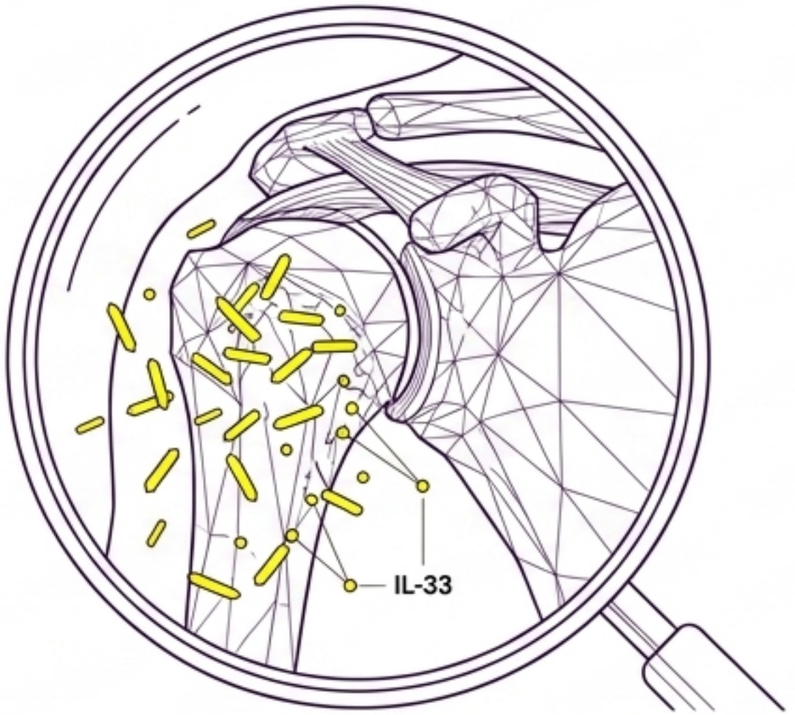
The T-Cell Homing Diagram



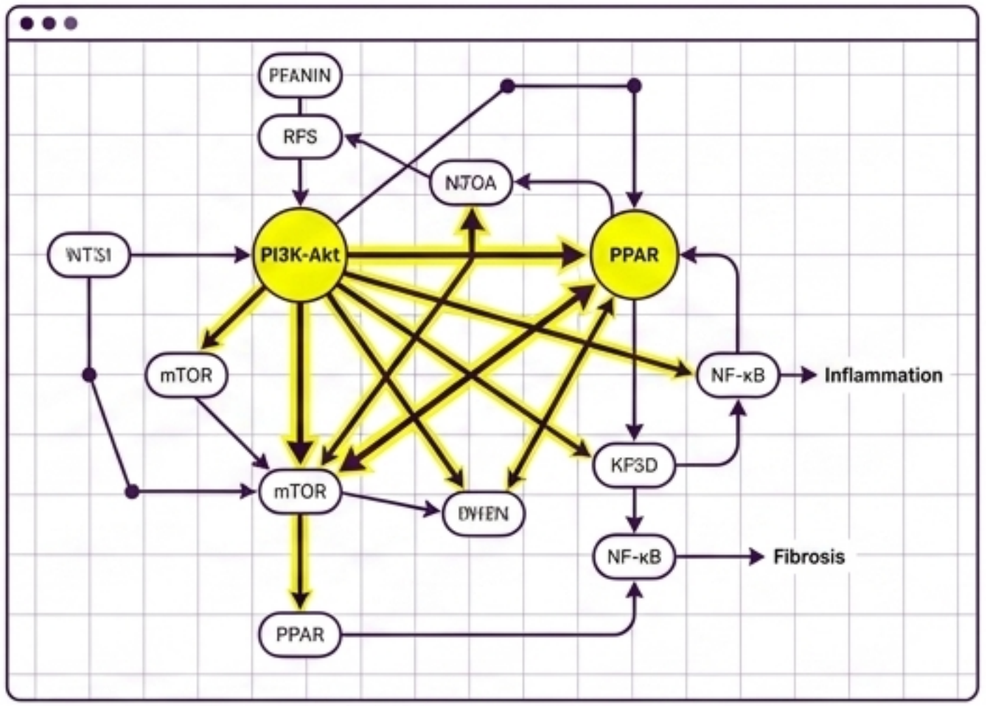
PRACTICAL TAKEAWAY: A deeper systemic autoimmune response may be driving therapy-resistant Frozen Shoulder, rendering standard mechanical treatments insufficient.

Subclinical Infection & Cellular Proteomics

Proteomic studies of Primary Frozen Shoulder show **unique metabolic signatures (PI3K-Akt)** linked to **insulin resistance**. Furthermore, the presence of subclinical bacteria like *P. acnes*—often migrating from oral dysbiosis—triggers **alarmins (IL-33)** that perpetuate the **inflammatory-fibrotic cascade**.



Pathogenic Infiltration: *P. acnes* & Alarmins



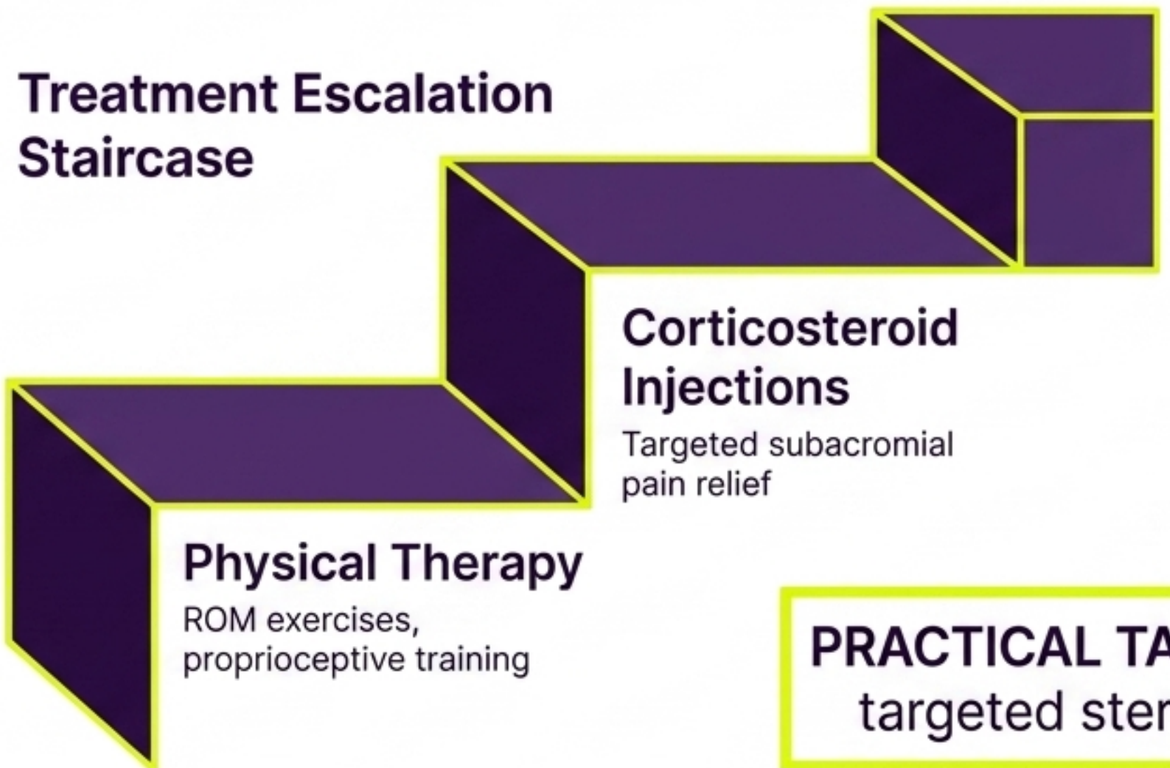
Metabolic Signatures: Insulin Resistance

PRACTICAL TAKEAWAY: The presence of opportunistic bacteria and metabolic cellular signaling proves that Primary and Secondary Frozen Shoulder require distinctly different treatment protocols.

Traditional Conservative Care

Initial management focuses on pain control and early mobilization. However, transcriptomic studies indicate that relying on long-term NSAIDs may be counterproductive; by suppressing early protective neutrophil activity, NSAIDs can prevent tissue resolution and increase the risk of chronic pain.

Treatment Escalation Staircase



Corticosteroid Injections

Targeted subacromial pain relief

Physical Therapy

ROM exercises, proprioceptive training

PRACTICAL TAKEAWAY: Prioritize early physical therapy and targeted steroid injections over long-term NSAID reliance.

Surgical & Interventional Escalation

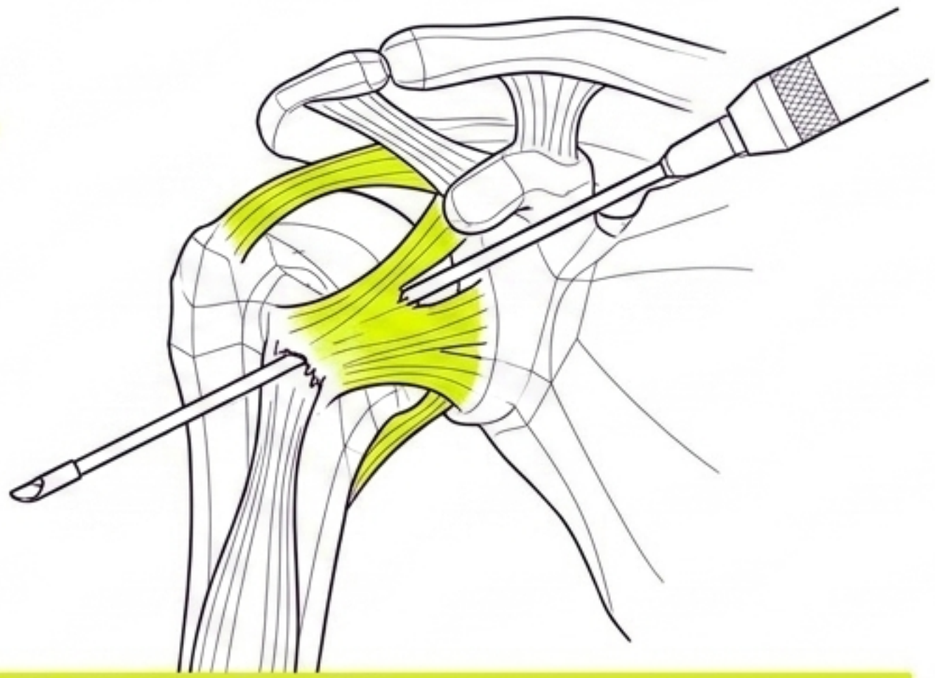
When conservative care fails to restore mobility after a year, intervention is escalated. Manipulation forcibly stretches or tears the capsule, while arthroscopic release precisely cuts the tight bands.

Treatment Escalation Staircase

Arthroscopic Capsular Release

Manipulation Under Anesthesia (MUA)

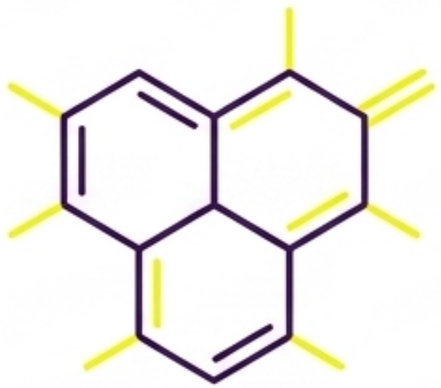
Risks:
Humeral fractures, tendon ruptures



PRACTICAL TAKEAWAY: Reserve surgical intervention for refractory cases lasting >1 year, as forced manipulation carries severe secondary injury risks.

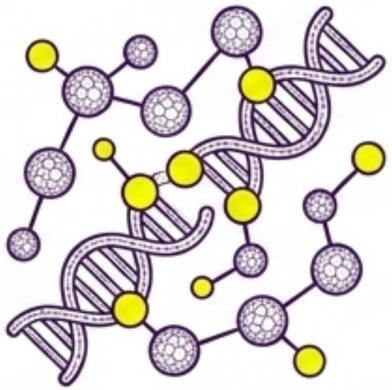
Emerging Systemic Interventions

To address the root Low-Grade Inflammation, emerging protocols utilize targeted immuno-nutrition, microbiome support, and therapeutic hypercapnia (90-second plastic bag rebreathing) to suppress systemic pro-inflammatory cytokines and alter the metabolic state.



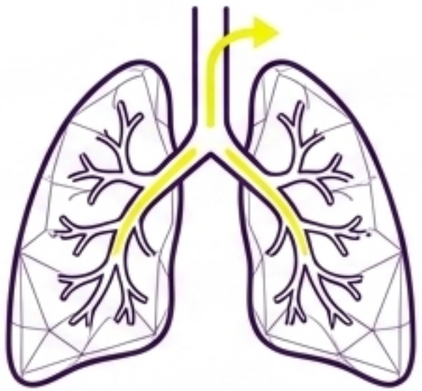
Nutrition

n-3 PUFAs & olive oil phenolics to reduce ROS



Microbiome

Probiotics (*L. plantarum*) to inhibit pro-inflammatory TNF-a



Breathwork

Therapeutic Hypercapnia

PRACTICAL TAKEAWAY: Incorporate metabolic and psychological interventions to address the root systemic causes of Primary Frozen Shoulder, rather than treating the joint in isolation.

The Collaborative Care Model

Effective management of adhesive capsulitis requires dismantling the silos of traditional medicine. Treating the joint alone ignores the **metabolic** and **psychological** drivers of the disease, leading to prolonged recovery and persistent symptoms.

Primary Care & Endocrinology
Metabolic screening

Orthopedics
Injections / Surgery

Mental Health & Nutrition
Psychological / Dietary intervention

Physical Therapy
ROM / Rehab

PRACTICAL TAKEAWAY: Build a multidisciplinary referral network; comprehensive care is the only reliable way to **accelerate the thawing phase** and restore **quality of life.**