

# Anterior pelvic tilt: the lateral gateway to low back pain

## Abstract

**Background:** Outside red-flag conditions, anterior pelvic tilt (APT) is proposed as the primary biomechanical driver of most low back pain (LBP). Its clinical declaration, however, is most consistently lateral. Greater trochanteric pain syndrome (GTPS) is the obligatory lateral expression of APT and the most practical station for diagnosis and phenotyping.

**Objective:** To present a clinic-first, cascade-based framework that (1) extends Janda's Lower Crossed Syndrome into a dynamic four-stream model; (2) mandates a lateral-first diagnostic entry via GTPS; (3) employs a targeted trochanteric injection as a biomechanical filter and transient reset; and (4) restores durable pelvic neutrality by correcting muscle imbalance.

**Model:** APT initiates a reproducible four-stream cascade:

Lateral stream-gluteal inhibition, TFL-ITB overdrive, GTPS, and SIJ shear. Upstream stream-hyperlordosis, facet capsular strain/synovitis, posture-provoked foraminal irritation, posterior annular tension, and low-grade listhesis as a lordosis amplifier (not frank instability). Downstream stream-femoral/tibial internal rotation, subtalar unlocking (flexible flatfoot), posterior knee strain, and gastrocnemius shortening. Fascial stream-integrative non-dermatomal echo zones linking regions (pseudo-sciatica, paravertebral "renal" mimic, coccygodynia). Diagnostic fulcrum: A targeted trochanteric block (local anesthetic ± corticosteroid) functions as a biomechanical filter and transient reset. Same-session or ≤72-hour multizone relief (lateral/SIJ/paravertebral/coccygeal/posterior knee) confirms APT with obligatory GTPS and opens a time-sensitive window for corrective motor retraining. Nonresponse prompts reconsideration of non-cascade etiologies.

**Conclusion:** APT is the origin; GTPS is the gateway. The lateral stream is not optional-it is obligatory. Trochanteric injection clarifies diagnosis and resets mechanics; durable resolution is achieved by restoring muscle balance and pelvic neutrality across streams.

**Keywords:** anterior pelvic tilt, greater trochanteric pain syndrome, lower crossed syndrome, pseudo-sciatica, facetogenic pain, iliotibial band, sacroiliac joint, subtalar unlocking, fascia, phenotyping

Volume 17 Issue 5 - 2025

## Safaaeldin Abaza

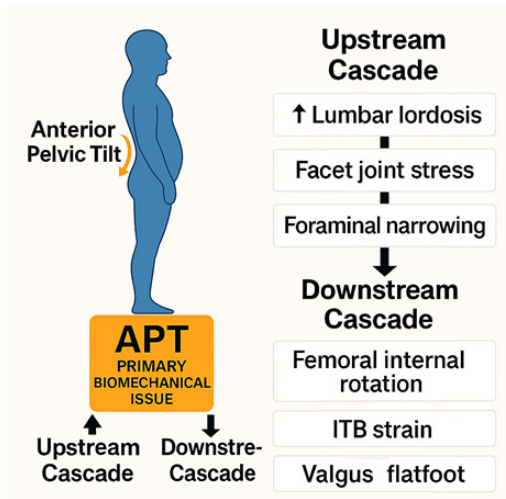
Consultant Orthopaedic Surgeon, Medeor Hospital & Heart Beat Medical Centre, Abu Dhabi, UAE

**Correspondence:** Safaaeldin Abaza, FRCS (Glasgow), Consultant Orthopaedic Surgeon, Medeor Hospital & Heart Beat Medical Centre, Abu Dhabi, UAE

**Received:** September 12, 2025 | **Published:** September 23, 2025

**Abbreviations:** APT, anterior pelvic tilt; LBP, low back pain; GTPS, greater trochanteric pain syndrome; SIJ, sacroiliac joint; ITB, iliotibial band; TFL, tensor fasciae latae; TVA, transversus abdominis; SLR, straight leg raise; MRI, magnetic resonance imaging

Capsule: "APT is the conductor-every symptom is an echo."

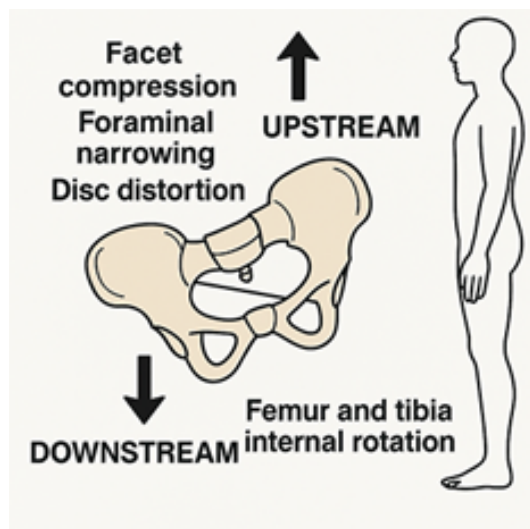


## Introduction

Low back pain is frequently over-imaged, over-labeled, and under-explained. The problem is not a deficit of anatomy but a deficit of biomechanical causality. Outside red-flag disease, the origin is upstream in pelvic orientation-anterior pelvic tilt (APT). When the pelvis tips forward, a platform that should remain level becomes a tilted base, destabilizing load sharing across the spine, pelvic girdle, and lower limb. Patients may feel pain "up" or "down," but the pelvis most often confesses laterally first.

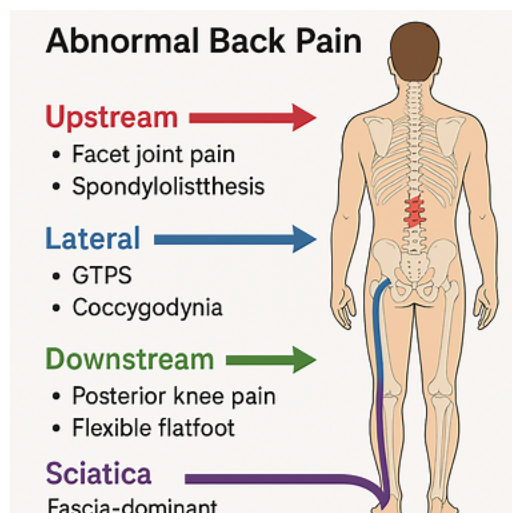
## Functional doctrine - a level pelvis

A level pelvis stabilizes lumbar lordosis, anchors the shoulder-trunk complex, and transmits load symmetrically to both limbs. This horizontal platform is the precondition for efficient gait and resilient tissue loading. When muscle balance is lost-tight iliopsoas and lumbar extensors crossed with weak gluteals and deep abdominals (Janda's Lower Crossed Syndrome)<sup>1</sup>-the pelvis rotates anteriorly, shifting the center of mass forward and compelling compensations in three directions, with a fourth fascial stream integrating the distortions.



### From imbalance to cascade

Janda mapped the imbalance; the clinic must map its propagation. APT deepens lordosis (upstream), collapses frontal-plane pelvic control (lateral), and drives femoro-tibial internal rotation with subtalar unlocking (downstream). Fascia integrates these distortions across regions, explaining non-dermatomal radiation and the rapid, multi-regional changes observed after a targeted lateral reset.



### The lateral confession - GTPS as gateway

Across stream-dominant phenotypes, GTPS is consistently present. It is not merely a coincident bursitis but the earliest, most accessible expression of pelvic-origin mechanics. Trochanteric palpation tenderness, pain with resisted abduction, and a positive Trendelenburg sign identify the station where diagnosis should begin. This lateral-first approach installs a single, reliable entry point for phenotyping.

### Biomechanical filter and reset

A trochanteric injection (local anesthetic ± corticosteroid) acts as a mechanical truth test. Same-session or short-interval relief across lateral, SIJ, paravertebral, coccygeal, and posterior knee zones indicates that re-leveling the pelvis de-noises upstream and downstream nociceptive echoes. The injection is not the cure; it starts a time-sensitive window for motor retraining.

### The problem with localization-based diagnosis

Modern musculoskeletal care remains trapped in a localization mindset-where pain is diagnosed by its anatomical location rather than its biomechanical origin. This organ-centric approach leads to fragmented reasoning, overreliance on imaging, and mislabeling of mimicry syndromes.

Localization fails because it ignores the cascade. It treats the symptom as the source and the echo as the origin. This leads to:

- Overdiagnosis of incidental findings (disc bulge, bursitis, flatfoot)
- Mislabeling of mimicry syndromes (sciatica, SIJ dysfunction, coccydynia)
- Failed interventions targeting symptoms, not sources

**Capsule:** "Pain location is not pain origin-APT echoes everywhere."

**Capsule:** "Radiology shows the damage-biomechanics reveals the cause."

**Capsule:** "The pelvis is the platform; GTPS is the confession; injection resets the cascade-muscle balance keeps it level."<sup>2-5</sup>

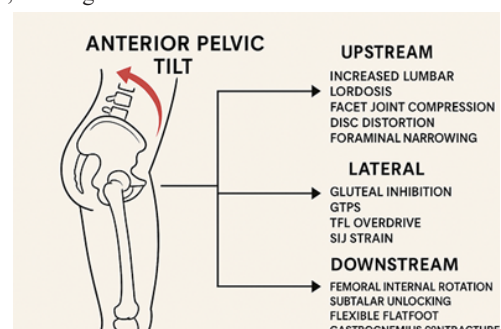
### The fundamental principle - the pelvis must remain level

At the core of efficient human movement and musculoskeletal health is a level pelvis. The pelvis acts as the central platform for the entire kinetic chain. When positioned correctly, it provides a stable base for the spine, supports the shoulder girdle, and ensures even transmission of weight from the torso to the lower limbs. A level pelvis allows:

### Common Causes of APT

- Tight iliopsoas from prolonged sitting
- Overactive lumbar extensors
- Weak gluteus medius/minimus and transversus abdominis
- TFL overdrive and ITB tension
- Gastrocnemius shortening and subtalar unlocking
- Sedentary behavior and gait asymmetry
- APT:** Define by ASIS-PSIS inclinometer angle or rib-pelvis gap
- GTPS:** Confirm by ≥3 signs-tenderness, Trendelenburg, resisted abduction pain

**Capsule:** "APT is not a posture-it is a consequence of imbalance, overload, and neglect."<sup>1,6</sup>



## The four-stream cascade model

Anterior pelvic tilt (APT) is not a static posture; it is a dynamic biomechanical configuration. Once the pelvis rotates anteriorly, it initiates a four-stream cascade that propagates dysfunction in lateral, upstream, downstream, and fascial directions. Each stream carries its own clinical signatures, yet all originate from the same tilted platform.

### Lateral stream - the gateway and confession

- Gluteus medius/minimus inhibition; Trendelenburg gait; TFL overdrive.
- ITB tension; lateral knee irritation; SIJ shear without inflammatory markers.
- GTPS as the earliest and most accessible expression.
- Trochanteric palpation pain; resisted abduction weakness; lateral/posterolateral radiation.

*Capsule: "GTPS is not a hip problem-it is a pelvic confession."*<sup>5-7</sup>

### Upstream stream - the amplifier

- APT → increased lumbosacral angle → hyperlordosis → posterior element approximation.
- Facet capsular strain/synovitis; posture-provoked foraminal irritation (pseudo-radiculopathy).
- Posterior annular disc tension; "bulge" without herniation; low-grade listhesis as a lordosis amplifier.
- Extension-sensitive axial pain; flexion relief; benign neurology.

*Capsule: "Lordosis compresses the facets, distorts the disc, and narrows the foramina-but the pain is pelvic."*<sup>2,4,6,8</sup>

### Downstream stream - the collapse vector

- Pelvic tilt → femoral internal rotation → tibial internal rotation → subtalar unlocking (flexible flatfoot).
- Medial arch fatigue; posterior tibial overload; valgus drift; patellofemoral stress. arch reconstitutes on tiptoe.
- Gastrocnemius shortening → restricted dorsiflexion, toe-out gait, posterior knee strain.
- Posterior knee ache without intra-articular signs;
- Capsule: "Flatfoot is not a foot collapse-it is a pelvic echo."*

Author anchors: Clinical gait coupling texts; Abaza.

### Fascial stream - the integrative highway, fascial Echo: The fourth amplifier

Fascia does not respect joint boundaries-it amplifies dysfunction across zones. Once GTPS is triggered, fascia echoes tension into:

- Coccyx (coccydynia mimicry)
- Paraspinals (discogenic mimicry)
- SIJ (sacroiliitis mimicry)
- Posterior hip (piriformis mimicry)

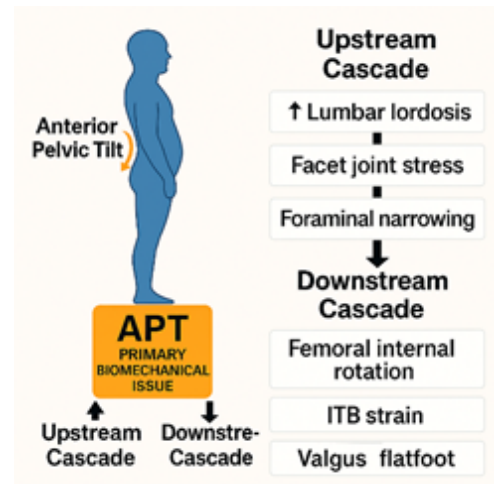
Tensegrity web transmitting asymmetry across regions; non-dermatomal echo zones.

- Thoracolumbar fascia: paravertebral/flank "renal" mimic; diaphragmatic drag.

- Gluteal-TFL-piriformis corridor: pseudo-sciatica; SIJ mimicry.
- Posterior compartment: Achilles "tightness," plantar fatigue, eversion overload.
- Rapid multi-regional relief after lateral reset reflects fascial de-tensioning.

*Capsule: "Fascia is the highway-pain is the passenger."*

**Capsule Quote:** "Fascia multiplies dysfunction. It does not localize-it echoes."<sup>5,6,9</sup>



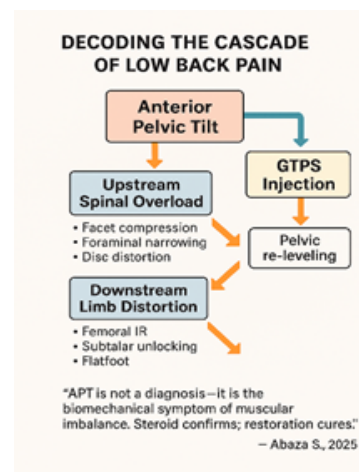
### Phenotype classification (Stream-Dominant Logic)

APT does not express uniformly; it declares itself through dominant streams. Phenotyping allows clinicians to triage LBP based on observable biomechanical patterns, not merely pain location. Each phenotype reflects a stream-dominant distortion, guiding both diagnosis and correction.

**APT-Lateral:** GTPS; gluteal inhibition; Trendelenburg gait; SIJ shear. Trochanteric tenderness and resisted abduction pain confirm entry.

**APT-Upstream:** Extension-sensitive, Hyperlordosis; facetogenic pain; thoracolumbar stiffness; posture-provoked foraminal irritation; benign neurology.

**APT-Downstream:** Patellofemoral overload; tibial internal rotation; flexible flatfoot; posterior knee strain; ITB tension.



**APT–Fascial echo:** Non-dermatomal radiation; coccygodynia; pseudo-sciatica; rapid multi-zone relief after lateral reset.

**Mixed phenotype:** Multi-stream signatures with mimicry overlays; multizone symptom shifts that settle after lateral reset.

*Capsule:* “Phenotype logic is the new anatomy-streams tell the story.”

**Capsule:** “Phenotyping is not labeling—it is decoding the cascade.”<sup>3,7,9</sup>

### Diagnostic sequence (bedside)

Palpate GTPS and ITB; assess resisted abduction and Trendelenburg sign.

Assess pelvic tilt magnitude and rib–pelvis distance.

Observe gait for pelvic drop and subtalar unlocking.

Apply GTPS injection (after red-flag exclusion) → relief confirms cascade origin.

Classify phenotype; begin stream-specific correction immediately.

Treatment logic: Injection is the reset; correction is the cure. Restore pelvic neutrality via inhibition (tight), activation (weak), rebalancing (overactive), and gait/foot retraining. Educate to reframe pain as biomechanical, not structural.

*Capsule:* “Normal LBP is not vague—it is biomechanical. GTPS is the key.”<sup>2,7</sup>

### Clinical implication: “normal” low back pain vs. mimicry pain

#### Normal Low Back Pain (No neurological deficit)

Outside red-flag conditions, the majority of patients present with nonspecific LBP without neurological deficit. Typical features include:

**Onset:** After lifting, bending, desk sitting, or non-spinal trauma (e.g., fall on the hip or knee).

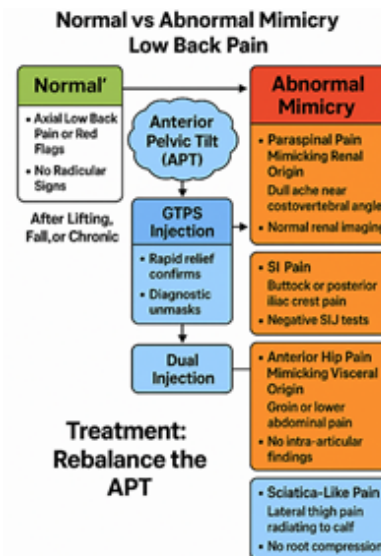
**Neurological exam:** Negative straight-leg raise (SLR), no focal weakness, no reflex changes, no sensory level.

**Course:** May be acute (lifting, sudden twist) or chronic (desk sitting, prolonged static postures).

**Mechanism:** Reflects the cascade of anterior pelvic tilt (APT) with obligatory lateral involvement (GTPS, ITB overdrive, SIJ shear) but no hard nerve compression.

**Clinical note:** These cases respond predictably to trochanteric injection and subsequent motor retraining.

**Caanatomysule:** “The normal back is painful, but not neurological.”<sup>10–12</sup>



#### Mimicry LBP: fascia-driven echoes and diagnostic clarity

#### Mimicry pain in APT: fascia echo, diagnostic confusion, and clinical resolution

APT-driven pain often mimics unrelated pathologies due to fascial propagation, multi-joint echo, and non-dermatomal distribution. In our clinical practice, after exclusion of red flags, negative straight leg raise (SLR), and absence of neurological signs, all patients demonstrated positive GTPS findings and experienced temporary relief following targeted injection therapy, with or without steroid and/or local anesthesia.

*Capsule:* “Mimicry deceives, but the cascade confesses.”

#### Common mimicry patterns and confirmations

Mimicry arises when fascia transmits mechanical distortion across compartments, creating pain zones that defy dermatomal logic. The origin is biomechanical, not structural. Recognize the echo, trace the stream, and confirm the origin through a lateral reset.

#### Sciatica-like Pain (GTPS + ITBS Combination)

Mimics radicular sciatica but lacks dermatomal pattern.

SLR negative; no nerve root involvement.

Originates from GTPS and iliotibial band tension.

*Capsule:* “It mimics sciatica, but the nerve is innocent.”

#### Paraspinal pain mimicking renal pathology

Deep lumbar pain misattributed to renal origin.

Caused by facet joint stress and posterior fascial tension.



No renal findings; flank tenderness is fascial.

*Capsule:* “The kidney is blamed, but the fascia is the culprit.”

### SI joint dysfunction and coccygodynia

Pain localized to sacral and coccygeal regions.

Often misdiagnosed as SIJ instability or coccygeal trauma.

True source: fascial tension across posterior pelvic ring.

*Capsule:* “The joint is stable-the fascia is unstable.”

### Anterior and posterior hip pain

Mimics intra-articular hip pathology (e.g., labral tear).

Imaging often normal; pain due to capsular stretch and fascial convergence.

*Capsule:* “The hip hurts, but the joint is innocent.”

### Flank pain mimicking visceral or urological conditions

Flank discomfort suggests visceral pathology.

No visceral findings; pain arises from lateral fascial propagation.

*Capsule:* “It feels visceral, but it’s biomechanical.”

### Spondylolisthesis misattributed to instability

Radiographic slip often blamed for symptoms.

Many cases are incidental, long-standing, and asymptomatic.

Stability maintained by soft tissue compensation.

*Capsule:* “The slip is stable-the fascia holds the line.”

### Normal back pain with negative neurological signs

Diffuse lumbar pain with no radicular features.

SLR negative; reflexes and motor function intact.

Pain is fascia-driven, not discogenic.

*Capsule:* “The disc is silent-the fascia speaks.”

### Coccygodynia and pelvic floor mimicry

Tailbone pain often misdiagnosed as trauma or pelvic floor dysfunction.

### Mimicry patterns of APT–GTPS Cascade

Mimicry pattern	What it resembles	Key clinical clues	Why it's not that	Response to GTPS injection
<b>Renal-like pain</b>	Flank/renal colic	Lateral hip tenderness, pain worsens with gait	No hematuria, imaging normal	Rapid relief confirms pelvic origin
<b>Coccygeal pain</b>	Coccydynia	Sitting intolerance, tailbone ache	Coccyx imaging normal, pain lateralizes	Injection abolishes pain
<b>Pseudo-sciatica</b>	Lumbar radiculopathy	Lateral thigh pain, sometimes below knee	Negative straight-leg raise, no dermatomal deficit	Pain resolves post-injection
<b>Hip arthritis mimic</b>	Groin/hip OA	Pain on hip rotation, limp	X-ray shows minimal OA, pain lateral not intra-articular	Injection relieves pain despite OA
<b>Trochanteric bursitis mimic</b>	Local bursitis	Point tenderness over GT	True bursitis rare; cascade explains overload	Injection relieves, but root is APT
<b>Discogenic mimic</b>	Disc herniation	Low back pain, sometimes central	MRI may show incidental disc bulge	Injection relieves despite disc finding
<b>SI joint mimic</b>	Sacroiliitis	Buttock pain, worse with stairs	SI provocative tests inconsistent	Injection relieves, SI stable
<b>Knee mimic</b>	Lateral knee pain	Iliotibial band tightness	Knee imaging normal	Pain resolves after pelvic correction
<b>Plantar mimic</b>	Heel pain	Plantar fasciitis-like	No calcaneal spur, gait lateralized	Injection + pelvic leveling ends pain

Fascial tension and posterior pelvic echo are the true drivers.

No imaging abnormalities; responds to GTPS-targeted therapy.

*Capsule:* “The coccyx cries, but the echo comes from the hip.”

### Clinical resolution via GTPS injection therapy

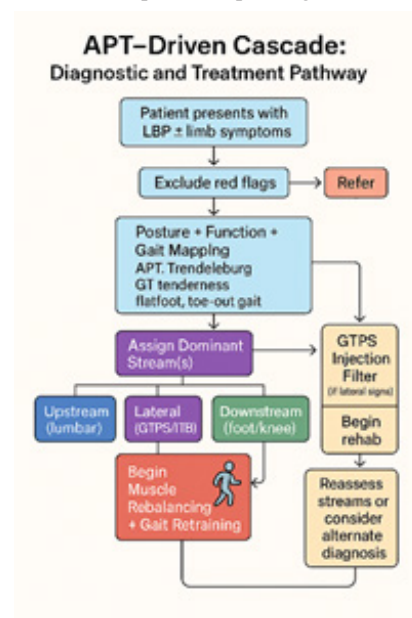
Clinical confirmation: In our clinic, over more than 20 years GTPS injection yields immediate relief in >90% of cases-across acute, chronic, and mimicry presentations. Minor structural findings (disc bulge, spondylolisthesis) are often incidental.

This response confirms the biomechanical origin and fascial propagation of symptoms.

*Capsule:* “The needle confirms what the fascia whispers.”

This reinforces the principle that APT is the origin and GTPS is the gateway, with mimicry zones acting as echoes rather than primary pathology.

**Capsule:** “Whether twisted, fallen, or desk-bound-if GTPS is present and the nerve is silent, the pelvis is speaking.”<sup>2,3,6,9</sup>



**Capsule takeaway**

*"Mimicry is not mystery — it is pelvic confession."*

Each mimicry pattern is a **false flag** generated by the cascade. **GTPS injection** is both diagnostic and therapeutic: relief unmasks the true origin (APT).

**Common mimicry patterns and confirmations**

Paravertebral "renal" pain → upstream facet echo; relief after GTPS injection.

SIJ shear → lateral stream distortion; SIJ tenderness resolves post-injection; inflammatory markers negative.

Coccygodynia → fascial echo from the lateral stream; coccygeal pain fades after lateral reset.

Pseudo-sciatica → ITB tension/piriformis echo; negative SLR; relief post-injection.

Posterior knee pain → downstream fascial echo; no joint-line tenderness; gait collapse present; relief after lateral reset.<sup>13–15</sup>

**Case pearls**

Renal-like flank pain with normal renal workup; extension-sensitive paravertebral tenderness; trochanteric block yields same-session lumbar/flank relief.

Non-traumatic coccygodynia; gluteal inhibition; Trendelenburg gait; trochanteric injection resolves coccygeal pain within 48 hours.

Posterior knee pain in a runner; subtalar unlocking; tibial internal rotation; GTPS injection reduces posterior knee ache; downstream retraining completes care.

Schematic overlay (narrated): Central tilt (APT) → lateral gateway (GTPS) → upstream echo (facet/flank) → downstream echo (posterior knee/flatfoot) → fascial overlay (pseudo-sciatica/coccyx).

*Capsule: "Mimicry is fascia misread-GTPS resets the narrative."*<sup>3,6,9</sup>

**Trochanteric Injection (Post-Red-Flag Exclusion): Universal Entry, Rare Exception****Red-flag exclusion (non-negotiable)**

No infection, malignancy, fracture, cauda equina, progressive neurological deficit, or inflammatory spondyloarthropathy.

If trauma is suspected, clear fracture/instability first.

Capsule: "Pelvic leveling ends pain; muscle balance ends relapse."

**Clinical truth - relief is the rule**

After red flags are excluded, the majority of acute (lifting, fall) and chronic LBP—including mimicry—benefit from trochanteric injection (local anesthetic ± corticosteroid). Multizone relief (lateral/SIJ/paravertebral/coccygeal/posterior knee) confirms cascade origin and opens a window for motor retraining.

**Rare nonresponse - diagnostic pivot**

Nonresponse suggests non-cascade pathology (true root compression, occult fracture, infection), a missed phenotype, fascial adaptation beyond the reset threshold, or psychosocial overlay. In such cases, proceed to targeted investigations or alternative triage guided by examination.

**Standardized Injection Protocol**

**Agent:** 3–5 mL lidocaine ± 20–40 mg triamcinolone

**Site:** Posterolateral superior iliac fossa

**Optional:** Distal ITB block for pseudo-sciatica or knee radiation

**The reset (diagnostic and therapeutic)****Options:**

Local anesthetic alone (best phenotyping test).

Local anesthetic + corticosteroid (longer reset window).

Bilateral when both sides active.

Dual (GTPS + distal ITB) for sciatica-like or knee-dominant patterns.

**Mechanism:** Reduces lateral nociception/TFL–ITB overdrive → gluteal re-engagement → transient pelvic re-leveling → secondary unload upstream (facets/foramina) and downstream (subtalar/posterior knee).

Capsule: "Inject to reset; retrain to cure."

**Clinical strategy: temporary pelvic leveling**

Once GTPS is identified and injected, the pelvis temporarily re-levels. This creates a therapeutic gap—a window of relief that must be used strategically.

**Why It Matters:**

The relief is not the cure—it is the diagnostic confirmation

The temporary re-leveling allows for targeted muscle rebalancing

Gluteal activation, TFL downtraining, and core retraining must follow

**Capsule quote:** "Injection gives time. Correction gives freedom." -Dr. Safaaeldin Abaza **Capsule Quote:** "The pelvis re-levels. The clock starts. Rebalance before the echo returns." -Dr. Safaaeldin Abaza

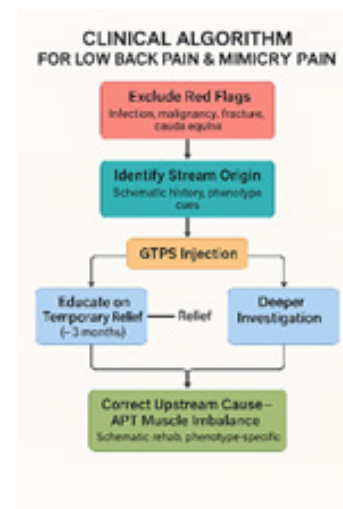
Capsule: "Pelvic leveling ends pain; muscle balance ends relapse."

Strategic benefits: Diagnostic clarity; resource preservation; time efficiency; prevention of diagnostic drift; patient education and trust.

Capsule: "Exclude the dangerous—then decode the mechanical."

Capsule: "Injection reveals the origin—relief confirms the cascade."

Capsule: "No relief means look again—not give up."



### Clinical algorithm and educational implications

A schematic algorithm guides clinicians: Phenotype → GTPS Injection → Confirm → Rehabilitate

This model democratizes diagnostics, reduces imaging reliance, and enhances global teaching.

#### Capsule:

“If it mimics, inject. If it relieves, confirm.”<sup>3,6</sup>

### Muscle imbalance correction and pelvic neutral restoration

#### Core imbalances in APT and corrections

Tight/overactive: Iliopsoas; lumbar extensors; gastrocnemius–soleus (with pronation).

Weak/inhibited: Gluteus medius/minimus; deep external rotators (endurance); transversus abdominis.

Overactive/compensatory: TFL; piriformis.

Physiotherapy-precision, not protocol: Stream-specific rehabilitation based on phenotype prevents relapse and normalizes load distribution. Pelvic neutrality is a dynamic platform to be maintained under load and time.<sup>16–18</sup>

Capsule: “Strength is not enough–balance is the cure.”

Capsule: “Pelvic leveling ends pain; muscle balance ends relapse.”

Capsule: “Physiotherapy is not exercise–it is biomechanical re-education.”<sup>1,6</sup>

### Take-home points

APT is the biomechanical origin of most non-red-flag LBP.

GTPS is the lateral confession and diagnostic gateway.

Trochanteric injection (after red-flag exclusion) is a diagnostic filter and mechanical reset; relief is the rule.

Mimicry LBP (renal-like, coccygeal, pseudo-sciatica) stems from fascia-driven echoes of the cascade.

Durable resolution depends on restoring pelvic neutrality via inhibition–activation–rebalance–gait retraining.

Physiotherapy must be stream-specific and phenotype-guided.

Nonresponse to injection is uncommon and diagnostically valuable.

Capsule: “The cascade is not a concept–it is a clinical roadmap.”

### Collective capsule summation

“Low back pain, hip pain, SIJ tenderness, and even coccygeal discomfort are not separate entities–they are biomechanical echoes of one pelvic distortion. The GTPS injection confirms the amplifier, and the post-injection protocol restores the cascade. This paradigm redefines diagnosis, treatment, and teaching.”<sup>7</sup>

### Benefits of the GTPS injection paradigm

- i. **Diagnostic clarity:** Rapid pain relief confirms pelvic origin, even in cases with misleading imaging
- ii. **Therapeutic precision:** Targets the true amplifier (gluteal collapse), not the structural distractor

iii. **Educational impact:** Reinforces schematic teaching and capsule logic for global learners

iv. **Clinical efficiency:** Reduces unnecessary imaging, referrals, and invasive procedures

v. **Patient empowerment:** Post-injection drills restore pelvic control and prevent recurrence

“The injection is not a shortcut–it is a biomechanical spotlight.”<sup>6</sup>

### Limitations and considerations

**Not curative:** Injection resets pain but does not correct pelvic distortion

**Requires skilled palpation:** GTPS zone must be precisely identified

**False negatives possible:** In cases with severe gluteal atrophy or multi-level distortion

**Post-injection compliance:** Without drills, relapse is inevitable

**Not a substitute for systemic pathology screening:** Renal, inflammatory, or neoplastic causes must be excluded

“The needle reveals–but the drills heal.”<sup>6</sup>

Capsule: “This model doesn’t just diagnose–it teaches, corrects, and prevents.”

### Diagnostic algorithm: cascade-based triage for low back pain

Caption: “From palpation to phenotype–every step reveals the stream.”

Step 1: Exclude Red Flags

Rule out infection, malignancy, fracture, cauda equina, inflammatory disease, and progressive neurological deficit.

Step 2: Palpate GTPS

Assess for tenderness over the greater trochanter.

Test resisted abduction and Trendelenburg gait.

Step 3: Assess Pelvic Tilt

Visual cueing or measurement of anterior rotation.

Rib–pelvis distance and lumbar lordosis exaggeration.

Step 4: Observe Gait and Foot Mechanics

Look for frontal-plane collapse, subtalar unlocking, and tibial internal rotation.

Step 5: Apply Trochanteric Injection

Local anesthetic ± corticosteroid.

Observe relief within 30–72 hours.

Step 6: Map Relief Zones

Lateral, SIJ, paravertebral, coccygeal, posterior knee.

Relief confirms cascade origin and stream dominance.

Step 7: Classify Phenotype

APT–Lateral, APT–Upstream, APT–Downstream, Fascial Echo, Mixed.

**Step 8: Initiate Stream-Specific Correction**

Muscle-imbalance restoration.

Gait and fascia retraining.

Patient education and ergonomic coaching.

**Practical protocol**

Identify clinical signs of GTPS (lateral hip tenderness, gluteal weakness, positive Trendelenburg sign). Administer ultrasound-guided steroid injection at the greater trochanteric bursa. Assess response: rapid improvement suggests biomechanical origin. Use the pain-free window to initiate corrective exercises and movement retraining.

While injections and symptom management provide relief, only restoration of muscle balance addresses the root cause.

**Future directions**

Caption: “From clinic to curriculum-this model is ready to scale.”

**Multicenter validation:** Prospective studies across orthopedic, pain, and physiotherapy clinics to quantify relief patterns, phenotype prevalence, and long-term outcomes.

Schematic teaching modules: Integration into residency and fellowship programs using capsule pedagogy and stream-based diagnostics.

**Global accessibility:** Translation into visual handouts, mobile apps, and patient-facing tools for low-resource settings.

**AI-assisted phenotyping:** Use of machine learning to automate gait analysis, pelvic tilt detection, and stream classification.

**Publication series:** Expansion into related conditions-hip OA, ITBS, coccygodynia, pseudo-sciatica-using the same cascade logic.

Capsule: “This is not the end-it is the beginning of diagnostic clarity.”

**Acknowledgements**

None.

**Conflicts of interest**

The author declares that there are no conflicts of interest.

**References**

1. Janda V. Muscles and motor control in low back pain: assessment. In: Twomey TL, Taylor, JR, editors. *Physical therapy of the low back*. Churchill Livingstone, New York. 1987.
2. Bogduk N. *Clinical anatomy of the lumbar spine and sacrum*. 5th ed. Churchill Livingstone; 2012.
3. Boyd B, Vijayaraghavan N, Karvelas K, et al. Evidenced-based management of greater trochanteric pain syndrome. *Current physical medicine and rehabilitation reports* 2020;8:313–320.
4. Moore KL, Dalley AF, Agur AMR. *Clinically oriented anatomy*. 8th ed. Wolters Kluwer; 2017.
5. Fairclough J, Hayashi K, Toumi H, et al. *Is iliotibial band syndrome really a friction syndrome?* *J Sci Med Sport*. 2007;10(2):74–76.
6. Abaza S. *Painful KOA and ITBS: a new approach*. *MedCrave Orthop Res*. 2020;10(2):45–52.
7. Abaza S. *The dilemma of KOA and ITB syndrome*. *MedCrave Orthop Res*. 2015;2(4):12–18.
8. Standring S. *Gray's Anatomy: the anatomical basis of clinical practice*. 41st ed. Elsevier; 2016.
9. Siff MC. *Supertraining*. 1999.
10. Chicago Pelvic Health. *LCS contributes to pelvic floor dysfunction and swayback posture*. 2023.
11. Contreras B. *APT and Postural Collapse*. 2023.
12. Wang X, Wang S, Zhang J, et al. *Platelet-rich plasma for the treatment of discogenic low back pain: a prospective randomized controlled trial*. 2025;6.
13. Subtalar Joint Motion. *Tibial IR drives foot collapse - not disc pathology*. 2024.
14. Physiopedia. *LCS causes dysfunction at L4–L5, SI joint, and hip*. 2024.
15. Samarpan Physio Clinic. *LCS is the most common compensatory pattern in the body*. 2023.
16. OsteoMag. *Therapeutic Implications of Pelvic Tilt*. 2022;
17. Radiopaedia. *Spinal Anatomy*.
18. TeachMeAnatomy. *Back Anatomy*.