(Lumbar Spine) Facet Joint Irritation in Athletes

Introductions

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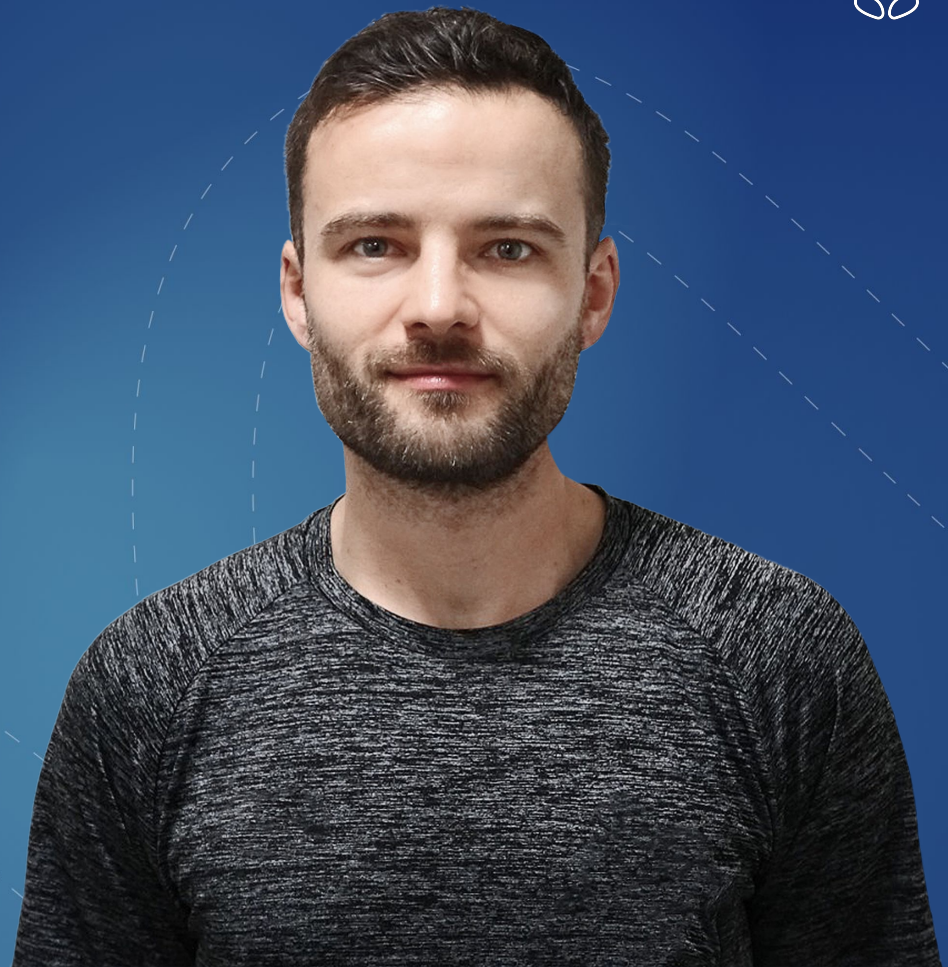
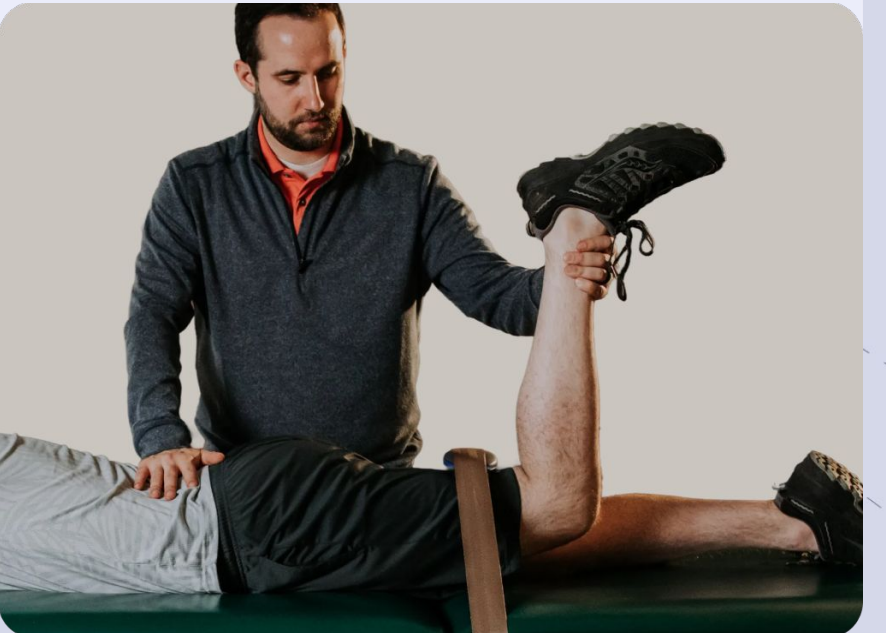
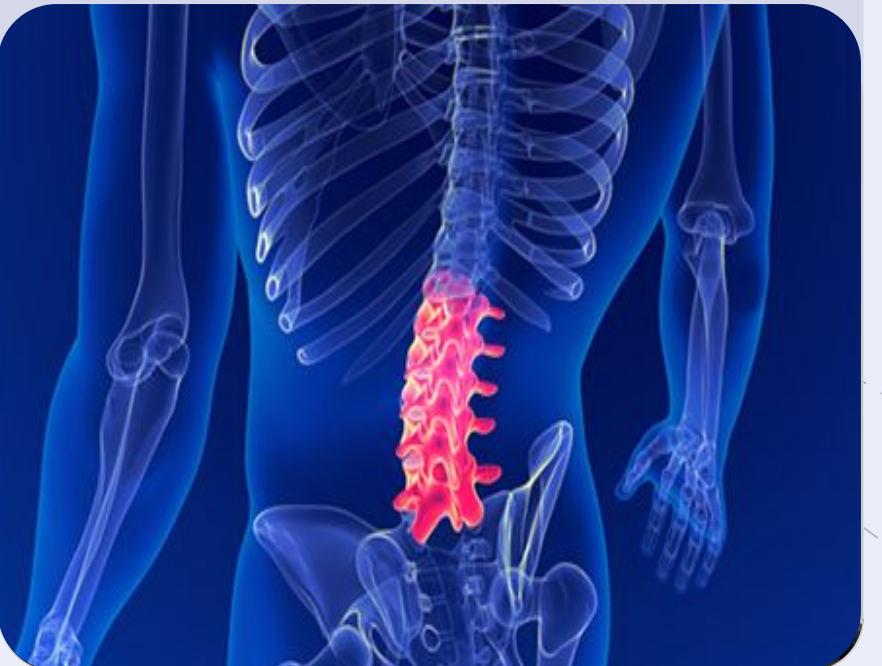


Learning Objectives



- Understand the pathophysiology, risk factors, and clinical presentation of extension-based facet joint irritation in athletes.
- Learn an integrated assessment protocol using ROM tests, core endurance baselines, and ActivForce dynamometry across lumbar flexion, rotation and extension.
- Learn to interpret ActivForce dashboard data — force curves and asymmetries — to build a criterion-based rehab protocol from baseline holds to multi-directional loading.

Agenda



- Introduction
- Clinical Presentation of Lumbar Facet Joint Irritation in Athletes
- Mechanisms of Injury: Extension-Related Back Pain
- Common Causes and Risk Factors
- Clinical Assessment
  - ROM: Hip Internal Rotation, Hip Extension, Shoulder Flexion, Lumbar Locked Rotation Test
  - Muscle Testing: Lumbar Extension, Lumbar Flexion, Lumbar Lateral Flexion, Torso Rotation
- Case Study: Data Review and Analysis
- Treatment and REhabilitation Strategies
- Q&A

Lumbar Facet Joint Irritation in Athletes

Why Facet Joint Irritation Matters in Sport

What are the lumbar facet (zygapophyseal) joints?

- Paired synovial joints connecting the inferior articular process of one vertebra to the superior articular process below; richly innervated by the medial branch of the dorsal ramus.
- Guide and limit motion — share load with the disc, resist excessive extension, rotation, and shear forces.
- In athletes, repetitive extension and rotation loading (rather than degeneration alone) is the dominant driver of irritation.

15-41%
Of chronic low back pain in adults is facetogenic

70%
prevalence of facet abnormalities on MRI in elite adolescent tennis players

28-64%
of youth athletes report LBP by age 16

How These Structures Drive the Injury

Anatomical Structure	*Structure Description*	*Injury Pattern*
Articular Process	Bony processes from adjacent vertebrae that articulate to form the joint; lumbar facets sit in a sagittal plane (more coronal at L5–S1).	Repeated extension drives the processes into closer approximation ("joint closure"), increasing posterior compressive load with every rep.
Capsule & Synovium	Fibrous capsule lined by synovium encloses the joint; densely supplied with free nerve endings and mechanoreceptors.	Mechanically compressed and stretched at end-range; capsular nociceptors fire, producing the local axial pain.
Pars Interarticularis	Bony bridge of lamina between the two articular processes; a key stress-concentration point adjacent to the joint.	Bears concentrated bending/shear stress in extension + rotation — repetitive loading risks stress reaction or spondylolysis, especially in adolescents.
Ligamentum Flavum	Elastic ligament forming the joint's anteromedial capsule and the posterior wall of the spinal canal.	Slackens in extension, reducing its normal load-sharing and stabilizing contribution to the segment.
Medial Branch Nerve	Slackens in extension, reducing its normal load-sharing and stabilizing contribution to the segment.	Sensitized capsule signals through this nerve — explains referred pain into buttock/thigh without true radicular spread.

Clinical Presentation

Pain Behavior

Dull, axial low back ache that sharpens with lumbar extension, rotation, and combined extension + rotation (e.g., serving, bowling, swinging).

Location & Referral

Typically unilateral or paraspinal; may refer to buttock, groin, or posterior thigh — rarely past the knee, distinguishing it from radicular pain.

Aggravating Positions

Standing extension, prolonged standing, walking uphill, getting out of bed; relief with flexion, sitting, or rest.

Functional Signs

Positive Kemp's test, pain on quadrant testing, segmental stiffness/hypomobility, and reduced active extension endurance.

Mechanism of Injury: Extension- Related Back Pain

Repetitive Extension Loading

Sport-specific hyperextension/rotation (serve, bowling, gymnastics arch) repeatedly closes the facet joint space.

Increased Posterior Load Share

Extension shifts axial load from the disc onto the facet joints and posterior elements.

Capsular & Synovial Microtrauma

Repeated joint closure irritates the richly innervated capsule and synovium, triggering local inflammation.

Pain & Protective Guarding

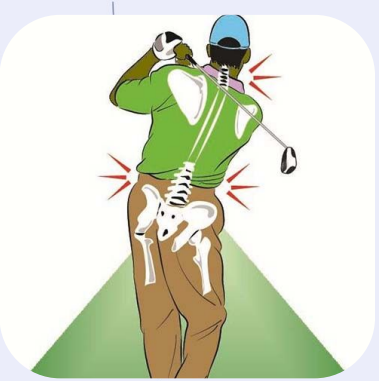
Nociceptive input drives reflexive paraspinal guarding, further limiting extension and reinforcing the cycle.

Cumulative cycle repeats with each rep, swing, or jump → chronic facet sensitization if unaddressed.

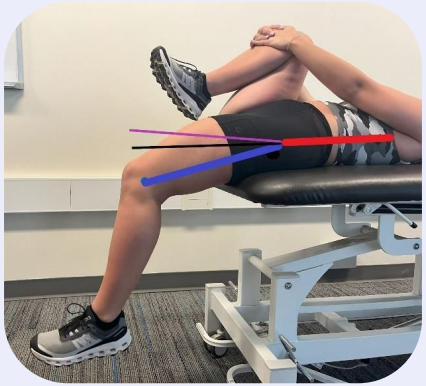
Common Causes & Risk Factors

Sport & Extrinsic Demands

- Rotation-related sports: tennis, golf, baseball/cricket pitching/bowling — high angular velocity trunk rotation + extension
- Extension-dominant sports: gymnastics, diving, volleyball serving/spiking, swimming (butterfly/breaststroke)
- Rapid increases in training volume/intensity without adequate adaptation time
- Insufficient recovery and inadequate warm-up before rotational/extension loading
- Adolescent growth-spurt loading — elevated spondylolysis & facet stress risk during peak height velocity



Common Causes & Risk Factors



Biomechanical & Individual Factors

- Limited or asymmetric hip internal rotation / total hip rotation ROM — forces compensatory lumbar rotation
- Restricted hip extension ROM (tight hip flexors) — increases lumbar extension to achieve sport position
- Reduced thoracic rotation/shoulder flexion mobility — shifts rotational demand down to the lumbar spine
- Decreased lumbar flexion AND extension ROM — strongest evidenced risk factors for athletic LBP
- Poor core/trunk endurance, muscle imbalance, prior LBP history, and higher body weight

Objective testing

Range of Motion
Lumbar locked rotation test

Werner et al 2014

Range of Motion Hip Extension

Werner et al 2014

Range of Motion Shoulder Flexion

Werner et al 2014

Endurance Plank

McGill 2010

Endurance Side Plank

McGill 2010

Endurance Sorenson Hold

McGill 2010

Muscle Testing with HDD Torso Flexion

Dekkers et al (2025)

Muscle Testing with HDD Torso Extension

Dekkers et al (2025)

Muscle Testing with HDD Torso Rotation

Dekkers et al (2025)

Case Study

Clinical Presentation

History of present condition –
52 year old kick boxer. Recurring right sided sciatica, episodic in nature, occurs over several years. Most recent episode has just eased but lasted 2 weeks, required to take this time off work. Episodes occur every 3 months or so.

Aggravating factors –
Getting out of bed
Sitting more than 2 hours

Diurnal pattern –
Worst in am

Eases –
Rest

Past medical history -
High cholesterol

Clinical Presentation

Observation –
Nil of note

Range of movement –
Limited range of movement into lateral flexion but otherwise good range of movement

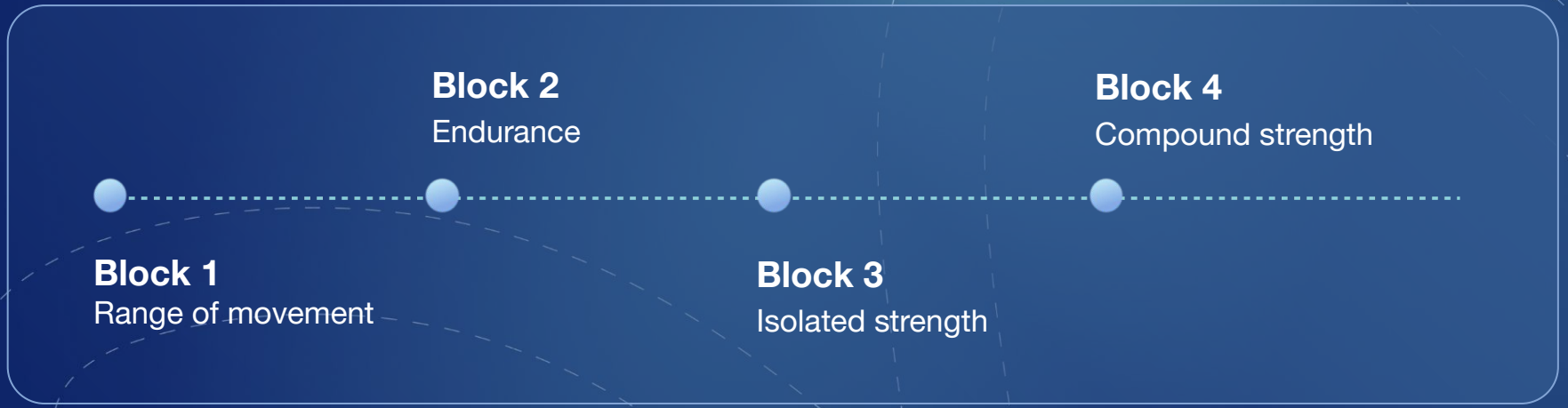
Special tests –
Dermatomes: no sensory disturbance
Myotomes: muscle strength screen clear
Reflexes: normal knee and ankle jerk bilaterally
Slump: positive right side
Straight leg raise: positive cross over sign

Palpation –
Tender on palpation of transverse processes lower lumbar spine

Diagnosis –
L5-S1 spondylolisthesis confirmed on MRI

Roadmap

Block periodization



Results

ABSOLUTE PERCENTAGE

Filter: All | Left | Right | No Laterality

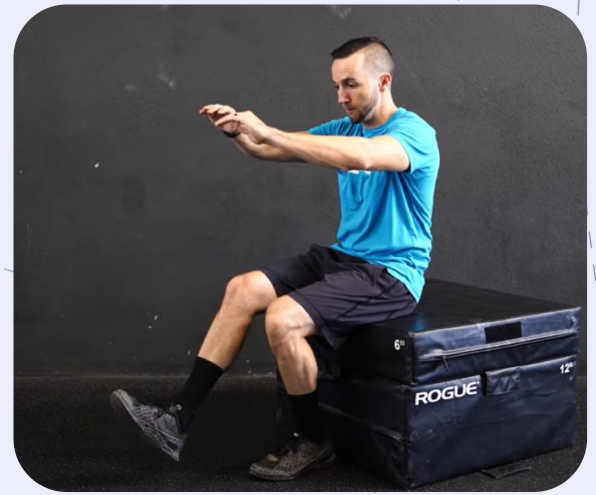
Test	Unit	Expected	Left	Right	No Laterality
RANGE OF MOVEMENT Lumbar locked rotation test (Thoracic Spine)	Degrees	64	104.7%	104.7%	—
ENDURANCE Sorenson hold (Lumbar Spine)	Seconds	108	—	—	39.8%
ENDURANCE Plank (Lumbar Spine)	Seconds	119	—	—	84.9%
ENDURANCE Single leg sit to stand (Knee)	Repetitions	13	7.7%	7.7%	—
ENDURANCE Side plank (Lumbar Spine)	Seconds	96	43.8%	39.6%	—

Block 1

Range of movement and muscular endurance

Objectives:

- Increase range of movement into lateral flexion
- Increase confidence into flexion
- Improve endurance torso and lower limb


ROGUE

Results

ABSOLUTE PERCENTAGE

Filter: All | Left | Right | No Laterality

Test	Unit	Expected	Left	Right	No Laterality
STRENGTH Extension (Lumbar Spine)	Newtons	480.3	—	—	76.2%
STRENGTH Flexion (Lumbar Spine)	Newtons	202	—	—	180.7%
STRENGTH Pallof press (Lumbar Spine)	Newtons	181.3	59.6%	46.9%	—
STRENGTH Extension (Knee)	Newtons	395.2	95.7%	93.4%	—

Block 2

Isolated strength

Objectives:

- Increase strength into torso rotation
- Increase strength into knee extension


LEG EXTENSION MACHINE
Exercise Library

Block 3

Compound strength

Objectives:

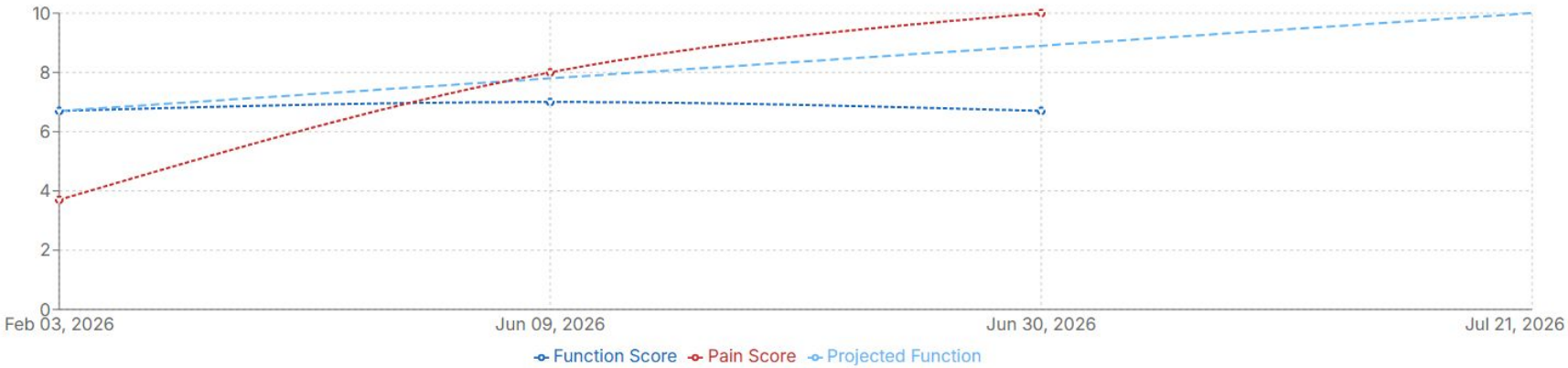
- Improve strength multi joint movements
- Improve transfer into sport and activities of daily living


ROMANIAN DEADLIFT
Exercise Library


FRONT SQUAT
Exercise Library

Symptoms Graph

Show all intervals



Noticeable change in symptoms by **April 4, 2026** based on other patients with Lumbar Spine pain (["Costa et al (2009)","Ferreira et al (2007)","Helmhout et al (2008)","Nicholas, Hefford & Tumilty (2012)"]).

Minimal clinically important difference and average change are to be used as a rough guide only. Recovery is influenced by multiple factors such as duration of symptoms and severity of injury.

Questions?

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References

Dekkers, T. A., Blake, C., Collins, K. D., McVeigh, J. G., & O'Sullivan, K. J. (2025). Trunk strength and endurance testing in field-athletes: A reliability study. Physical Therapy in Sport.

Feijen, S., Kuppens, K., Tate, A., Baert, I., Struyf, T., & Struyf, F. (2018). Intra-and interrater reliability of the 'lumbar-locked thoracic rotation test'in competitive swimmers ages 10 through 18 years.

McGill, S., Belore, M., Crosby, I., & Russell, C. (2010). Clinical tools to quantify torso flexion endurance: Normative data from student and firefighter populations. Occupational Ergonomics , 9 (1), 55-61.

Cejudo, A., Sainz de Baranda, P., Ayala, F., & Santonja, F. (2020). External and total hip rotation ranges of motion predispose to low back pain in elite Spanish inline hockey players. International Journal of Environmental Research and Public Health, 17(13), 4858. https://doi.org/10.3390/ijerph17134858

Cook, C. E., & Cook, A. E. (2018). Orthopedic physical examination tests: An evidence-based approach (3rd ed.). Pearson.

Lin, S., Shi, S., Liu, M., Lin, X., & Zhang, J. (2022). Facet joint syndrome: Pathophysiology, diagnosis, and treatment. Journal of Pain Research, 15, 3689–3710. https://doi.org/10.2147/JPR.S389602

Mooney, V., & Robertson, J. (1976). The facet syndrome. Clinical Orthopaedics and Related Research, 115, 149–156.

Sadler, S. G., Spink, M. J., Ho, A., De Jonge, X. J., & Chuter, V. H. (2017). Restriction in lateral bending range of motion, lumbar lordosis, and hamstring flexibility predicts the development of low back pain: A systematic review of prospective cohort studies. BMC Musculoskeletal Disorders, 18, Article 179. https://doi.org/10.1186/s12891-017-1534-0

Sakai, T., Tezuka, F., Yamashita, K., Takata, Y., Higashino, K., Nagamachi, A., & Sairyo, K. (2021). Rotation-related sports players demonstrate rotation-type lumbar spondylolysis fracture angle and decreased hip internal rotation range of motion. Journal of Orthopaedic Science, 27(5), 1015–1020. https://doi.org/10.1016/j.jos.2021.07.010

Schoenfeld, A. J., & Weiner, B. K. (2010). Treatment of lumbar disc herniation: Evidence-based practice. International Journal of General Medicine, 3, 209–214. https://doi.org/10.2147/IJGM.S12270

Sieben, J., et al., StatPearls contributors. (2023). Lumbar facet arthropathy. In StatPearls. StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK538228/

Trompeter, K., Fett, D., & Platen, P. (2017). Prevalence of back pain in sports: A systematic review of the literature. Sports Medicine, 47(6), 1183–1207. https://doi.org/10.1007/s40279-016-0645-3

Won, H. S., Yang, M., & Kim, Y. D. (2020). Facet joint injections for management of low back pain: A clinically focused review. Anesthesia and Pain Medicine, 15(1), 8–18. https://doi.org/10.17085/apm.2020.15.1.8

Physiopedia. (2024). Lumbar facet syndrome. https://www.physio-pedia.com/Lumbar_Facet_Syndrome

Physiopedia. (2023). Lumbar facet joint syndrome: Causes and preventions in the workplace. https://www.physio-pedia.com/Lumbar_Facet_Joint_Syndrome:_Causes_and_Preventions_in_the_Workplace