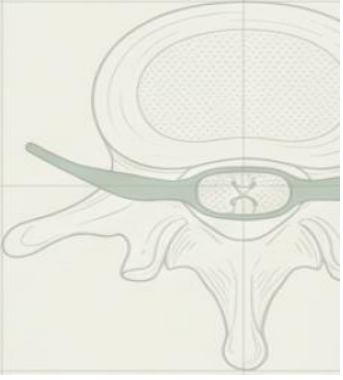




Sports and Exercise Medicine Perspectives on the Prevention and Rehabilitation of Chronic Lower Back Pain

Surg Commander Buddhika Lokugamhewa

Consultant physician in Sports and Exercise Medicine (Acting)

Navy General Hospital - Colombo



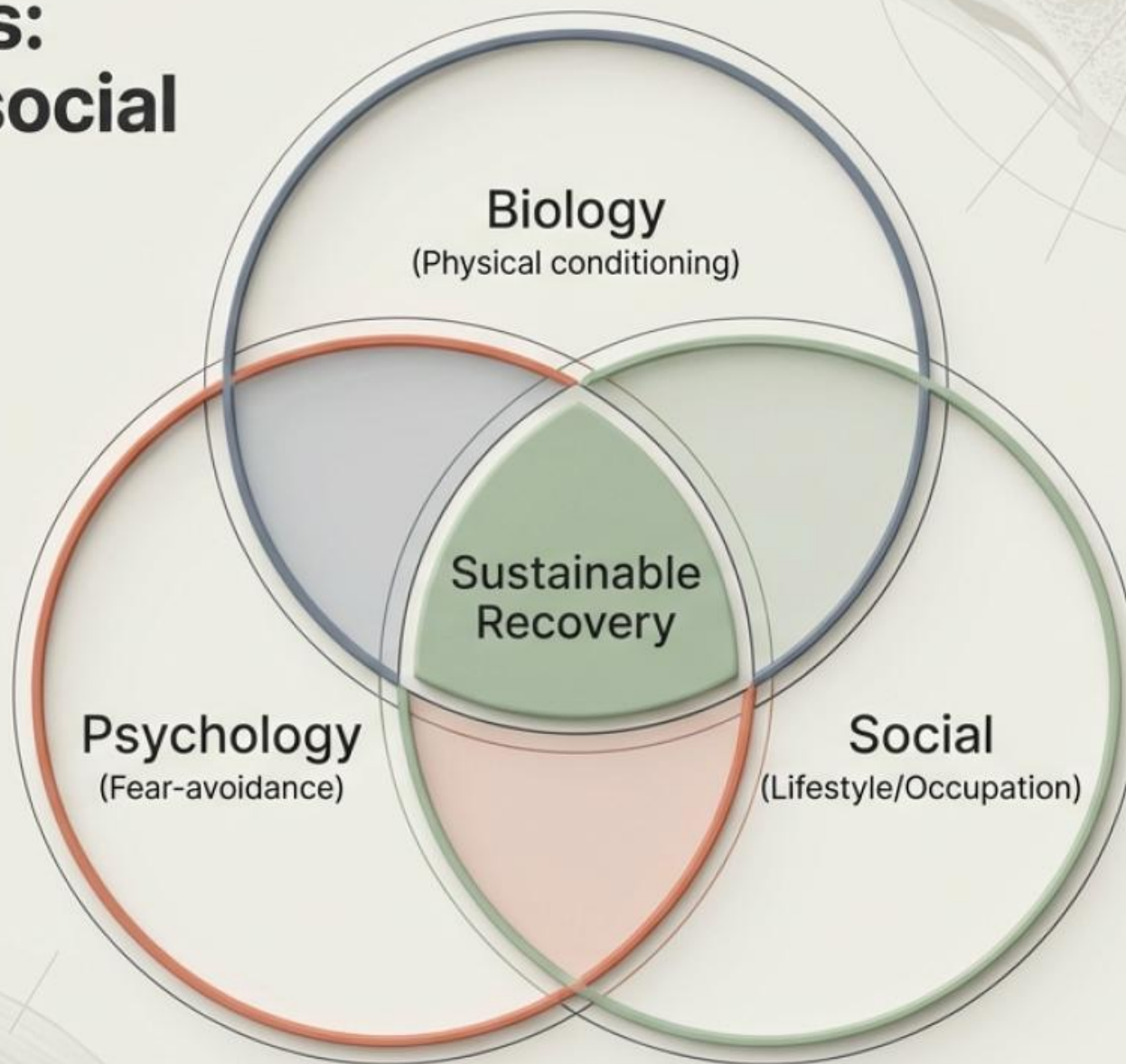


Hawk eye view

- Biopsychosocial frame of SEM
- Preventive and rehab strategies in SEM
- Clinical application
- The evidence-based data



The SEM Lens: A Biopsychosocial Framework



**Leading cause
of disability
worldwide.**

Sports and
Exercise
Medicine treats
the person, not
just the spine.



Identifying Modifiable Risk Factors



Physical Inactivity

Primary driver of deconditioning.



Poor Trunk Endurance

Inability to sustain support.



Altered Movement Patterns

Compensatory mechanics.



Fear-Avoidance Behaviours

Psychological barrier to movement.

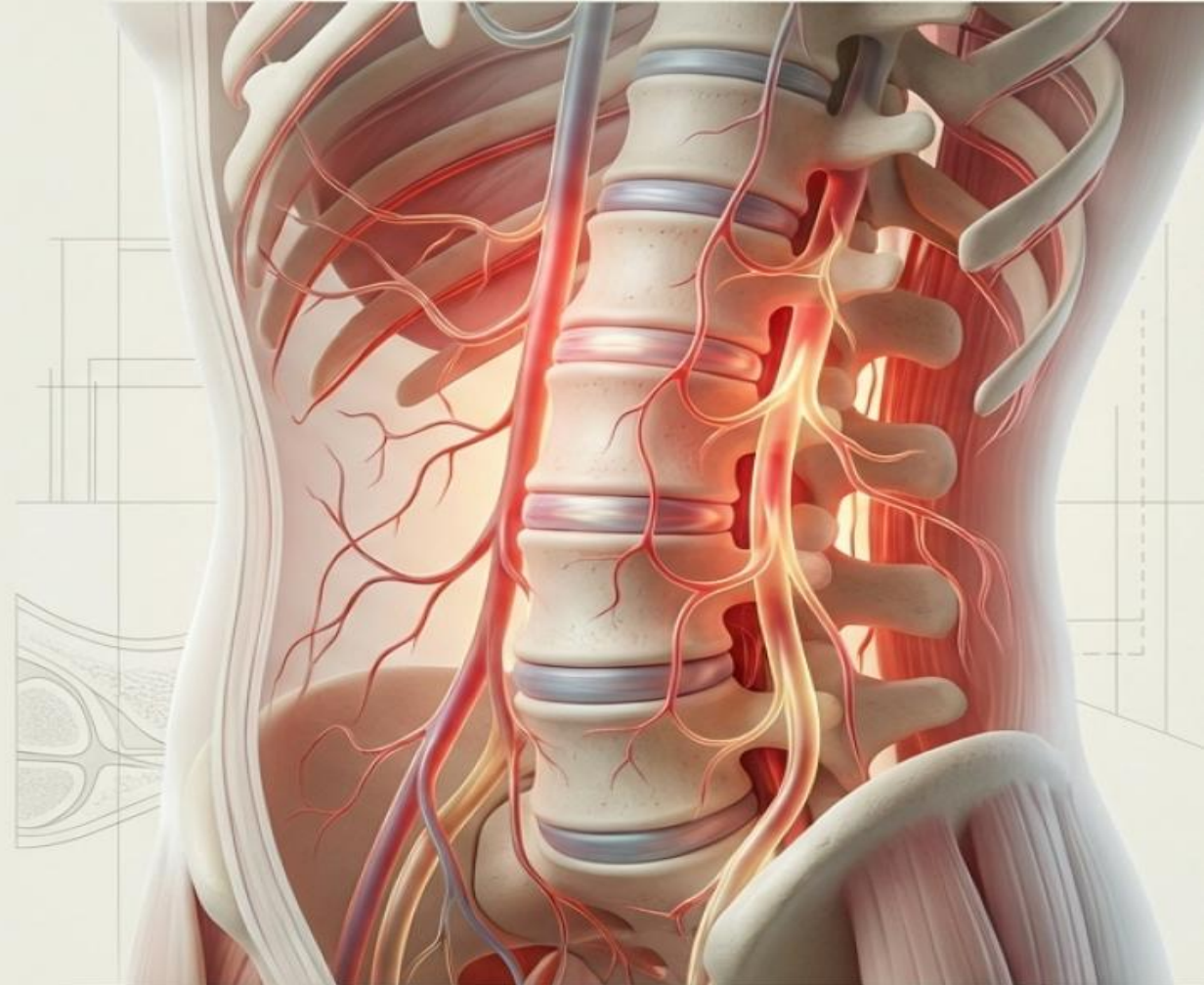
Early identification is critical for prevention.

Aerobic training

The Metabolic Foundation

Why Aerobic Exercise Works

-  **Nutrient Delivery:**
Accelerates healing.
-  **Pain Modulation:**
Triggers endorphin release.
-  **Function:**
Reduces stiffness.
-  **Weight Management:**
Reduces mechanical load.



Recommended Low-Impact Aerobic Activities:

- **Walking:** A simple, effective way to improve mobility and circulation.
- **Swimming/Aqua-based Aerobics:** remove gravity's stress on the spine
- **Cycling/Stationary Bike:** Ideal for keeping the back mobile without jarring
- **Chair aerobics**
- **Elliptical Trainer:** Offers a cardiovascular workout with minimal impact,

Motion is lotion.



Recommendation

The Prescription: Dosage and Consistency



Minutes of moderate-intensity
aerobic exercise per week.

- **Daily Goal:**
20–30 minutes.
- **Rule:**
If pain >3/10, stop.
- **Goal:** Consistency
beats intensity.



ORIGINAL RESEARCH ARTICLES

Efficacy of Aerobic Exercise for Treatment of Chronic Low Back Pain

A Meta-Analysis

Meng, Xian-Guo MD; Yue, Shou-Wei MD

[Author Information](#) 

American Journal of Physical Medicine & Rehabilitation 94(5):p 358-365, May 2015. | DOI: 10.1097/PHM.0000000000000188

Conclusion

The current meta-analysis provides reliable evidence that aerobic exercise could effectively diminish pain intensity and improve the physical and psychological functioning of CLBP patients. Thus, aerobic exercise may be a suitable choice for treating CLBP.

JOURNAL ARTICLE

Exercise for the Prevention of Low Back Pain: Systematic Review and Meta-Analysis of Controlled Trials

[Get access >](#)

[Rahman Shiri](#) , [David Coggon](#), [Kobra Falah-Hassani](#)

American Journal of Epidemiology, Volume 187, Issue 5, May 2018, Pages 1093–1101, <https://doi.org/10.1093/aje/kwx337>

Published: 19 October 2017 **Article history** ▼





Original submission

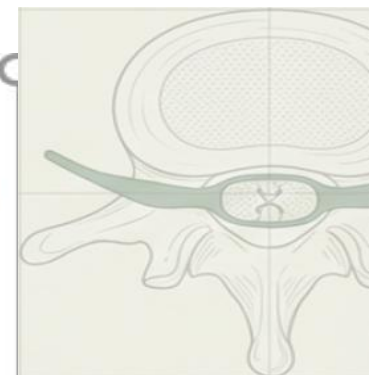
Effects of aerobic exercise on low back pain patients in treatment ☆

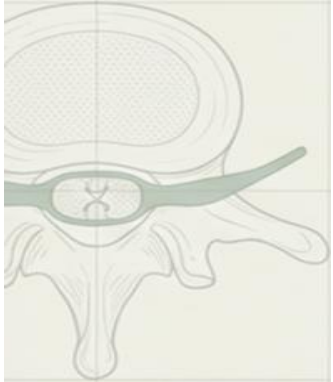
Arthur Daniel Sculco MS^a, Donald C Paup PhD^a  , Bo Fernhall PhD^a,
Mario J Sculco MD^b

Conclusions: Low to moderate aerobic exercise appears to improve mood states and work status and reduce the need for physical therapy referrals and pain medication prescriptions for LBPP in the care of a [neurosurgeon](#).

REVISED The effectiveness of different aerobic exercises to improve pain intensity and disability in chronic low back pain patients: a systematic review [version 2; peer review: 1 approved, 2 approved with reservations]

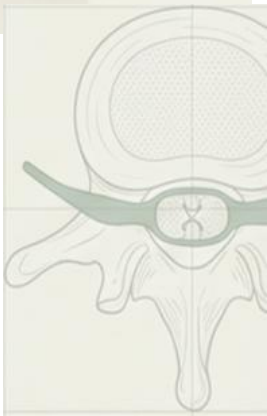
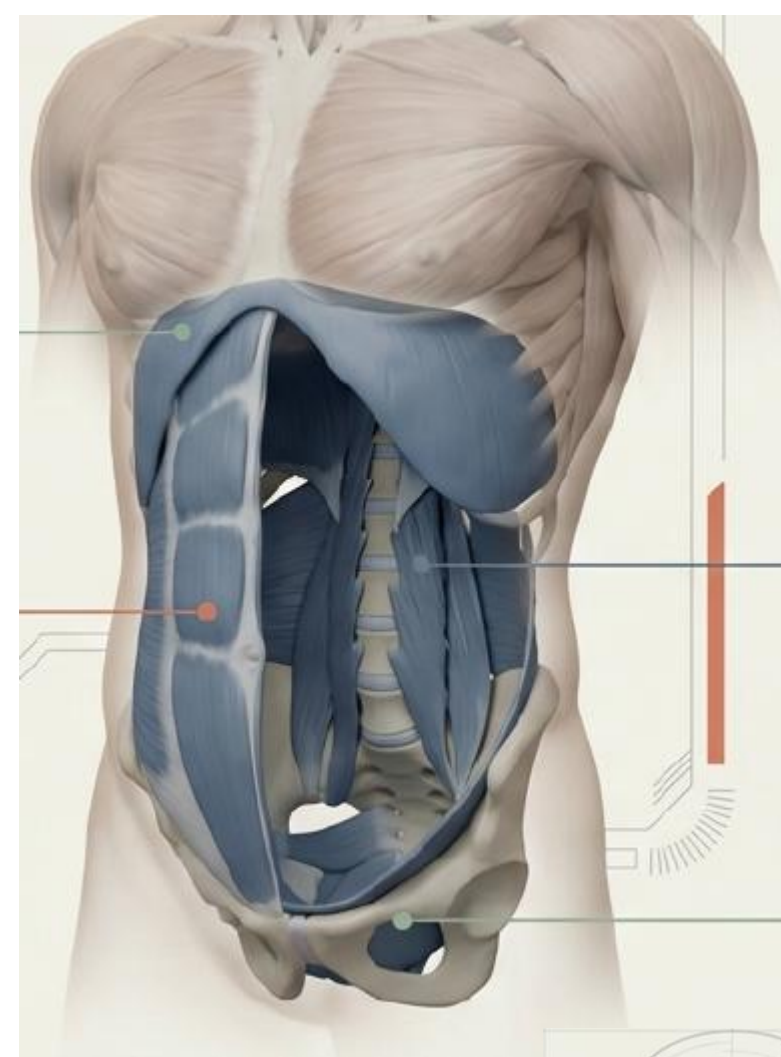
Shabbir Ahmed Sany ¹, Maria Mitsi², Taukir Tanjim ³, Minhazur Rahman ¹

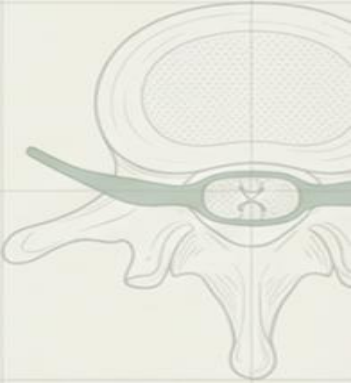




The “core”

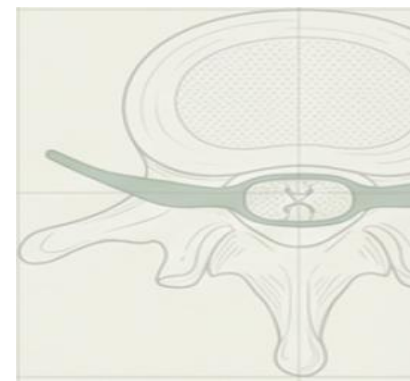
- refers to the lumbopelvic–hip complex, comprising:
- Deep stabilizing muscles:
 - Transversus abdominis (TrA)
 - Multifidus
 - Pelvic floor muscles
 - Diaphragm
- Global stabilizers and movers:
 - Rectus abdominis
 - Internal and external obliques
 - Erector spinae
 - Quadratus lumborum
 - Gluteal musculature
- Core stability involves the ability to control spinal position and movement through coordinated muscle activation, maintaining a neutral spine during static and dynamic tasks.





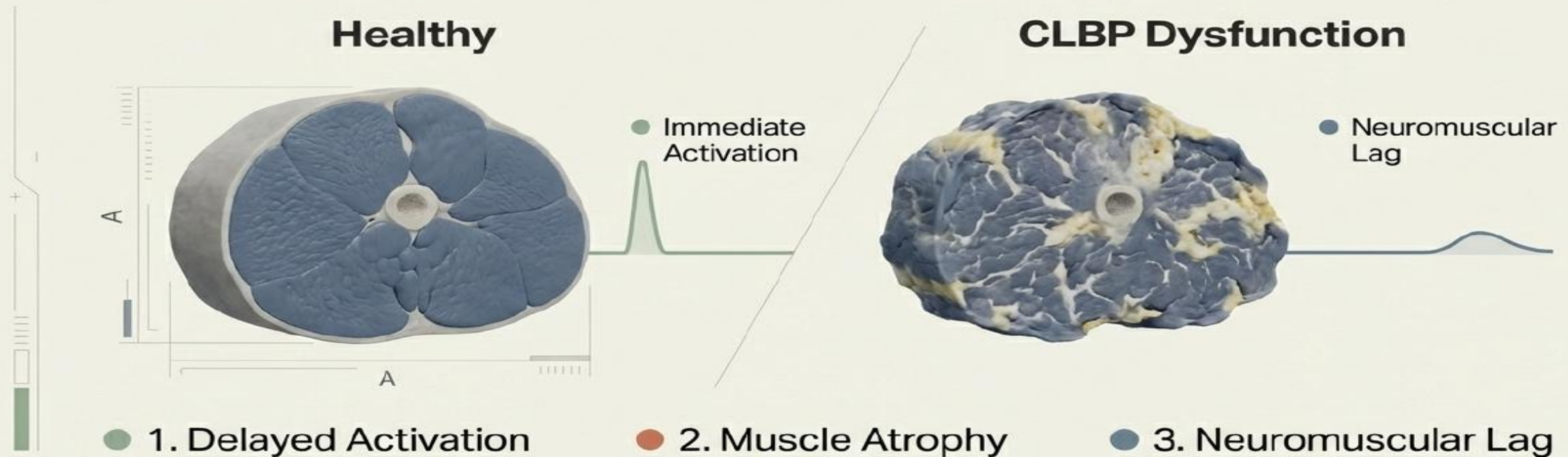
Pathophysiological Basis in LBP

- **Individuals with LBP often exhibit:**
- Delayed activation of transversus abdominis
- Atrophy of multifidus muscles
- Reduced endurance of trunk musculature
- Impaired neuromuscular control
- Altered movement patterns



Pathophysiology

The Dysfunction: Pathophysiological Changes



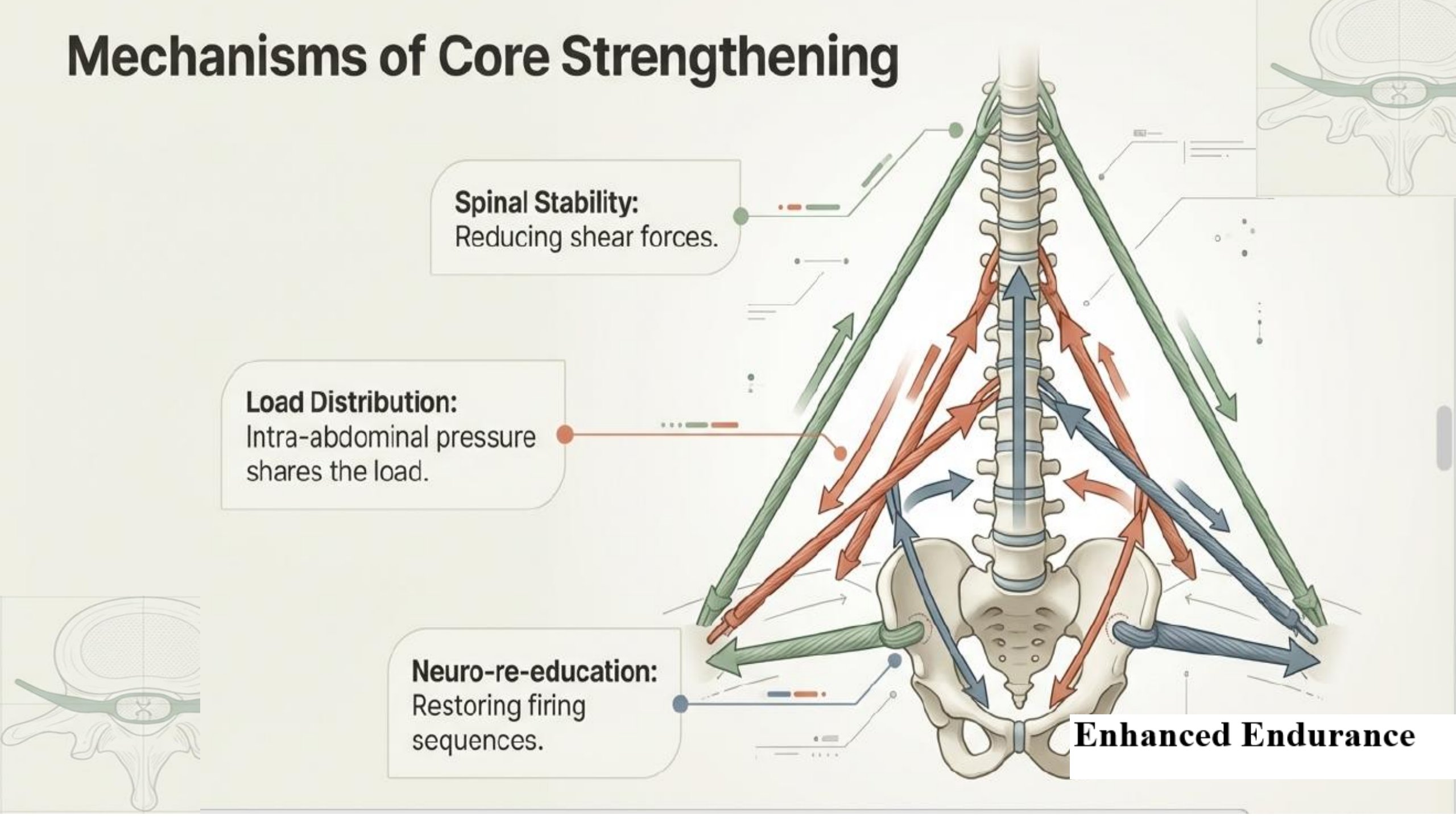
Mechanisms of Core Strengthening

Spinal Stability:
Reducing shear forces.

Load Distribution:
Intra-abdominal pressure
shares the load.

Neuro-re-education:
Restoring firing
sequences.

Enhanced Endurance



The Evidence Base

Mary Ann
Liebert

 IOS Press

Impact Factor: **1.5** / 5-Year Impact Factor: **1.8**

 Restricted access | Research article | First published online November 1, 2015 | [Request permissions](#) 

Efficacy of core muscle strengthening exercise in chronic low back pain patients

[Tarun Kumar](#), [Suraj Kumar](#) , [\[...\]](#), and [V.P. Sharma](#)  [View all authors and affiliations](#)

[Volume 28, Issue 4](#) | <https://doi.org/10.3233/BMR-140572>

CONCLUSION: This study concludes that core muscle strengthening exercise, along with lumbar flexibility and gluteus maximus strengthening, is an effective rehabilitation technique for all chronic low back pain patients irrespective of the duration (less than one year and more than one year) of their pain.

Efficacy of Core Stability in Non-Specific Chronic Low Back Pain

by **Antonio Frizziero** ^{1,*}  , **Giacomo Pellizzon** ² , **Filippo Vittadini** ³ , **Davide Bigliardi** ¹  and **Cosimo Costantino** ¹  

¹ Department of Medicine and Surgery, University of Parma, 43126 Parma, Italy

² Centro di Medicina Spa, 31020 Villorba, Italy

³ Department of Physical and Rehabilitation Medicine, Casa di Cura Policlinico S. Marco, 30100 Venice, Italy

* Author to whom correspondence should be addressed.

J. Funct. Morphol. Kinesiol. **2021**, 6(2), 37; <https://doi.org/10.3390/jfmk6020037>

Submission received: 11 March 2021 / Revised: 12 April 2021 / Accepted: 20 April 2021 /

Published: 22 April 2021

(This article belongs to the Special Issue **Role of Exercises in Musculoskeletal Disorders—4th Edition**)

Structured core stability programmes reduce recurrence rates more effectively than general exercise alone.

- Significant reduction in functional disability.
- Multifidus training linked to reduced acute.
- Multifidus training linked to reduced acute episodes.
- First-line therapy (ACP & NICE Guidelines).



Clinical Application

Activation phase

- Abdominal drawing-in maneuver
- Multifidus activation

Stabilization phase

- Planks
- Side bridges
- Bird-dog exercises

Functional integration phase

- Squats and deadlifts with neutral spine
- Dynamic balance training
- Sport- or occupation-specific tasks

Progression should be individualised and based on pain tolerance and functional capacity.

The Roadmap: Progression of Training





McKenzie Method

(Mechanical Diagnosis and Therapy – MDT)

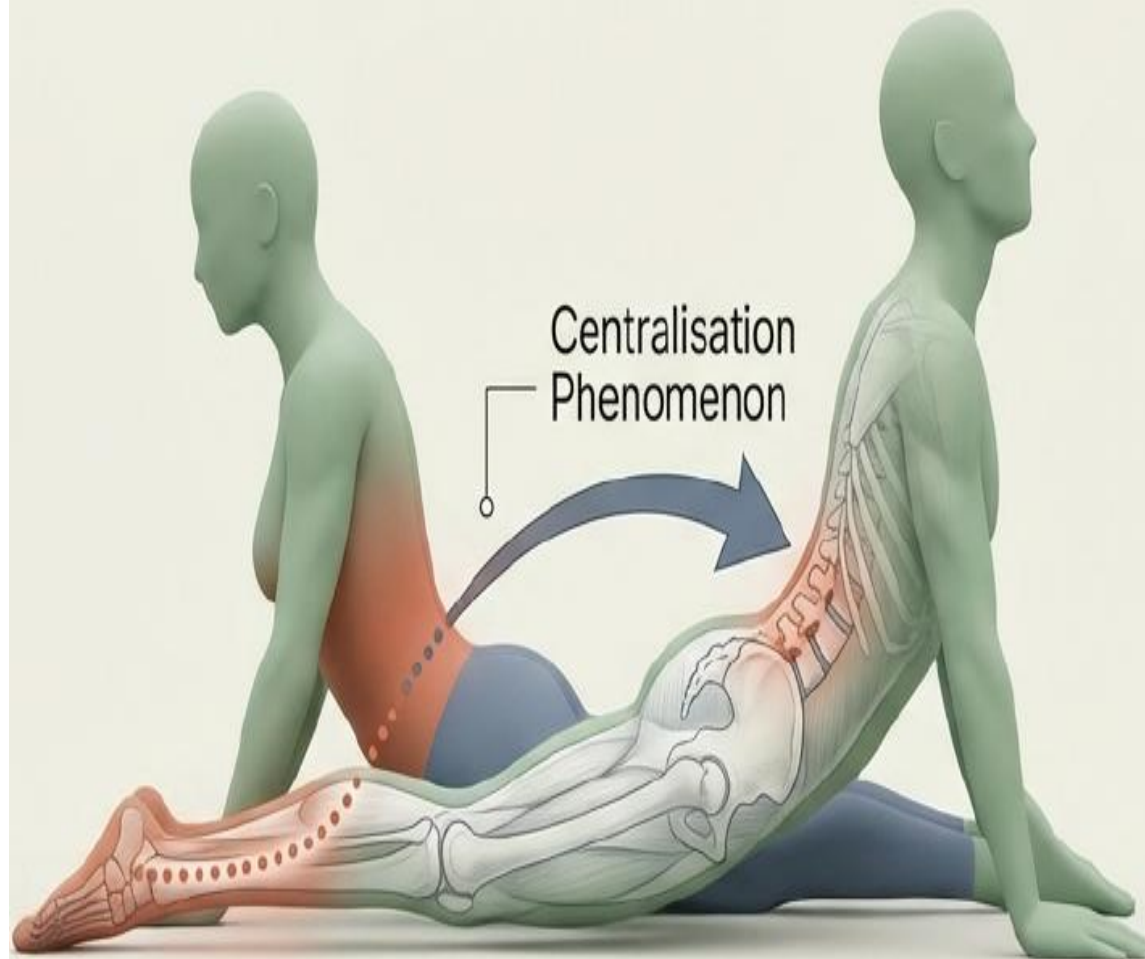
- Developed by Robin McKenzie in the 1950s
- The hallmark of MDT is the phenomenon of **centralization**

Proposed mechanisms include:

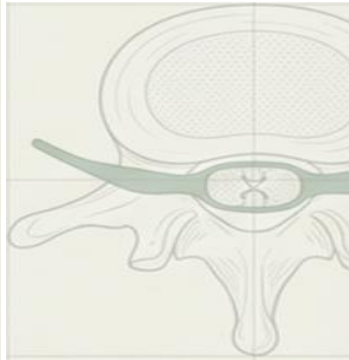
- Reduction of posterior disc bulge through anterior migration of nucleus pulposus
- Reduction of mechanical compression on nerve roots
- Restoration of normal joint mechanics
- Modulation of nociceptive input

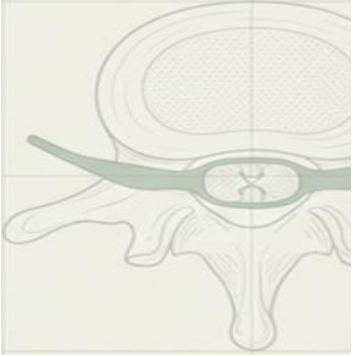


The McKenzie Method (Extension Bias)



- **Target:** Discogenic pain / Radiculopathy.
- **Mechanism:** Repeated extension moves distal pain toward the spine.
- **Goal:** Reduce posterior disc bulge.





Evidence base

•Systematic reviews and meta-analyses

Machado LA, von Sperling de Souza M, Ferreira PH, Ferreira ML. *The McKenzie method for low back pain: a systematic review of the literature with a meta-analysis approach*. **Spine (Phila Pa 1976)**. 2006;31(9):E254–62. doi:10.1097/01.brs.0000214884.18502.93.

Kuhn timer A, Kuhn timer J, Ham D, Rosedale R. *The McKenzie Method and its association with psychosocial outcomes in low back pain: a systematic review*. **Physiother Theory Pract**. 2021;37(12):1283–97. doi:10.1080/09593985.2019.1710881.

Cochrane Back Review Group. *The McKenzie method for (sub)acute non-specific low back pain*. **Cochrane Database Syst Rev**. 2023;4:CD009711. doi:10.1002/14651858.CD009711.pub2.

•Randomized controlled trials on McKenzie MDT

Garcia AN, Costa LC, Menezes Costa LC, et al. *McKenzie Method of Mechanical Diagnosis and Therapy was slightly more effective than placebo for pain, but not for disability, in patients with chronic non-specific low back pain: a randomised placebo controlled trial with short and longer term follow-up*. **Br J Sports Med**. 2018;52(9):594–601. doi:10.1136/bjsports-2017-098351.

Cherkin DC, Deyo RA, Wheeler K, Ciol MA. *Effectiveness of the McKenzie Method in addition to first-line care for acute low back pain: a randomized controlled trial*. **BMC Med**. 2010;8:10. doi:10.1186/1741-7015-8-10.

(Note: Cherkin et al. trial often cited in literature alongside McKenzie MDT evaluations of acute LBP.)

•Additional literature reviews

Costa LO, Maher CG, McAuley JH, et al. *Effectiveness of the McKenzie Method of Mechanical Diagnosis and Therapy for treating low back pain: literature review with meta-analysis*. **PubMed**. 2018;29602304. (SMD outcomes for acute and chronic LBP).

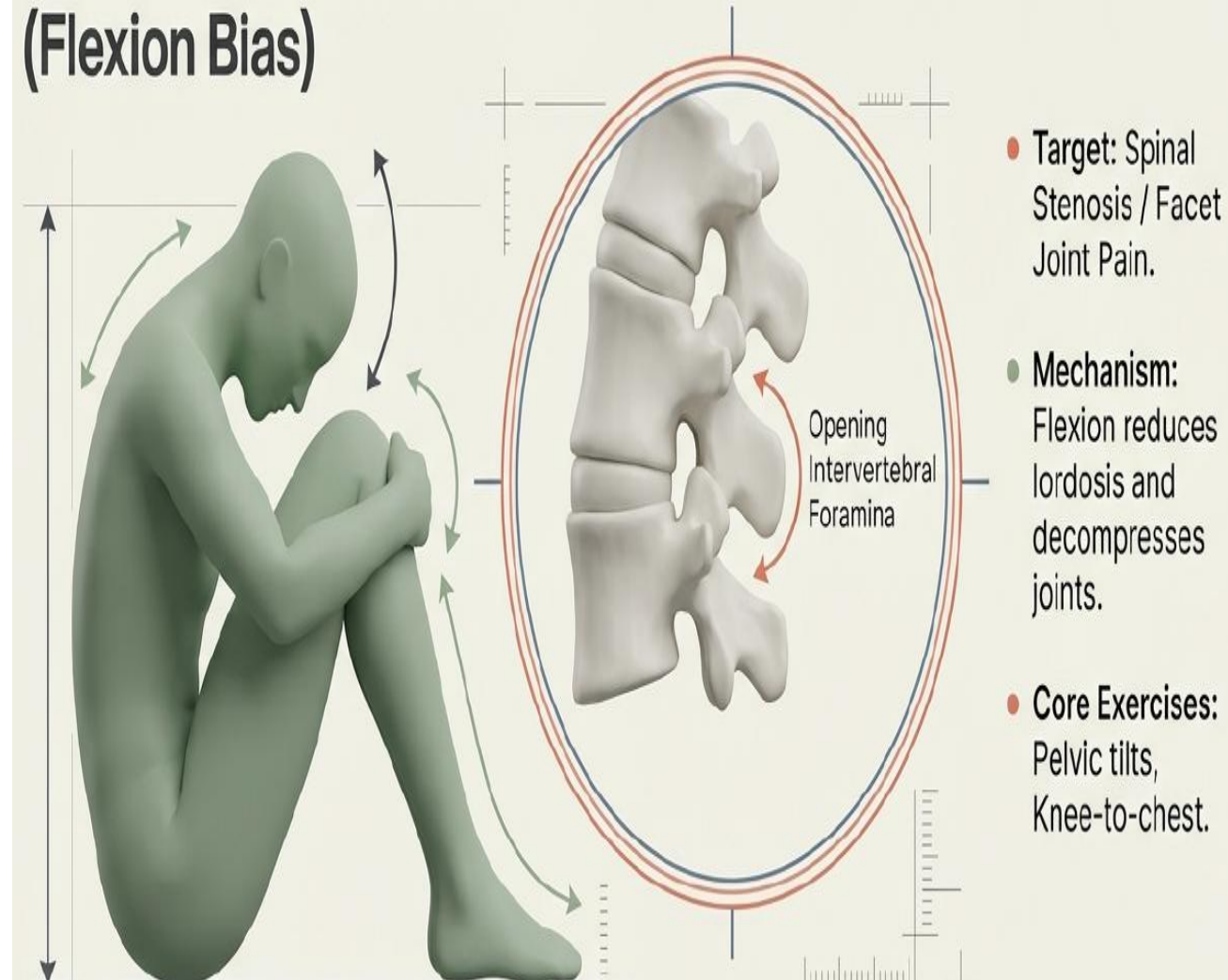
Namnaqani FI, Mashabi AS, Yaseen KM, Alshehri MA. *The effectiveness of McKenzie method compared to manual therapy for treating chronic low back pain: a systematic review*. **J Musculoskelet Neuronal Interact**. 2019;19(4):492–9.

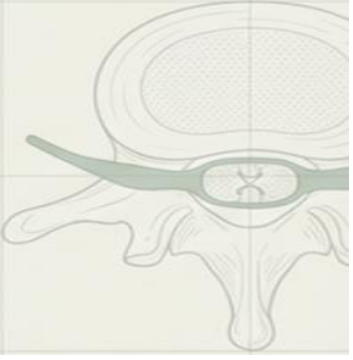


Williams Flexion Exercises

- Developed by Dr Paul Williams in the 1930s.
- The program emphasises **lumbar flexion** to:
- Reduce lumbar lordosis
- Decrease facet joint compression
- Open intervertebral foramina
- **Core Components-**
- Posterior pelvic tilts
- Single and double knee-to-chest exercises
- Partial sit-ups
- Hamstring stretching
- Hip flexor stretching
- Squatting exercises

Williams Flexion Exercises (Flexion Bias)



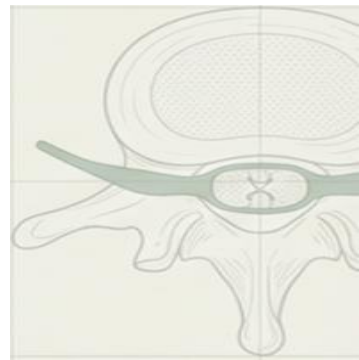


Flexion-based exercises may:

- Increase intervertebral foraminal space
- Reduce facet joint loading
- Stretch lumbar extensors
- Improve abdominal muscle strength

These exercises are traditionally recommended for:

- Lumbar spinal stenosis
- Spondylosis
- Degenerative facet arthropathy



Evidence based Data

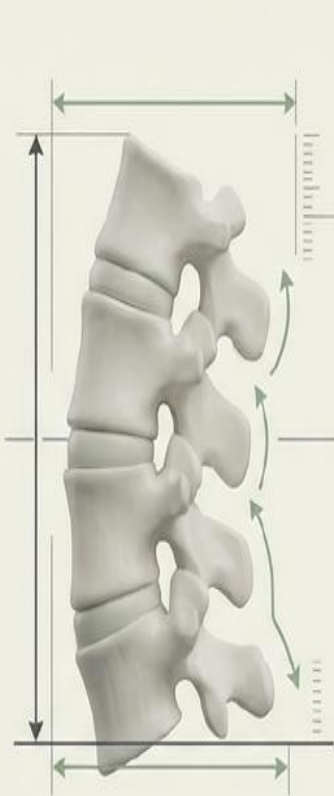
- Elnaggar IM, Nordin M, Sheikhzadeh A, Parnianpour M, Kahanovitz N. *Effects of spinal flexion and extension exercises on low-back pain and spinal mobility in chronic mechanical low-back pain patients. Spine (Phila Pa .2018).* 1991;16(8):967-972. doi:10.1097/00007632-199108000-00018
- Park CH, Beom J, Chung CK, et al. *Long-term effects of lumbar flexion vs extension exercises for chronic axial low back pain: a randomized controlled trial. Sci Rep.* 2024;14:2714.
- Ozello DA, Dydyk AM, Sapra A. *Williams back exercises.* In: **StatPearls [Internet]**. Treasure Island (FL): StatPearls Publishing; 2025.

The Decision Matrix: Extension vs. Flexion

Discogenic Pain



Goal: Centralisation



Stenosis / Facet Pain

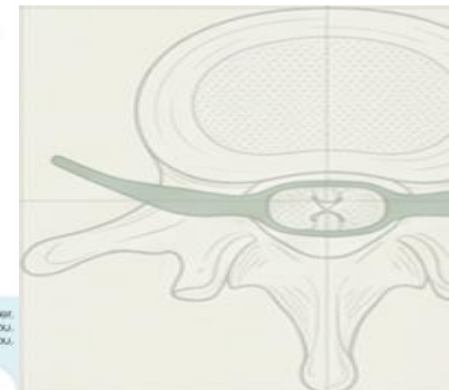
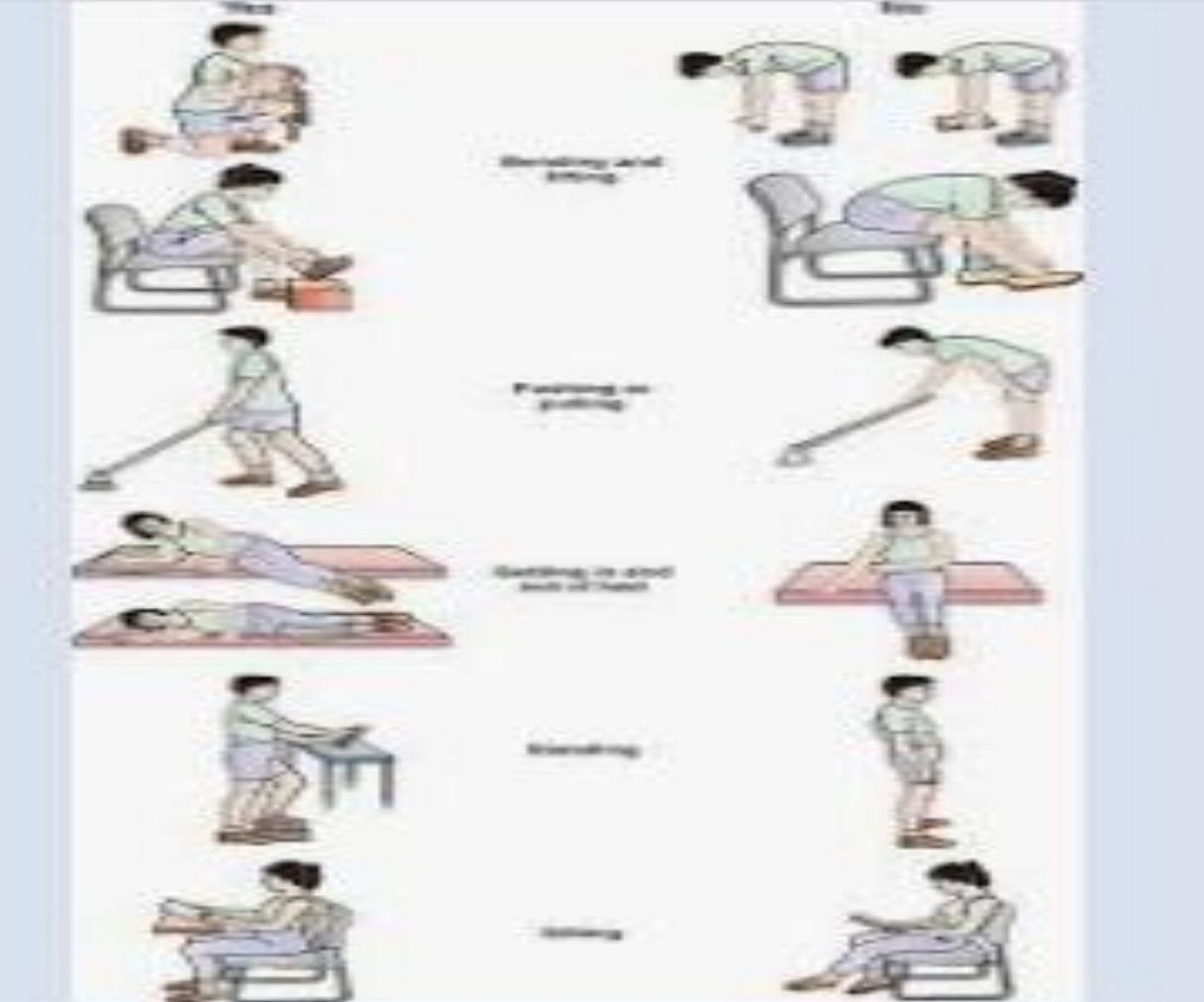


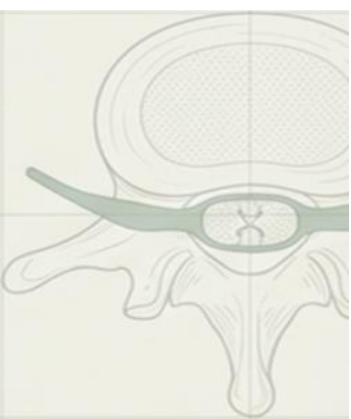
Goal: Open Foramina



Assessment determines direction.
One size does not fit all.

Back disciplines and Ergonomics





Current Trends and Risk Factors in Low Back Pain: An Ergonomic Perspective on Prevention and Management

Ahmad Humaizi Hilmi

UniMAP

 **FULL ARTICLE**

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Fakulti Kejuruteraan & Teknologi Mekanikal, Universiti Malaysia Perlis

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Review Article

Effectiveness of workplace intervention strategies in lower back pain prevention: a review

Danuta ROMAN-LIU, Joanna KAMIŃSKA, Tomasz TOKARSKI

 著者情報

キーワード: [Personal intervention](#), [Technical intervention](#), [Behavioural training](#), [Physical exercises](#)

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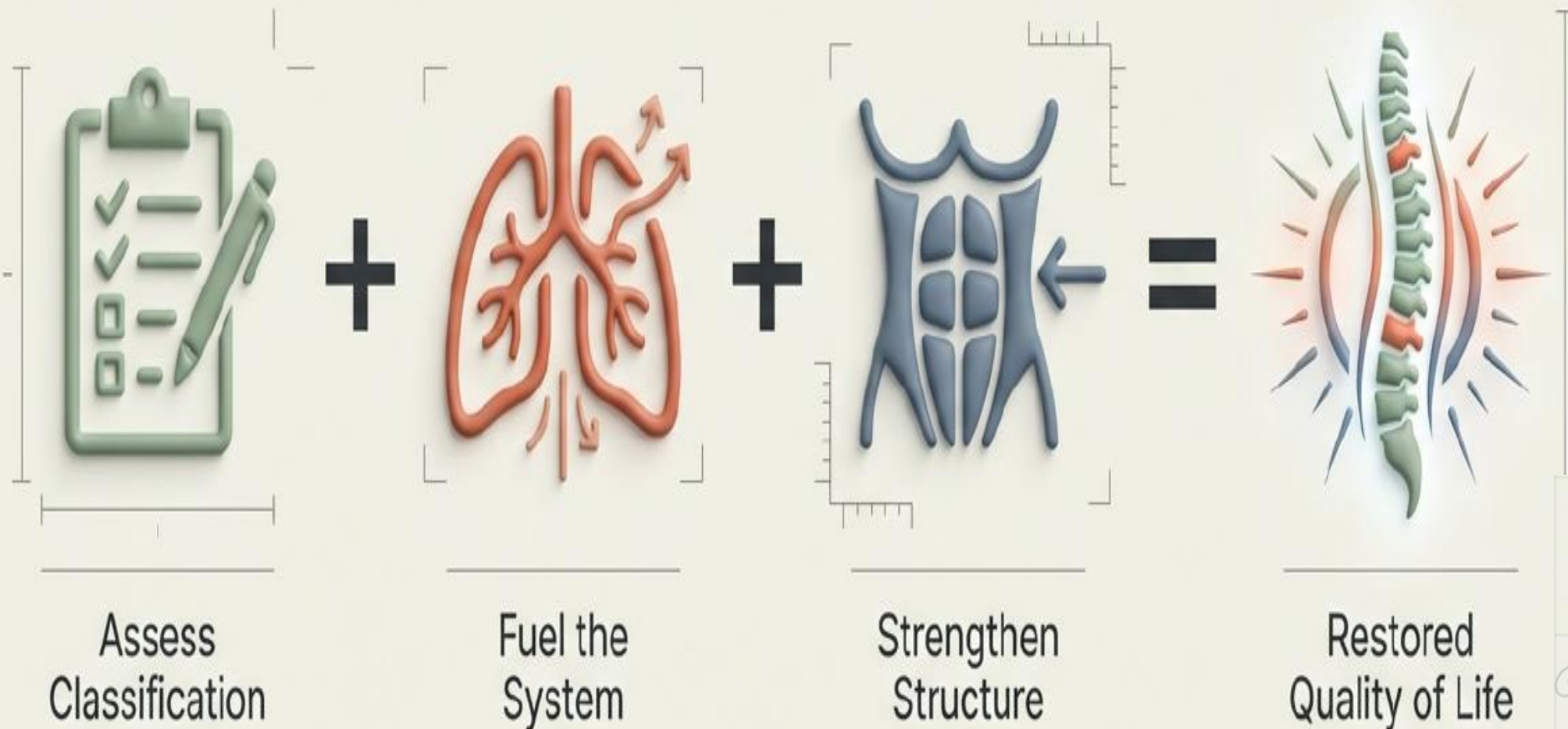
 <https://doi.org/10.2486/indhealth.2020-0130>





The Gold Standard

Individualised, Classification-Based Care



Thank you