

A comparison of lumbopelvic motion patterns and erector spinae behavior between asymptomatic subjects and patients with recurrent low back pain during pain-free periods

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"Recurrent LBP patients during their pain-free period showed significantly greater ES activation both in flexion and extension."

J Manipulative Physiol Ther. | 2015 Feb;38(2):130-7

Chronic low back pain and back muscle activity during functional tasks

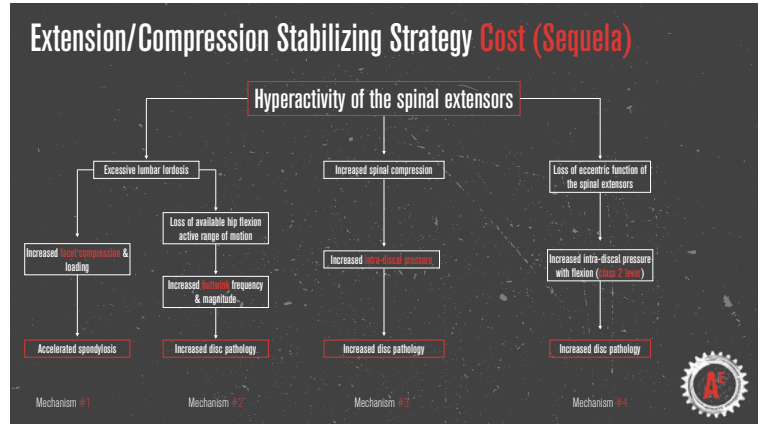
Maicon Lima ¹, Arthur Sá Ferreira ², Felipe José Jandre Reis ³, Vanessa Pires ⁴, Ney Maciel-Filho ⁵

"Patients with chronic low back pain showed an increase in back muscle activity regardless of the type of functional task."

Gait Posture. | 2018 Mar;61:250-256.

Pathomechanics


The impact the erector spinae has on lower back pain.

“It is more often the **internal forces** that produce pain and injury than the external ones.”

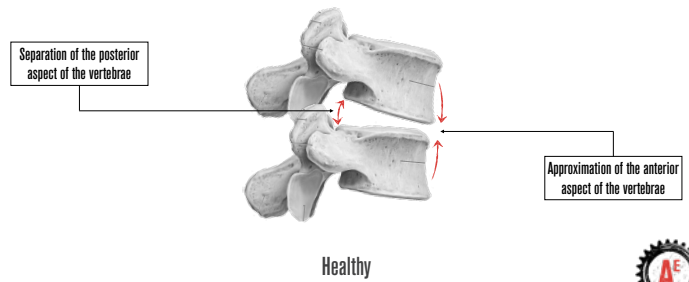
Pavel Kolar, PT

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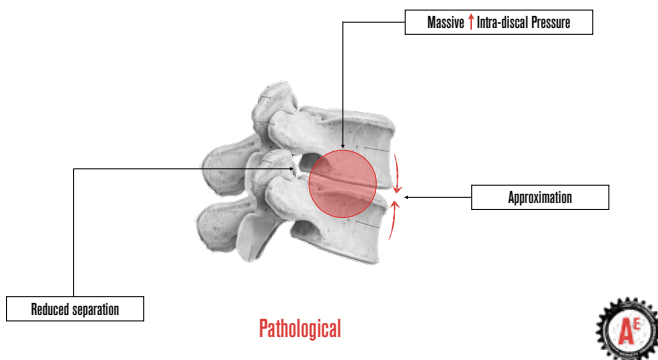
Lumbar Flexion

Osteokinematics



Lumbar Flexion

Osteokinematics

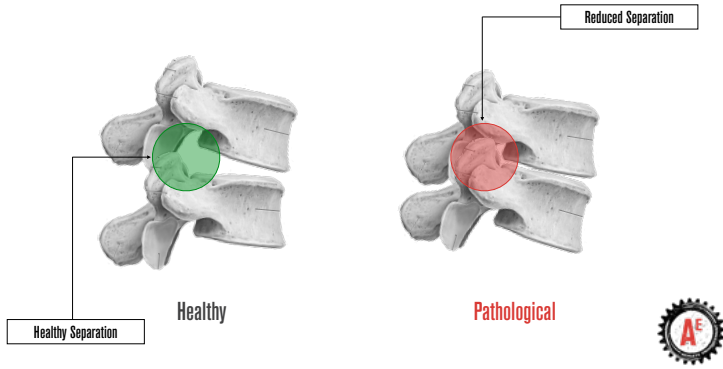


Lumbar Flexion

Osteokinematics



Lumbar Flexion
Osteokinematics



“Without the diaphragm,
there is no pressure;
without pressure, there
is no stability.”

Paul Hodges, PhD, PT
World-Leading Researcher



What is Intra-Abdominal Pressure?

“IAP is the summation of **mechanical**
forces produced by the diaphragm and the
opposing trunk musculature.”

Practical definition



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What is Intra-Abdominal Pressure?

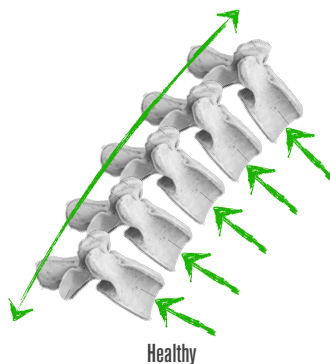
“IAP is an **outward-pushing** force
within the abdomen.”

Practical definition

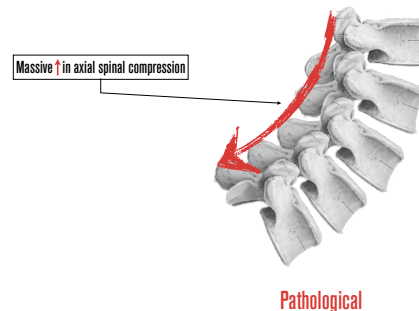


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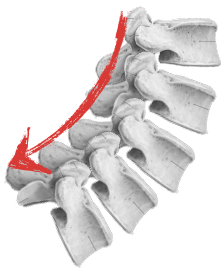
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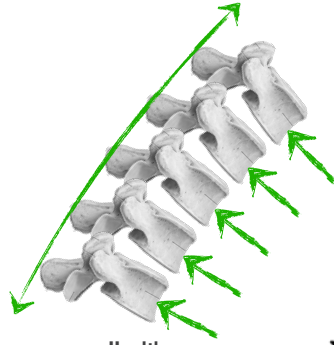
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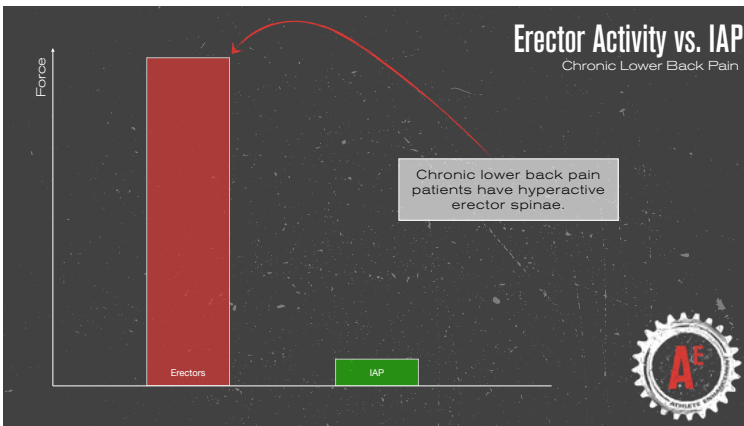
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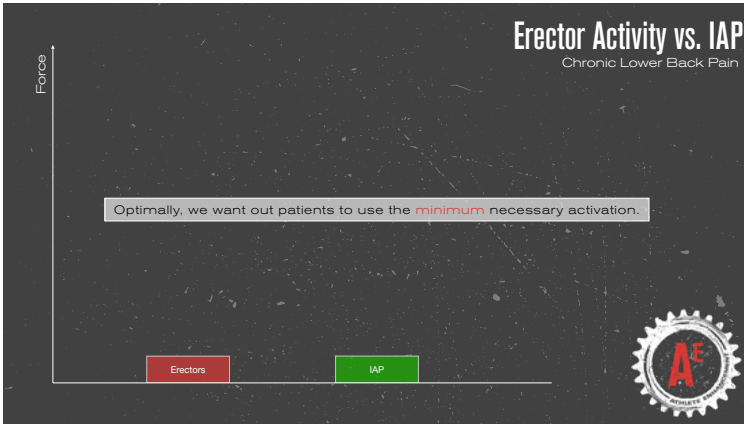


Pathological



Healthy





Optimizing Lumbar Stability

Balancing the internal forces

- First:** Teach the ability to create IAP
- Second:** Teach the ability to simultaneously create IAP & relax the spinal erectors
- Third:** Integrate proper, balanced, effortless stabilization into their respiration pattern
- Finally:** Teach the patient how to flex and bend their spine using IAP as the foundational support.

Supported 3 Months

Supported 3 Months

Note:
This is the best position to teach the patient how to breathe and how to pressurize. It can be used as a home exercise, but I typically use it in the office and send them home with the subsequent exercises.

Focus:

- Effortless expansion into the pelvis and lower back.
- The abdomen should NOT draw inward.
- 3 things need to happen to ensure proper activation: 1) lower abdomen expansion, 2) The ribcage is pulled into a caudal position, 3) The lumbar spine and erectors expand posteriorly towards the table due to the increasing IAP.

Back Breathing In Sitting

Patient Position:
Sitting relaxed, with their elbows resting on their knees. The lumbar spine needs to be in a gently flexed position, to the point where the patient initially feels a gentle stretch on the erector spinae.

Action:
Through the nose, the patient takes easy, relaxed breaths into their pelvis and back.

Prescription/Dose:
3x/day for 3 minutes each session.

Focus:
1) Feeling IAP supporting the lumbar spine from the front. 2) Feeling the erector spinae relax immediate on inhalation.

ATHLETE ENHANCEMENT



Nasal Breathing = ↑ Core Activation

↑ Diaphragm Activity ↑ Intra-abdominal pressure

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Pathological Strategy

- Chest/shoulder elevation
- Concentric contraction of the spinal erectors during inspiration.
- Spinal extensors block posterior expansion (eccentric activation) of the dorsal musculature.
- Minimal diaphragm activation

ATHLETE ENHANCEMENT

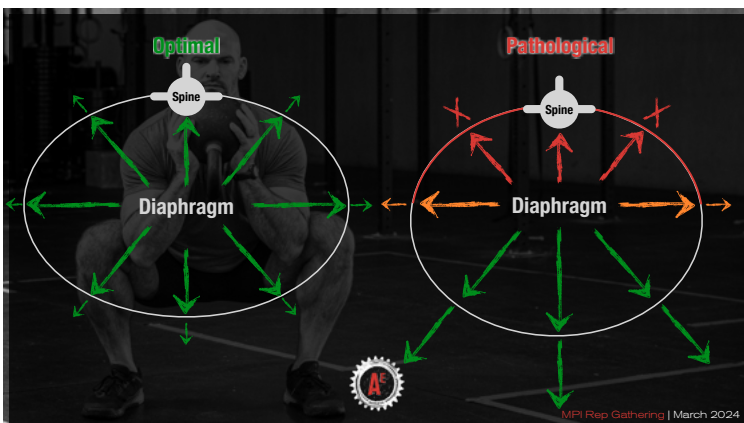
Optimal Strategy

- No chest or shoulder elevation
- Eccentric activation of the spinal erectors during inspiration, demonstrated by the expansion of the dorsal musculature.
- Good diaphragm activation, producing the outward-pushing force within the abdomen.

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*You must see, and the patient must feel, the pressure within the abdomen **expanding the spine and erectors posteriorly, stabilizing the spine from the inside.***

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Pressurized Seated Floor Touches

Start Position:
Sitting relaxed, with their elbows resting on their knees. The lumbar spine needs to be in a gently flexed position, to the point where the patient initially feels a gentle stretch on the erector spinae.

Action:
First, breathe into the pelvis and back. Second, slowly flex forward, feeling IAP supporting the lumbar spine the entire time.

Prescription/Dose:
3-5x/day for 10-15 reps.

Focus:
1) Feeling IAP supporting the lumbar spine from the front. 2) Feeling the erector spinae lengthen during active flexion.

ATHLETE ENHANCEMENT

Back Breathing in Standing

Patient Position:
Standing, with the hands resting on the knees to offload the lumbar spine. Pelvis tilted posteriorly either all the way or until a gentle stretch is felt.

Action:
Through the nose, the patient takes easy, relaxed breaths into their pelvis and back.

Prescription/Dose:
3x/day for 3 minutes each session.

Focus:
1) Feeling IAP supporting the lumbar spine from the front. 2) Feeling the erector spinae relax immediate on inhalation.



ATHLETE ENHANCEMENT

Pressurized Standing Floor Touches

Start Position:
Standing, with the hands resting on the knees to offload the lumbar spine. Pelvis tilted posteriorly either all the way or until a gentle stretch is felt.

Action:
First, breathe into the pelvis and back. Second, slowly flex forward, feeling IAP supporting the lumbar spine the entire time.

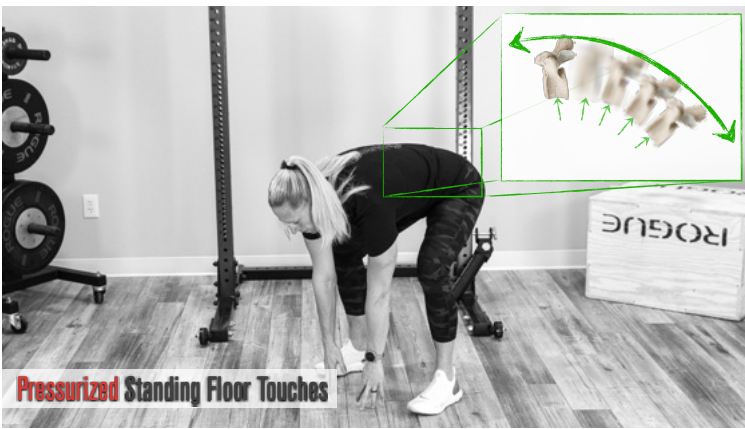
Prescription/Dose:
3-5x/day for 10-15 reps.

Focus:
1) Feeling IAP supporting the lumbar spine from the front. 2) Feeling the erector spinae lengthen during active flexion.



Start Position


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Pressurized Standing Floor Touches

*The purpose of this exercise is to teach the patient how to flex their spine maximally leveraging IAP whilst using the **minimal necessary activation of the spinal extensors.***

[Balanced internal forces]



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Video Explanation

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Thanks

www.Athlete-Enhancement.com



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