Why people get back pain and what can we do about it?

Prof. Eyal Lederman DO PhD
Common beliefs about LBP

- Lifting
- Injury by exercise
- Falling
- Weak back
- Weak abs
- Spinal curves
- Inflexible stiff back
- Wear and tear of the spine
- Short leg
- Twisted pelvis
- Flat feet
- Prolong sitting at work
- Lack of fitness
- Socio-economic background
- Psychological distress
- Depression
### Risk factors for recurrence / chronicity / disability

| **Physical** | Genetic factors  
|             | Previous history of LBP  
|             | Initial high intensity pain  
|             | Referred pain to LEX  
|             | Age 35-55 / Older age  |
| **Occupational** | Frequent heavy lifting  
|                    | Frequent bending  
|                    | Frequent lifting  
|                    | Unusual sitting posture  |
| **Psychological** | Depression  
|                     | Psychological distress  
|                     | Passive coping strategies  
|                     | Fear-avoidance beliefs  
|                     | Catastrophising  
|                     | Financial compensation  
|                     | Social and socio-occupational factors:  
|                     | Low job satisfaction  
|                     | Low social support  |

No association between structure, biomechanics and LBP

Trunk asymmetry, thoracic kyphosis and lumbar lordosis in teenagers and developing LBP in adulthood (Poussa MS 2005)
Elevation of one shoulder, elevation of one hip, and deviation of the spine from the midline of the body to LBP & neck pain (Dieck GS, 1985)

Low muscle strength, low muscle endurance, or reduced spinal mobility and erector spinae pairs imbalances during extension (Hamberg-van Reenen HH 2007 & Reeves PN 2006)

Spinal scoliosis (Christensen ST 2008 syst. rev.)
Increased lumbar lordosis and sagittal pelvic tilt on back pain during pregnancy (Franklin ME 1998)
Differences in regional lumbar spine angles or range of motion (Mitchell T, 2008)

Pelvic obliquity and the lateral sacral base angle pelvic asymmetry (Fann AV 2002 & Levangie PK 1999)

Inflexibility of the lower extremities or leg length discrepancy (Nadler SF 1998)
Hamstrings and psoas tightness (Hellsing, 1988)

Correcting foot mechanics have no effect on preventing back pain (Sahar T, et al, 2007)

For full text and discussion see Lederman E 2010 Fall of the postural-structural-biomechanical model in manual and physical therapies: exemplified by LBP. CPDO online journal. www.cpdo.net
No association between structure, biomechanics and LBP

Disc degeneration?
Facet degeneration (n=3529)
Spina bifida,
Transitional lumbar vertebra,
Tpondylolysis and spondylolisthesis

van Tulder et al 1997, syst. review, Luoma, 2004; Brooks et al 2009
Does minor trauma lead to chronic back pain / disability?

Minor trauma does not appear to increase the risk of serious LBP episodes or disability.

Neither the frequency of minor trauma events nor the reported severity of the event correlated with adverse outcomes.

Subjects with advanced structural findings were not more likely to become symptomatic.

Age and gender, abnormal psychometric testing, smoking, and compensation issues, accurately identified 80% of serious LBP events and 93% of LBP disability events.

N=200 asymptomatic / over 5yrs / check up every 6 months.
Can structure explain the patient’s condition?

Findings on MR imaging within 12 weeks of serious LBP inception are highly unlikely to represent any new structural change. Most new changes (loss of disc signal, facet arthrosis, and end plate signal changes) represent progressive age changes not associated with acute events.

Why spinal degeneration?

N=116 twins. Study over 5yrs.

Progression of degenerative signs:

Genetic and shared environmental influences
47% to 66%

Resistance training and occupational physical loading together
2% to 10%


Disc degeneration

Disc ageing / degeneration – starts in the first 2 decades and progress in 5-7th decade

Heritability for LBP & neck pain

LBP 41-57%

Neck pain 35-58%.
Genes and potential for condition / injury

COL5A1 gene associated with cruciate ruptures

The COL5A1 gene and Achilles tendon pathology

Rotator cuff injuries


Spinal flexibility

Genetic influences –
• Overall flexibility 47%.
• Flexion 64%
• Extension more environmental and behavioural factors (associated with disc degeneration)

Getting old is not bad after all….

Frequency of back and neck pain same at all ages (20-71yrs) 
Duration slightly longer in older age
Postural-behavioural factors

Lack of association between work-related posture and LBP including:

- Prolonged standing
- Bending,
- Twisting,
- Awkward postures (kneeling or squatting)
- Sitting posture at work
- Prolonged sitting at work / home
- Recreational sports activities

(Hartvigsen et al 2000 syst. review; Chen et al 2009 syst. review; Bakker et al 2009 syst. review; Roffey et al 2010 syst. review; Wai et al 2010, syst. review).
Pain hyperexcitability & hyperalgesia

Saline into tib ant

Saline infraspinatus muscle

Central adaptation to pain

Brain areas associated with pain, active during words associated with pain

Pain condition

Pre-injury

Psychosocial factors
Cognitions / beliefs / attitudes
Previous injury experiences
Coping strategies
Self-help / regulation

Post-injury

Ability to cope with pain
Ability to cope with functional loss
Social interactions
Employment consequences
Actions for recovery

Lederman E. 2010 Neuromuscular rehabilitation in manual and physical therapy, Elsevier
People develop narratives to explain uncertainty. People often develop catastrophic narratives to explain their back pain. Reconstructing alternative positive narratives is important.
## What may help

### Helpful

**Moderate contribution:**
Functional restoration / multidisciplinary rehabilitation

**Modest contribution:**
manual therapy (massage, manips, mobs)
All exercise (effective for prevention & CLBP but not acute)

### Informative & reassurance

The spine is strong
Emphasise positive attitudes and beliefs
Advice to remain active
Early return to normal pre-pain activities

### Don’t

Don’t build your part!
Medicalisation is detrimental
Rest
Therapist's own negative attitudes and beliefs (don’t disable your patients)

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Creating an environment for recovery

Repair & adaptation environment

- Daily activity
- Injury / illness
  Behaviour
- General / specific exercise
- Treatment

Therapist dependent
Patient dependent
The back pain lottery

Stress  Bending  LBP History  Fatigue
Back pain is multidimensional.

<table>
<thead>
<tr>
<th>DIMENSION</th>
<th>PROCESS</th>
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<tbody>
<tr>
<td>Psychological</td>
<td>Psychological-behavioural</td>
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<tr>
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<td>Psycho-physiological (including pain)</td>
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<td>Neural</td>
<td>Neuromuscular</td>
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<td>Physical / Local tissue</td>
<td>Pain / sensitisation</td>
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<td>Repair</td>
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<td></td>
<td>Fluid flow</td>
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<td>Adaptation</td>
</tr>
</tbody>
</table>
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