

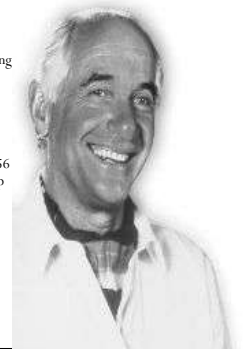
The Lumbar Spine

Mechanical Diagnosis And Therapy
R.A. McKenzie

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Who Is Robin McKenzie?

- He was a physiotherapist from New Zealand
- Influenced heavily by Dr. Cyriax
 - strong influence on McKenzie's initial training
 - Caused him to consider the framework for MDT
- Clinical experience
 - Treated the now infamous "Mr. Smith" in 1956
 - 3 weeks Hx of radicular leg pain cleared up with 5 minutes of prone lying in extension
 - Began a wider exploration of treating at End Of Range - some improved, while others worsened



McKenzie Self Help Books



The McKenzie Philosophy

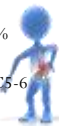
- Position and specific movements will alter symptoms
- Progressive application of forces
- Works with specific forces on the spine
- Self treatment and education



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Epidemiology

- 50-80% population experience back pain
- Peak prevalence 40-50 years of age and tapers after that
- Cervical spine - Women tend to be affected more men
- Lumbar spine – Men tend to more affected than women
- First episodes of Sx start in the 20's w/ recurrence rates between 39-71%
- Majority (80-90%) of low back disorders occur at the L4/5 and/or L5/S1
- Most cervical disorders are found in the lower region with 41% occurring at the C5/6 level and 33% at the C6/7 level
- When the nerve root is affected, 36.1% involve the C6 root (C5-6 level), 34.6% C7 (C6-7 level) and 25.2% C8 (C7-T1 level)



The Causes of Pain

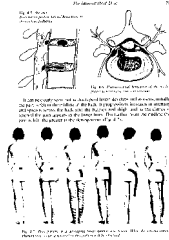
- Chemical Cause of Pain
- Mechanical cause of Pain
 1. Normal stresses applied to normal tissue
 2. Abnormal stress applied to normal tissue
 3. Normal stress applied to abnormal tissue
 4. Abnormal stress applied to abnormal tissue



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The Intervertebral Disc

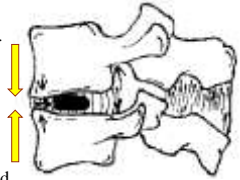
- Structure
- Pressure distribution
- Nuclear movement
- Damage and repair



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Conceptual Model - Flexion

- Zygapophyseal joint surfaces distract
 - inferior articular processes of the superior vertebra glide up and forward upon the superior articular surfaces of the vertebra below.
- Anterior loading of the intervertebral disc occurs with compression of the anterior portion, with relaxation and bulging of the outer anterior annular wall.
- The posterior annular wall is stretched and pulled taut.
- The nucleus distorts posteriorly.
- The vertebral canal lengthens, stretching the cord, dura and root filaments and opening the intervertebral foramina.



Conceptual Model - Extension

- Inferior articular processes of the vertebra above glides down and backward on the superior articular surfaces of the vertebra below.
- Posterior loading of the intervertebral disc occurs with distraction of the anterior portion of the annulus, which is stretched and pulled taut.
- The posterior annular wall is relaxed and there is posterior bulging of the outer, posterior annular wall.
- The nucleus distorts anteriorly.
- The vertebral canal shortens, which relaxes the cord, dura and root filaments, and reduces the size of the intervertebral foramina.



McKenzie Classifications

- Postural Syndrome
- Dysfunction Syndrome
- Derangement Syndrome



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Postural Syndrome

- is caused by mechanical deformation of soft tissues as a result of postural stresses
- characterized by intermittent pain brought on by particular postures or positions
- the pain ceases with a change of position or posture.



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Dysfunction Syndrome

- is caused by mechanical deformation of soft tissues affected by adaptive shortening
- leads to loss of movements in certain directions
- pain produced before full range of motion is achieved
- pain is brought on as soon as shortened tissues are stressed and ceases almost immediately when stress is released.



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Derangement Syndrome

- is caused by mechanical deformation of soft tissues as a result of internal derangement
- various forms of derangements are possible, and each presents a somewhat different set of signs and symptoms
- is usually characterized by constant pain,
- there is a partial loss of movements
- this causes the deformities in kyphosis, and scoliosis typical of the syndrome in the acute phase.



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The Derangements

- Derangement One
- Derangement Two
- Derangement Three
- Derangement Four
- Derangement Five
- Derangement Six
- Derangement Seven



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Derangement One

- Central or symmetrical pain across L4/5
- Rarely buttock or thigh pain
- No deformity

Treatment:

1. Reduction of derangement
2. Maintenance of reduction
3. Recovery of full function
4. Prevention of Recurrence



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Derangement Two

- Central or symmetrical pain across L4/5
- With or without buttock and/or thigh pain
- With deformity of lumbar Kyphosis

Treatment:

1. Reduction of derangement-reduce the kyphosis
2. Centralization of symptoms
3. Proceed as in derangement one



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Derangement Three

- Unilateral or asymmetrical pain across L4/5
- With or without buttock and/or thigh pain
- No deformity

Treatment:

1. As for Derangement one –usually reduces in 24 hours



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Derangement Four

- Unilateral or asymmetrical pain across L4/5
- With or without buttock and/or thigh pain
- With deformity of lumbar scoliosis

Treatment:

1. The lateral shift is corrected first
2. Once centralization has occur proceed as in derangement one.



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Derangement Five

- Unilateral or asymmetrical pain across L4/5
- With or without buttock and/or thigh pain
- With leg pain extending below the knee
- No deformity

Treatment:

1. Extension principles applied
2. If response is slow, unilateral mobilisation/manipulation procedures are indicated.



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Derangement Six

- Unilateral or asymmetrical pain across L4/5
- With or without buttock and/or thigh pain
- With leg pain extending below the knee
- With deformity of sciatic scoliosis



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Derangement Six

Treatment:

1. If movements indicate the reduction is possible, treatment is commenced following the same methodology as for Derangement 4/5
2. After the acute episode has subsided, evaluate for nerve root adherence and treat
3. Flexion principle for nerve root adherence.



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Derangement Seven

- Symmetrical or asymmetrical pain across L4/5
- With or without buttock and/or thigh pain
- With deformity of accentuated lumbar lordosis

Treatment:

1. Correct deviation if present (flex in step standing)
2. Progress to flexion in lying
3. Progress to flexion in standing



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Clinical Management

• Goals of treatment:

- Relieve Pain
- Restore Function
- Prevent reoccurrence



Treatment Techniques

- Postural re-education
- Therapist overpressure
- Therapeutic positioning
- Mobilization
- Therapeutic exercises
- Manipulation



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Evaluation

- History
- Behavior of Pain
- Differential Diagnosis
- Postural Assessment
- Range of Motion
- Repeated Movement Testing



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PHYSICAL EXAMINATION

- Primary role is to confirm hypothetical diagnosis from patient history along with determining appropriate loading strategy
- Posture:
 - Habits
 - Acute spinal deformity – lateral shift, torticollis, etc
 - Other abnormalities: leg length difference, scoliosis, atrophy, etc



Physical Exam

- Neuro exam as appropriate
- Movement Loss
 - Willingness to move/quality/quantity
 - Baseline for determination of the mechanical response of the test movements/positions
- Repeated Movement
 - Observations are made as to symptom and mechanical response after several repetitions
- Sustained test
 - can be performed if the repeated test movements don't provide adequate information to come to a conclusion
- Other – VBI, Hip, SIJ, Shoulder - clearing tests



Test Movements – Cervical Active Physiological Movements

- Protrusion (Pro) and Repeated (Rep Pro)
- Retraction (Ret) and Repeated (Rep Ret)
- Retraction Extension (Ret Ext) and Repeated (Rep Ret Ext)
- Sidebend (SB) and Repeated (Rep SB)
- Rotation (Rot) and Repeated (Rep Rot)
- Flexion (Flex) and Repeated (Rep Flex)



Lumbar Active Physiological Test Movements

- Flexion in Standing
- Extension in Standing
- Sideglide Left/Right
- Repeated Flexion in Standing
- Repeated Extension in Standing
- Flexion in Lying
- Repeated Flexion in Lying
- Extension in Lying
- Repeated Extension in Lying



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Indications

- Lumbar Strain-central pain, but not constant LBP
- Joint dysfunction
- Disc disease
- Bulging disc
- HNP-without neurological signs



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Contraindications

- Osteoporosis
- Infection
- Fracture
- Free Fragment
- Spondylolisthesis
- Spondylolysis-pars fracture
- Severe mental illness-caution with hands on techniques
- Pregnancy-caution



Treatment Principles

- Postural Syndrome: Postural correction
- Flexion Dysfunction: Flexion principles
- Extension Dysfunction: Extension principles
- Posterior Derangement: Extension principles
- Anterior Derangement: Flexion Principles
- Adherent Nerve Root: Flexion Principle

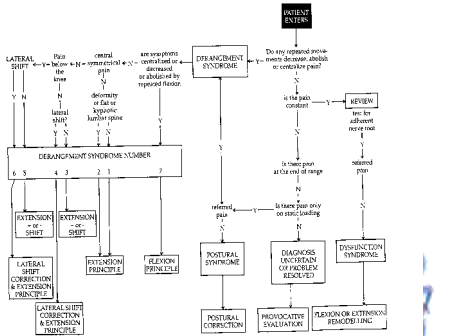


Figure 20-5 The Reflexion-Extension Algorithm.

Lumbar Examination

THE MAJOR LUMBAR SYNDROME

Distal
Proximal
Middle
Distal
Proximal
Middle
Distal
Proximal
Middle
Distal

HISTORY

Onset
Duration
Location
Quality
Quantity
Frequency
Aggravating
Alleviating
Associated
Trauma
Previous
History

PHYSICAL EXAMINATION

Observation
Inspection
Palpation
Range of Motion
Special Tests
Neurological
Vital Signs
Gait

BACK VIEW

Neck
Cervical
Thoracic
Lumbar
Sacrum
Coccyx

FRONT VIEW

Neck
Cervical
Thoracic
Lumbar
Sacrum
Coccyx

Lumbar Examination

EXAMINATION

POSTURE	Observation	Palpation	Range of Motion
ADVERSE POSITIONS	Flexion Extension Lateral Bending Rotation	Palpation	Range of Motion
RESTRICTIONS	Flexion Extension Lateral Bending Rotation	Palpation	Range of Motion
MUSCULOSKELETAL	Muscle strength Flexion Extension Lateral Bending Rotation	Palpation	Range of Motion
NEUROLOGICAL	Muscle strength Flexion Extension Lateral Bending Rotation	Palpation	Range of Motion
FUNCTIONAL	Walking Sitting Standing Lifting Carrying	Palpation	Range of Motion
PHYSIOLOGICAL	Heart rate Blood pressure Respiratory rate Temperature	Palpation	Range of Motion

Any Questions?

