DILEMMA OF LOWER BACK PAIN
DOUBLE CHALLENGE: DIAGNOSIS AND CORRECT TREATMENT

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Epidemiology

**Incidence of LBP:**
- 60-90% lifetime incidence
- 5% annual incidence
- 90% of cases of LBP resolve without treatment within 6-12 weeks
- 75% of cases with nerve root involvement can resolve in 6 months

**LBP and lumbar surgery are:**
- 2nd highest reasons for GP visits
- 5th leading cause for hospitalization
- 3rd leading cause for surgery
Chronic pain severely impacts quality of life and daily activities

N = 4839 respondents  Adapted from Breivik 2006
Back pain results in a high economic burden in the UK

<table>
<thead>
<tr>
<th>Condition</th>
<th>Direct Costs</th>
<th>Indirect Costs</th>
</tr>
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<tbody>
<tr>
<td>Back pain</td>
<td>£12 billion*</td>
<td></td>
</tr>
<tr>
<td>Coronary heart disease</td>
<td>£10 billion*</td>
<td></td>
</tr>
<tr>
<td>Rheumatoid arthritis</td>
<td>£8 billion*</td>
<td></td>
</tr>
<tr>
<td>Lower respiratory tract infections</td>
<td>£6 billion*</td>
<td></td>
</tr>
<tr>
<td>Alzheimer disease</td>
<td>£4 billion*</td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td>£2 billion*</td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
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*1998 costs

Adapted from Maniadakis N, Gray A. Pain 2000;84:95-103
Trends in Rates of Discectomy/Laminectomy and Fusion in 1992-2003

US Average Rate of Discharges per 1000 Medicare Enrollees

- Lumbar discectomy/laminectomy
- Lumbar fusion
- Nonlumbar fusion
- Nonlumbar discectomy/laminectomy

Lumbosacral Injection Rates by Year: Age- and Sex-Adjusted per 100,000

- Epidural
- Facet
- SI


Rates:
- 1994: 553.4
- 1995: 79.7
- 1996: 553.4
- 1997: 79.7
- 1998: 2055.2
- 1999: 263.9
- 2000: 212.3
- 2001: 263.9

Guy’s and St Thomas’ NHS Foundation Trust
Treatment guidelines
Most Common Locations of Chronic Pain
Structural Causes of The Back Pain

- Muscle
- Facet joints
- Sacroiliac joint
- Intervertebral Disc
- Mechanical or Chemical irritation of the Dura Matter
- Bone

The tissue source of low back pain cannot be specified in the majority of patients.
Diagnostic Evaluation

Diagnosis of low back pain is unspecified in 80% of patients


Evaluation of Back Pain

- Non Specific Lower Back Pain
- Back Pain potentially associated with radiculopathy or spinal stenosis
- Back pain potentially associated with another specific spinal cause
I. History:
The most reliable indicator of the existence pain and its intensity is the patient’s description.
Red Flags of Lower Back Pain

<table>
<thead>
<tr>
<th>History</th>
<th>Physical Examination</th>
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<tbody>
<tr>
<td>Gradual onset of back pain</td>
<td>Fever</td>
</tr>
<tr>
<td>Age &lt;20 years or &gt;50 years</td>
<td>Hypotension</td>
</tr>
<tr>
<td>Thoracic back pain</td>
<td>Extreme hypertension</td>
</tr>
<tr>
<td>Pain lasting longer than 6 weeks</td>
<td>Pale, ashen appearance</td>
</tr>
<tr>
<td>History of trauma</td>
<td>Pulsatile abdominal mass</td>
</tr>
<tr>
<td>Fever/chills/night sweats</td>
<td>Pulse amplitude differentials</td>
</tr>
<tr>
<td>Unintentional weight loss</td>
<td>Spinous process tenderness</td>
</tr>
<tr>
<td>Pain worse with recumbency</td>
<td>Focal neurologic signs</td>
</tr>
<tr>
<td>Pain worse at night</td>
<td>Acute urinary retention</td>
</tr>
<tr>
<td>Unrelenting pain despite supratherapeutic doses of analgesics</td>
<td></td>
</tr>
<tr>
<td>History of malignancy</td>
<td></td>
</tr>
<tr>
<td>History of immunosuppression</td>
<td></td>
</tr>
<tr>
<td>Recent procedure causing bacteremia</td>
<td></td>
</tr>
<tr>
<td>History of intravenous drug use</td>
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</table>
Red Flags of Lower Back Pain

- Significant trauma history, or minor in older adults
- Nocturnal pain in supine position with history of cancer
- Bladder or bowel incontinence or dysfunction
- Constitutional symptoms:
  - Fever / chills
  - Weight loss
  - Lymph node enlargement
- Risk factors for spinal infection
  - Recent infection
  - IV drug use
  - Immunosuppression

Major motor weakness
II. Examination:
Physical

– Posture:
  • Splinting
  • Body language

– Gait:
  • Antalgia
  • Heel / Toe pattern
  • Trendleberg

– Musculoskeletal:
  • ROM
  • Leg length
  • Vascular
  • Atrophy
– Abdomen:
  • Presence of a mass
    – Back:
  • Inspection
  • Palpation
  • ROM
  • Scoliosis
    – Neurological:
  • Sensation
  • Motor
  • DTRs
    – Rectal if indicated:

Evaluation of sphincter tone
**Symptom Magnification Examination:**

- **Waddell signs:**
  - Presence of *nonorganic* signs suggesting symptom magnification and psychological distress
  - Superficial or nonanatomic distribution of tenderness
  - Nonanatomic or regional disturbance of motor or sensory impairment
  - Inconsistency on positional SLR
  - Inappropriate/excessive verbalization of pain or gesturing
  - Pain with axial loading or rotation of spine

- **Give-away weakness:**
  - Inconsistent effort on manual motor testing with “ratcheting” rather than smooth resistance
Pathological Examination:

**Straight-leg raise (SLR):**

Elevation of lower extremity, seated or standing, resulting in neural tension at S1 nerve root with extremity pain.

**Patrick’s maneuver:**

Crossed leg with unilateral pain indicative of sacro-iliac (SI) joint dysfunction.

**Femoral stretch:**

Hip extension stretch with heel pushed to buttock in lateral supine or prone position resulting in anterior thigh pain.
Critical Clinical Indicators of Pathology

• In patients with back and leg pain, a typical history of sciatica (back and leg pain in a typical lumbar nerve root distribution) has a fairly high sensitivity, but uncertain specificity for herniated disc

• >90% of symptomatic lumbar disc herniations (back and leg pain due to a prolapsed lumbar disc compressing a nerve root) occur at L4/L5 and L5/S1 levels
III. Investigations:
Clinicians should perform diagnostic imaging and testing for patients with:

- LBP when severe or progressive neurologic deficits are present or when
- serious underlying conditions are suspected on the basis of history and physical examination

- Strong recommendations
- Moderate-quality evidence
Laboratory

- Performed primarily to screen for other disease etiologies
  - Infection
  - Cancer
  - Spondyloarthropathies
- No evidence to support value in first 7 weeks unless with red flags

Specifics:
- WBC
- ESR or CRP
- HLA-B27
- Tumor markers: Kidney, Breast, Lung, Thyroid, Prostate
Avoid Imaging in Non specific lower back pain.

But consider Plain X-Ray in the following:

- History of trauma with continued pain
- < 20 years or > 55 years with severe or persistent pain
- Noted spinal deformity on exam
- Signs / symptoms suggestive of spondyloarthropathy
- Suspicion for infection or tumour
MRI:

- **Best diagnostic tool for:**
  - Soft tissue abnormalities:
    - Infection
    - Bone marrow changes
    - Spinal canal and neural foraminal contents
  - Emergent screening:
    - Cauda equina syndrome
    - Spinal cored injury
    - Vascular occlusion
    - Radiculopathy
      - Benign vs. malignant compression fractures
      - Osteomyelitis evaluation
      - Evaluation with prior spinal surgery
CT:
– Best for bony changes of spinal or foraminal stenosis
– Also best for bony detail to determine:
  • Fracture
  • DJD
  • Malignancy

– SW Wiesel study 1984 Spine:
  • 36% of asymptomatic subjects had “HNP” at L4-L5 and L5-S1 levels
A Systematic Evaluation of tests to identify the disc, SIJ or facet joint as the source of low back pain

M. J. Hancock, C. G. Maher, J. Latimer, M. F. Spindler, J. H. McAuley, M. Laslett, N. Bogduk
A Systematic Evaluation of Prevalence and Diagnostic Accuracy of Sacroiliac Joint Interventions

H Thomas T. Simopoulos, Laxmaiah Manchikanti, Vijay Singh, Sanjeeva Gupta, Haroon Hameed, Sudhir Diwan and Steven P. Cohen
Simopoulos concluded

Based on this systematic review, the evidence for:

- The diagnostic accuracy of sacroiliac joint injections is good
- The provocation manoeuvres is fair
- The evidence for imaging is limited
IV. Management:
The Goals of Pain Therapies

- Decrease pain
- Reduce suffering
- Improve physical functioning
- Improve emotional function
- Reduce drains on scarce healthcare resources
The Treatments of Chronic Pain

- Cognitive behavioral: improve emotional function, deals with meaning of pain, learning to live with pain, improves coping, etc
- Functional restorative: improves muscle function, balance and posture and decreases pain
- Pharmacological: opioids, non opioids, adjuvants
- Complimentary medical therapies: multiple including mind body techniques
- Interventional therapies: technique oriented and relies on technologies
Basic Principles of Selecting Therapy for Low Back Pain

- For most LBP, labeling with a specific etiology doesn’t help inform therapy choices
- Most patients with acute LBP will improve regardless of which therapy is chosen
- For chronic LBP, therapies are moderately effective at best
- Use interventions with proven efficacy
- Noninvasive approaches to most LBP
- Consider psychosocial factors
Gold Stander of Pain Intervention

- Accurate/working Diagnosis
- Proper patient selection
- Patient Education
- Precision in performing the procedure
Facets /Sacroiliac Joint Injection

Diagnostic Facets/ sacroiliac joint injections are widely considered the reference standard identifying spinal pain generator. But...

Therapeutic/ Diagnostic Block?
Intraarticular Vs Medial Branch blocks?
The ideal number to perform?
Single block Vs Double block?
It is believed that neural blockade can result in the long-term alleviation

- By interrupting nociceptive input, disrupting the reflex arc of afferent pain fibers and inhibiting ectopic discharges from injured nerves
- Possibly reversing central sensitization
- Corticosteroids may also inhibit the synthesis or release of a number of pro-inflammatory mediators, and cause a reversible local anesthetic effect

Which is the most effective injection intraarticular, periarticular or combination?
Lateral

L5-S1
RF Techniques
Ionic Heating Using RF Cannula

- RF energy is applied
- Ions in surrounding tissue move creating friction
- Friction heats surrounding tissue
- Hot tissue heats probe or electrode by conduction
- Probe thermocouple located at the tip, reads tissue temperature
Monopolar vs. Bipolar

(a) Monopolar

Electrically active electrode
Grounding pad with relatively large surface area.

(b) Bipolar

Electrically active electrode
Return Electrode with the same surface area.
Efficacy of RF-facet denervation in lumbar facet pain

RF-lumbar facet denervation results in reduction of pain and improvement of functional disability in a selected number of patients.

True:
• Gallagher et al Pain clinic 1994
• Van Kleef et al. Spine 1999
• Dreyfuss et al Spine 2000 (no RCT)
• Tekin et al. Clin J of Pain 2007
• Nath et al Spine 2008

Not true:
• Leclaire et al Spine 2001
Factors determining the success of radiofrequency denervation in lumbar facet joint pain: a prospective study

Konrad Streitberger · Tina Müller · Urs Eichenberger · Sven Trelle · Michele Curatolo

Table 2: Influence of different factors on duration of success (50% reduction in pain as compared to baseline), expressed in weeks

<table>
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<tr>
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<th>Hazard ratio</th>
<th>95% CI</th>
<th>p value</th>
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<td>Female</td>
<td>1.71</td>
<td>0.86, 3.4</td>
<td>0.12</td>
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<td>Age (years)</td>
<td>1.00</td>
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<td>2.39</td>
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<td>1.44</td>
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<td>1.96</td>
<td>0.82, 4.68</td>
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<td>2.97</td>
<td>1.32, 6.65</td>
<td>0.01</td>
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Bipolar Electrode Technique

Perform dual electrode lesions in a leap frog overlapping fashion
Bipolar Lesion Size Parameters

1. Tip Temperature
2. Lesion Time
3. Tip Length
4. Tip Diameter (gauge)
5. Tip Spacing
• Nine ablations still need to be performed!
• Complexity with water cooling increased chance of malfunction
• High cost
• One hour procedure
• Results remain
Dynamics of Bipolar Lesion

6+ mm spacing

4-5 mm spacing

2-3 mm spacing
A Novel RF Electrode: NIMBUS

Courtesy of Dr. R. Wright
A Systematic Evaluation of the Therapeutic Effectiveness of Sacroiliac Joint Interventions

Hans Hansen, MD1, Laxmaiah Manchikanti, MD2, Thomas T. Simopoulos, MD3, Paul J. Christo, MD4, Sanjeeva Gupta, MD5, Howard S. Smith, MD6, Haroon Hameed, MD7, and Steven P. Cohen, MD8
Randomized placebo-controlled study evaluating lateral branch radiofrequency denervation for sacroiliac joint pain

Cohen SP, Hurley RW, Buckenmaier CC 3rd, Kurihara C, Morlando B, Dragovich A
Department of Anesthesiology and Critical Care Medicine, Johns Hopkins School of Medicine, Baltimore, Maryland 21029, USA. scohen40@jhmi.edu

Abstract

BACKGROUND:
Sacroiliac joint pain is a challenging condition accounting for approximately 20% of cases of chronic low back pain. Currently, there are no effective long-term treatment options for sacroiliac joint pain.

METHODS:
A randomized placebo-controlled study was conducted in 28 patients with injection-diagnosed sacroiliac joint pain. Fourteen patients received L4-L5 primary dorsal rami and S1-S3 lateral branch radiofrequency denervation using cooling-probe technology after a local anesthetic block, and 14 patients received the local anesthetic block followed by placebo denervation. Patients who did not respond to placebo injections crossed over and were treated with radiofrequency denervation using conventional technology.

RESULTS:
One, 3, and 6 months after the procedure, 11 (79%), 9 (64%), and 8 (57%) radiofrequency-treated patients experienced pain relief of 50% or greater and significant functional improvement. In contrast, only 2 patients (14%) in the placebo group experienced significant improvement at their 1-month follow-up, and none experienced benefit 3 months after the procedure. In the crossover group (n = 11), 7 (64%), 6 (55%), and 4 (36%) experienced improvement 1, 3, and 6 months after the procedure. One year after treatment, only 2 patients (14%) in the treatment group continued to demonstrate persistent pain relief.

CONCLUSIONS:
These results provide preliminary evidence that L4 and L5 primary dorsal rami and S1-S3 lateral branch radiofrequency denervation may provide intermediate-term pain relief and functional benefit in selected patients with suspected sacroiliac joint pain. Larger studies are needed to confirm these results and to determine the optimal candidates and treatment parameters for this poorly understood disorder.

Anesthesiology. 2008 Aug;109(2):279-88
Factors determining the success of radiofrequency denervation in lumbar facet joint pain: a prospective study

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Kaplan-Meier survival estimates

Failure-free proportion vs. Time since intervention [weeks]
Assuming correct diagnosis; two primary reasons why RF ablation fails to provide the desired outcome

TECHNIQUE:
Inability to position conventional electrodes parallel and adjacent to the nerve

ANATOMIC VARIABILITY:
Lesion insufficiently large enough to encompass normal anatomic variability

Robert Wright
Better patient selection = Better outcome
Take away messages...

- **Chronic Pain** – more than pain to consider
- **Treatment** – Multidisciplinary Approach
  - Drugs
  - Interventions
  - Physical rehab
  - Psychosocial Function
THANK YOU

ALKAISY@AOL.COM