

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

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Guy's & St. Thomas' Hospital NHS Foundation Trust



Epidemiology

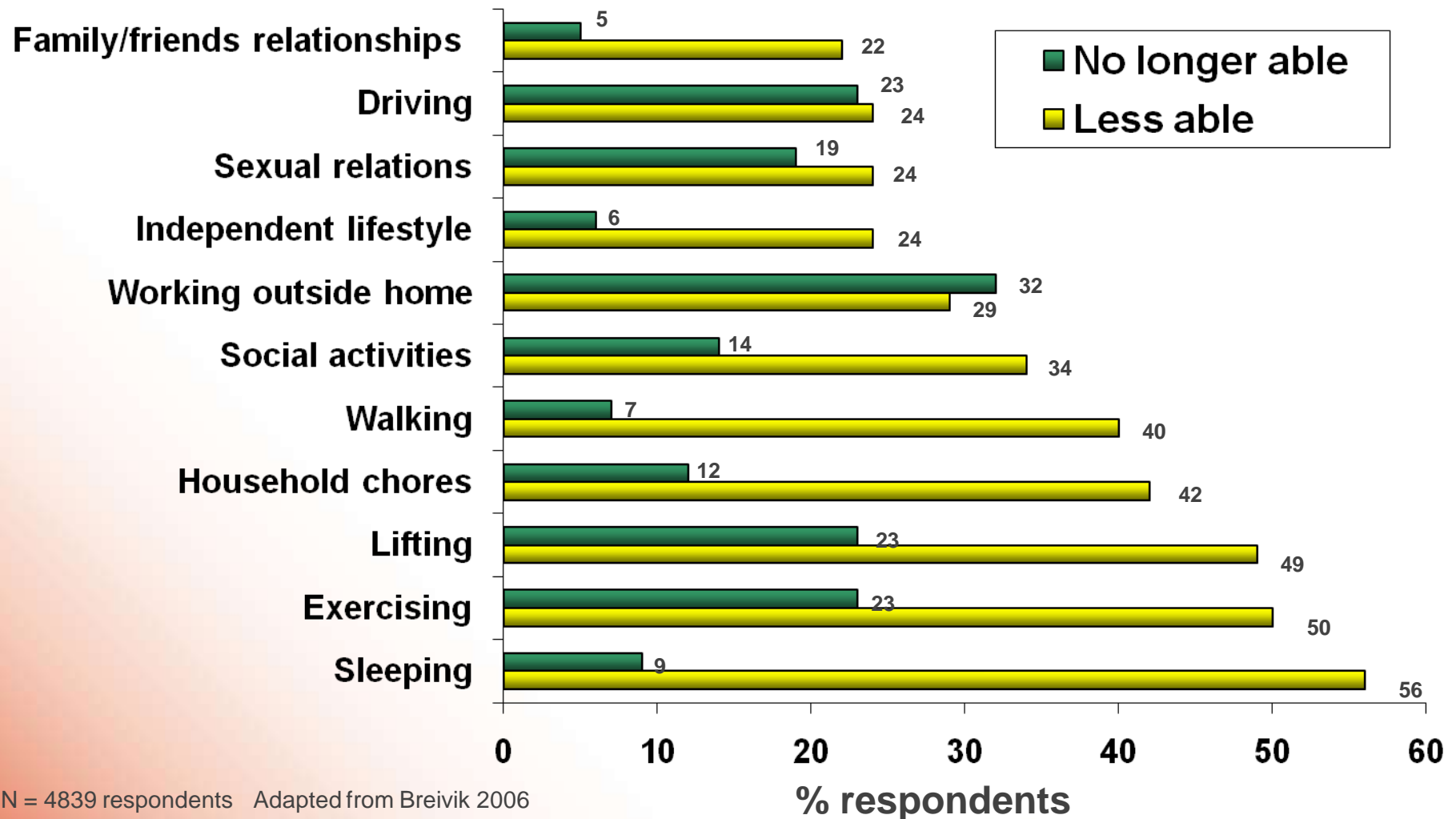
Incidence of LBP:

- **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



Back pain results in a high economic burden in the UK

Back pain

Coronary heart disease

Rheumatoid arthritis

Lower respiratory tract infections

Alzheimer disease

Stroke

Diabetes

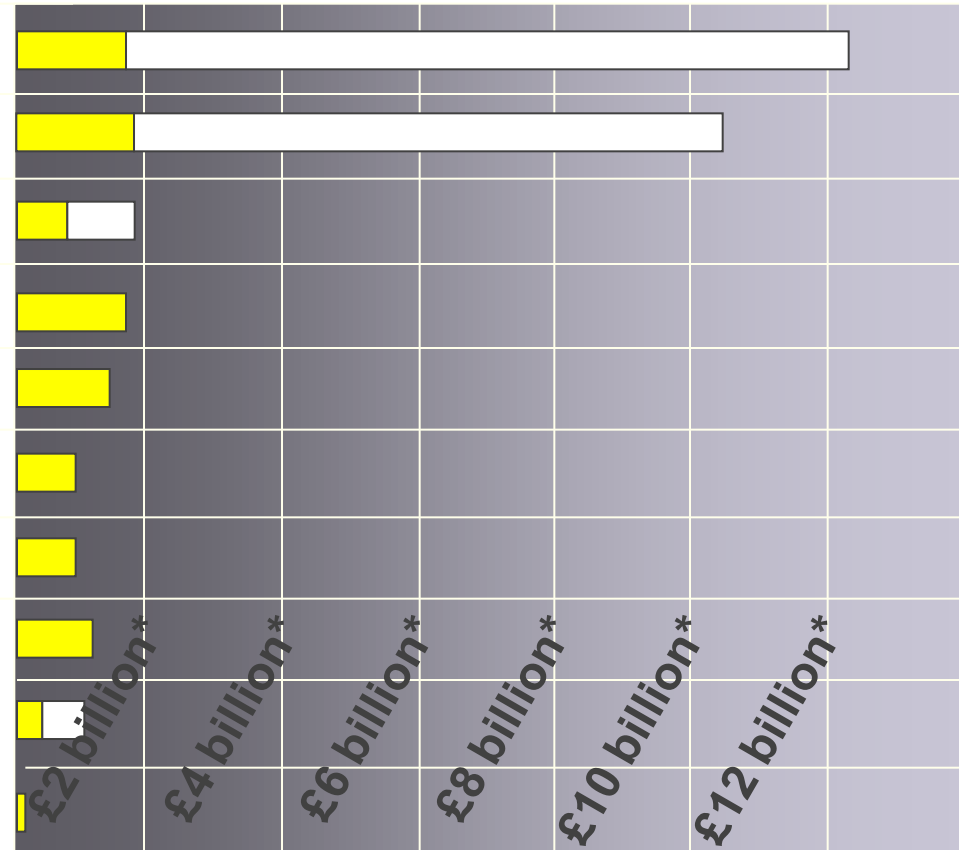


Direct costs



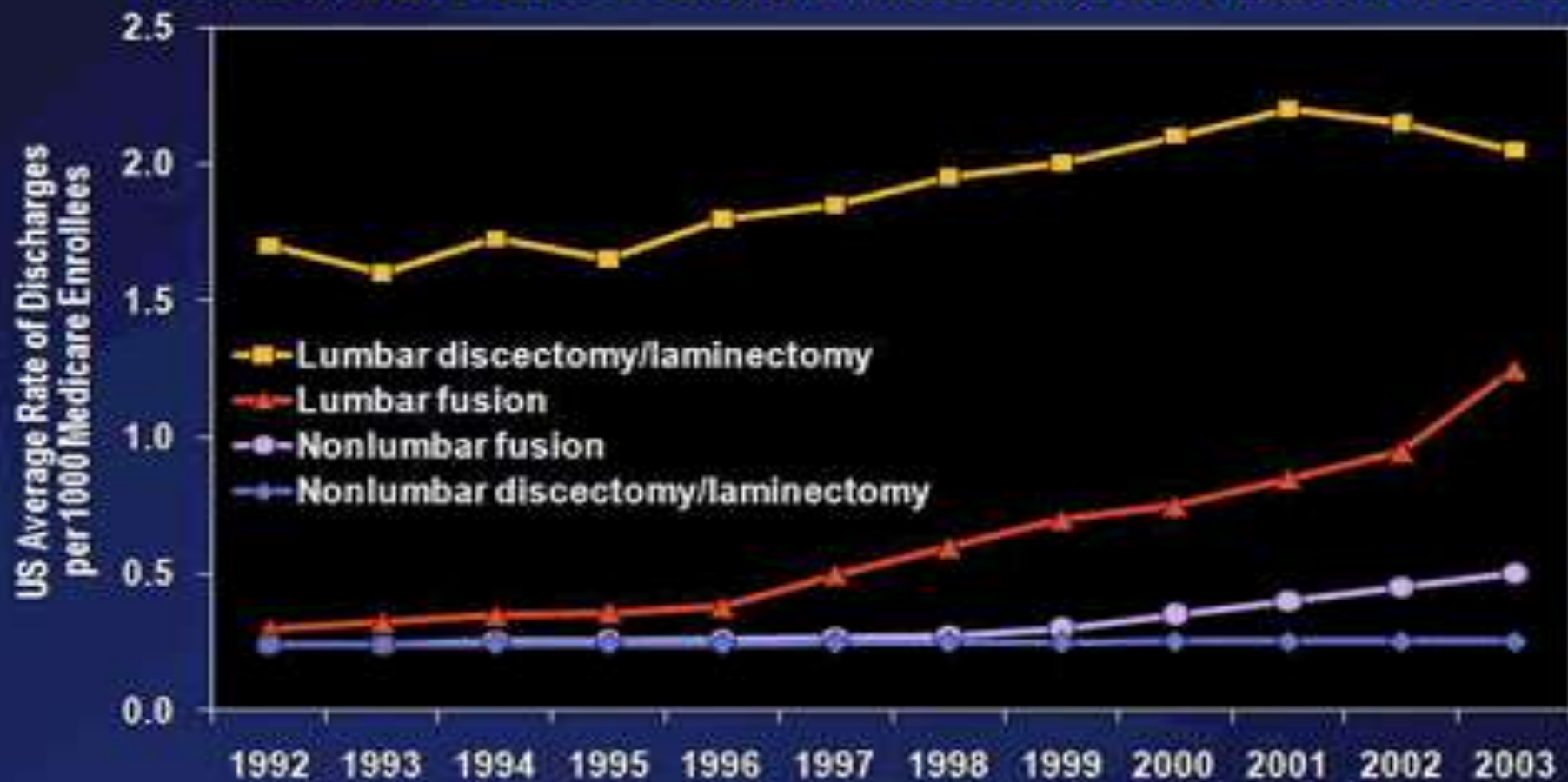
Indirect costs

*1998 costs



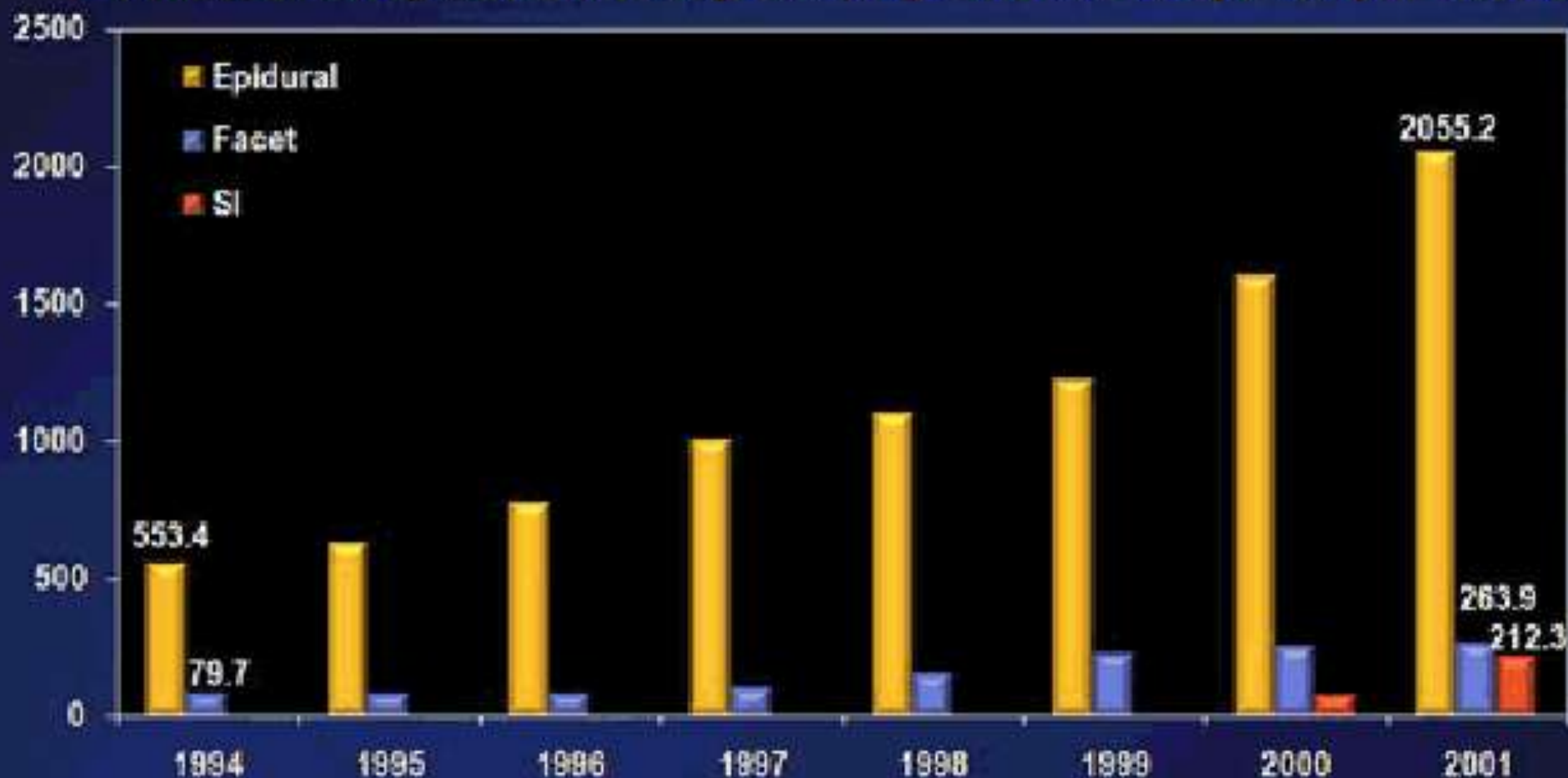
Adapted from Maniadakis N, Gray A. Pain 2000;84:95-103

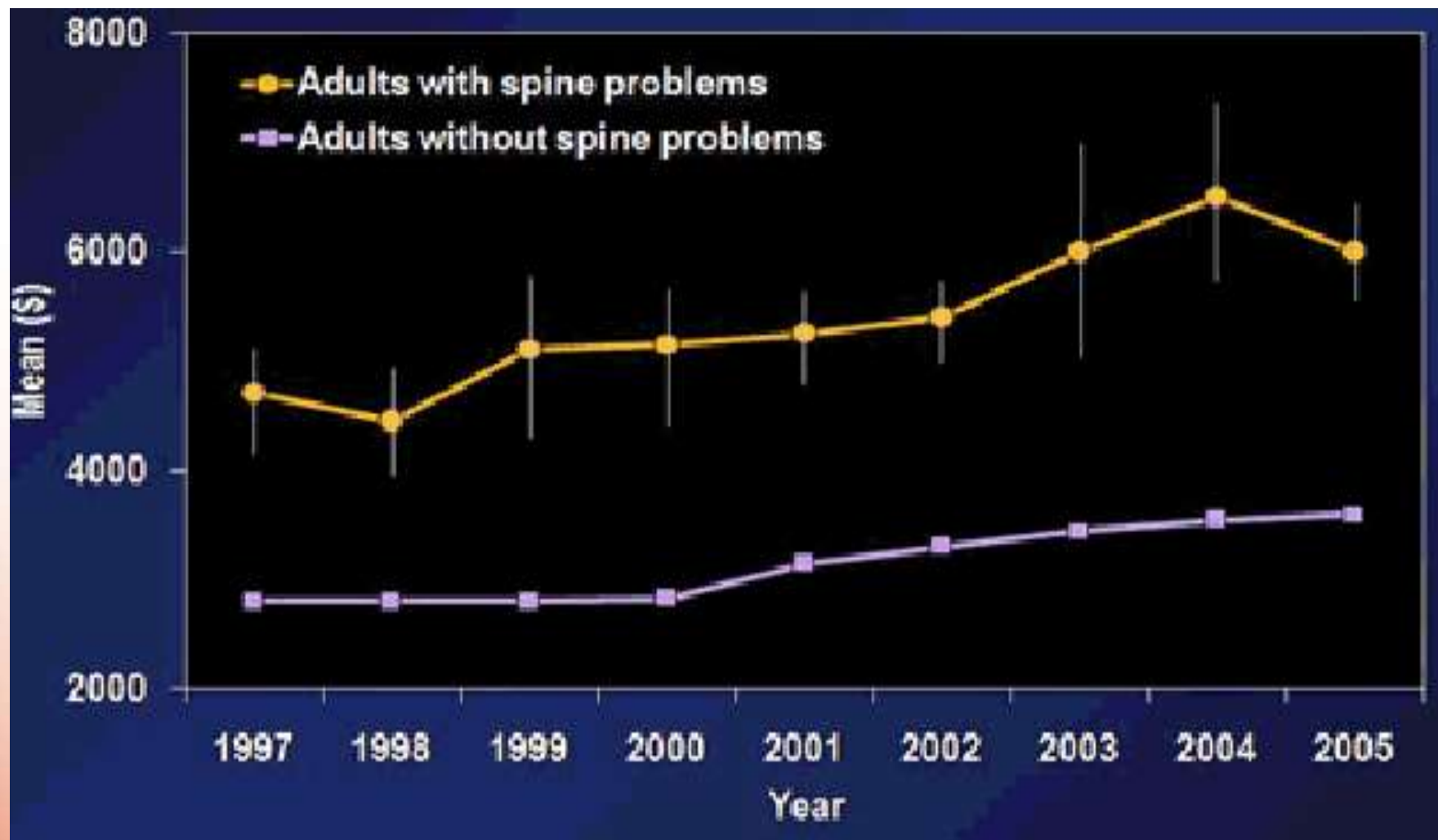
Trends in Rates of Discectomy/Laminectomy and Fusion in 1992-2003



Weinstein JN, et al. *Spine (Phila Pa 1976)*. 2006;31(23):2707-2714.

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

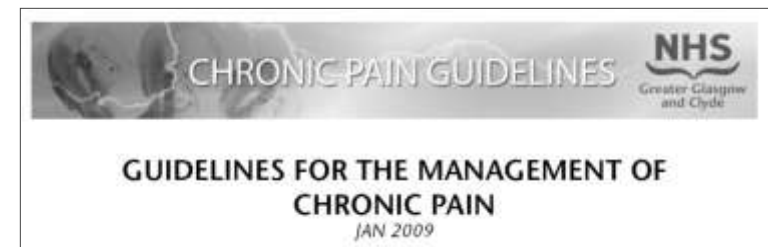




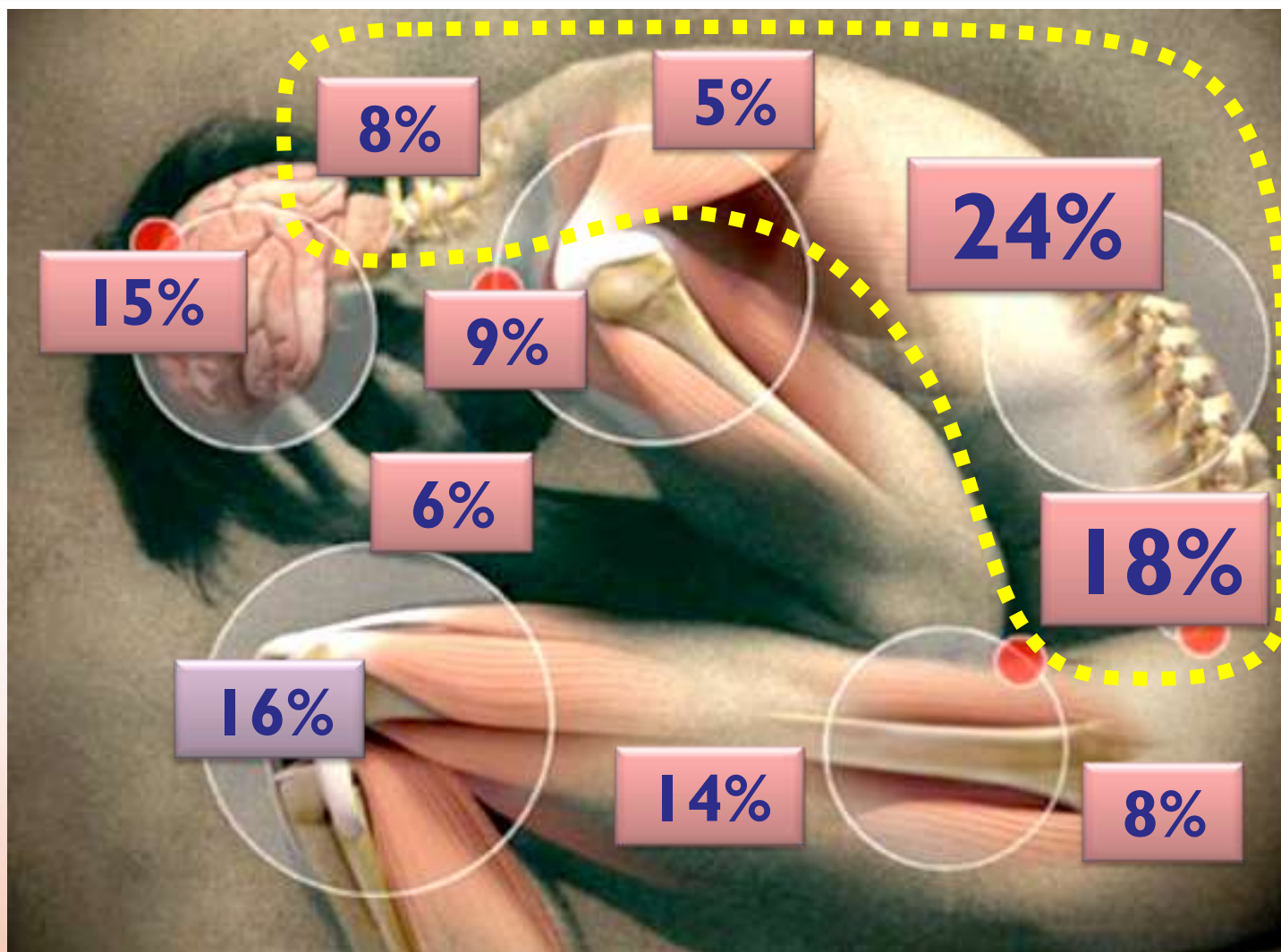




Treatment guidelines



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**

**Dillane JB et al: Acute back syndrome: a study from general practice.
BMJ. 1966;2:82-84**

**Rowe ML: Low back pain in industry: a position paper. J Occup Med
1969;11:161-169**

**White AA, Gordon S. Symposium on Idiopathic Low Back Pain. Mosby
Co. 1982**

- **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

○ History

- Gradual onset of back pain
- Age <20 years or >50 years
- Thoracic back pain
- Pain lasting longer than 6 weeks
- History of trauma
- Fever/chills/night sweats
- Unintentional weight loss
- Pain worse with recumbency
- Pain worse at night
- Unrelenting pain despite supratherapeutic doses of analgesics
- History of malignancy
- History of immunosuppression
- Recent procedure causing bacteremia
- History of intravenous drug use

○ Physical Examination

- Fever
- Hypotension
- Extreme hypertension
- Pale, ashen appearance
- Pulsatile abdominal mass
- Pulse amplitude differentials
- Spinous process tenderness
- Focal neurologic signs
- Acute urinary retention

Red Flags of Lower Back Pain

19

- 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

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

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 cord 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 Intervension

- **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?

Therapeutic Nerve Block

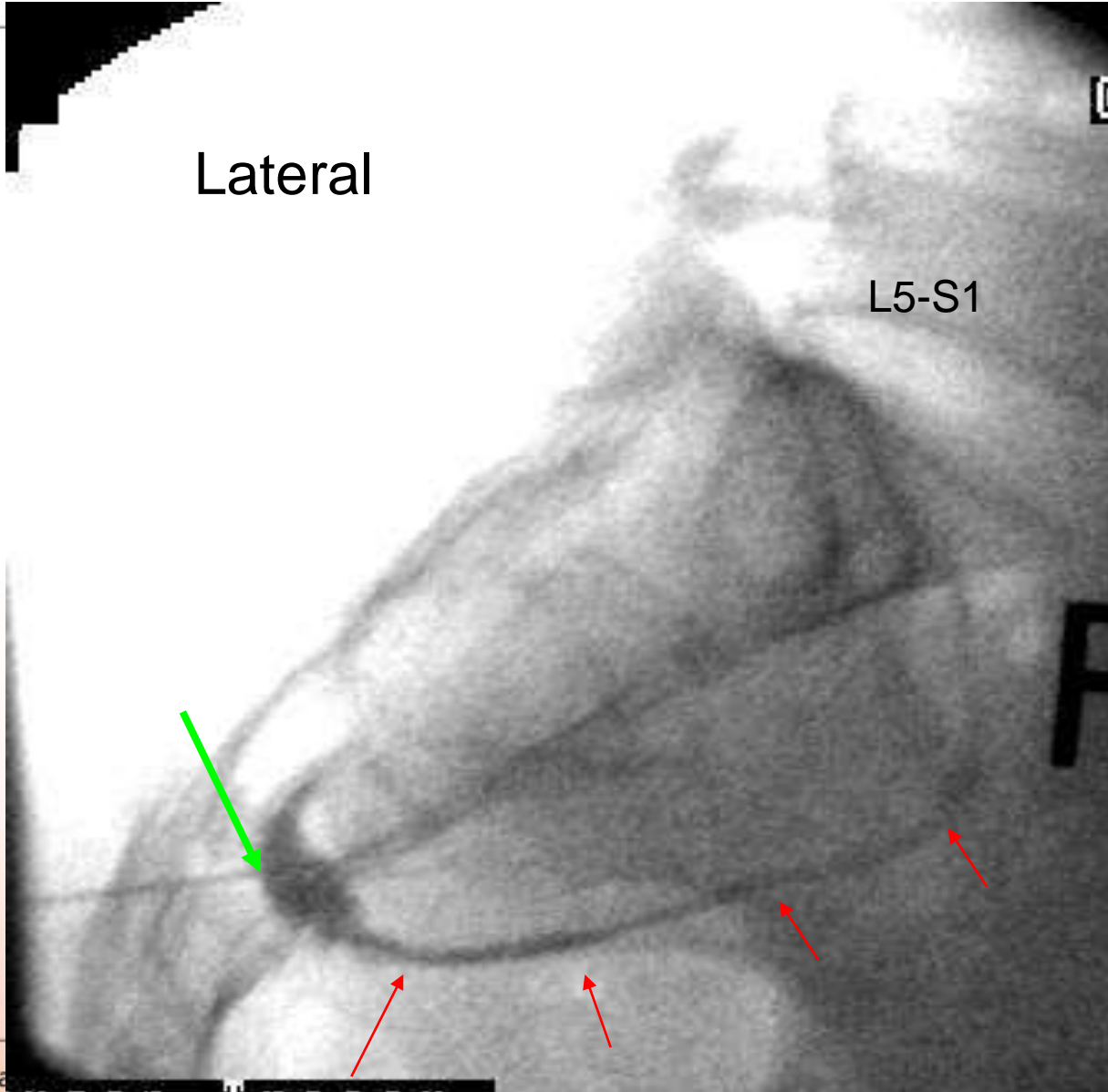
- It is believed that neural blockade can result in the long-term alleviation
- By interrupting nociceptive input, disrupting the reflex arc of afferent pain fibers and inhibiting ectopic discharges from injured nerves
- Possibly reversing central sensitization
- Corticosteroids may also inhibit the 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

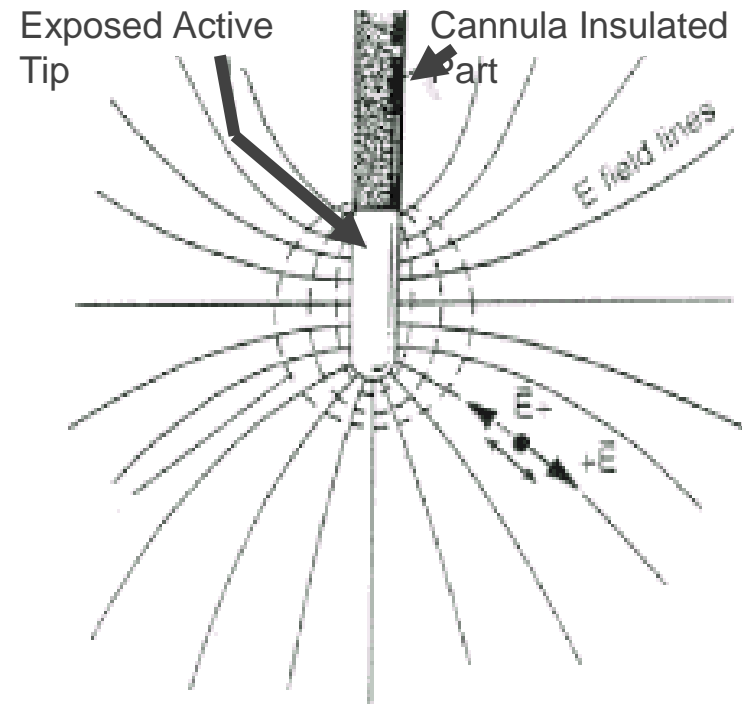
L5-S1



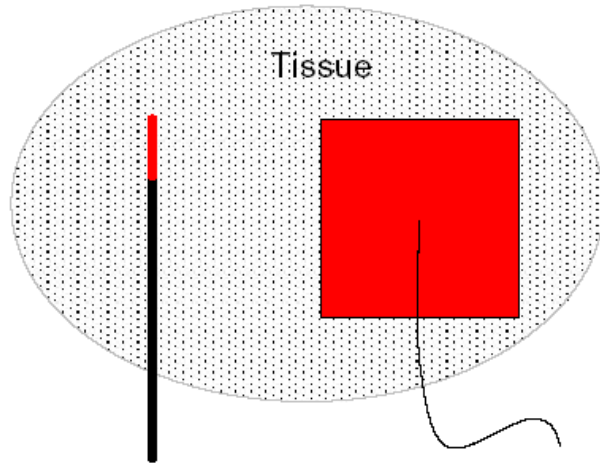
RF Techniques

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



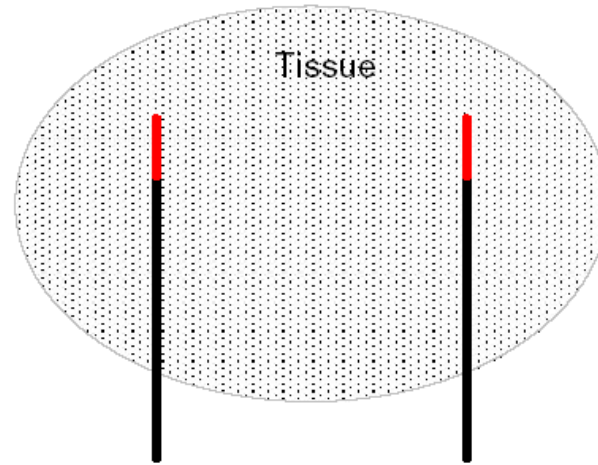
Monopolar vs. Bipolar



Electrically
active
electrode

Grounding pad
with relatively
large surface
area.

(a) Monopolar



Electrically
active
electrode

Return Electrode
with the same
surface area.

(b) Bipolar

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

Patients Selection

Eur Spine J
DOI 10.1007/s00586-011-1891-6

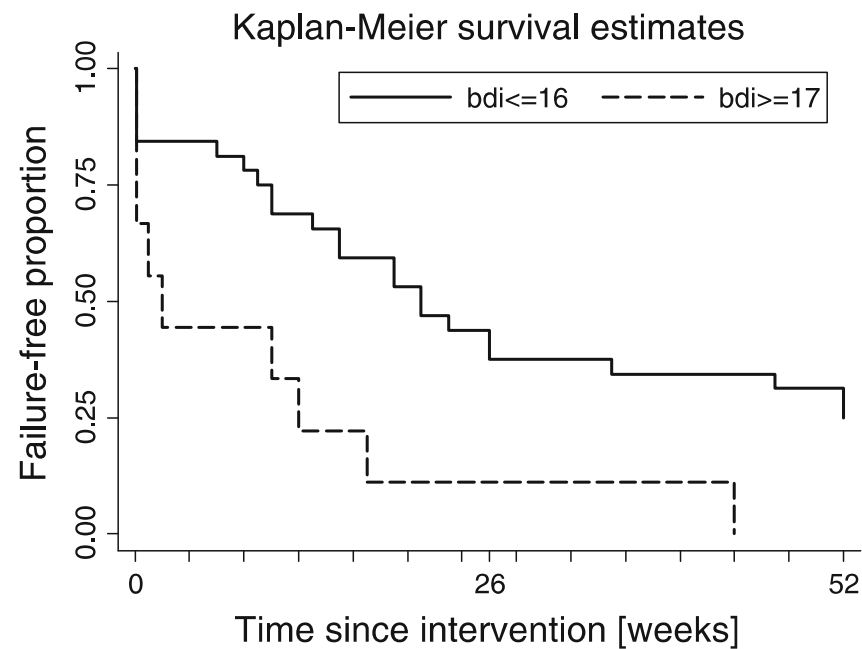
ORIGINAL ARTICLE

Factors determining the success of radiofrequency denervation in lumbar facet joint pain: a prospective study

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

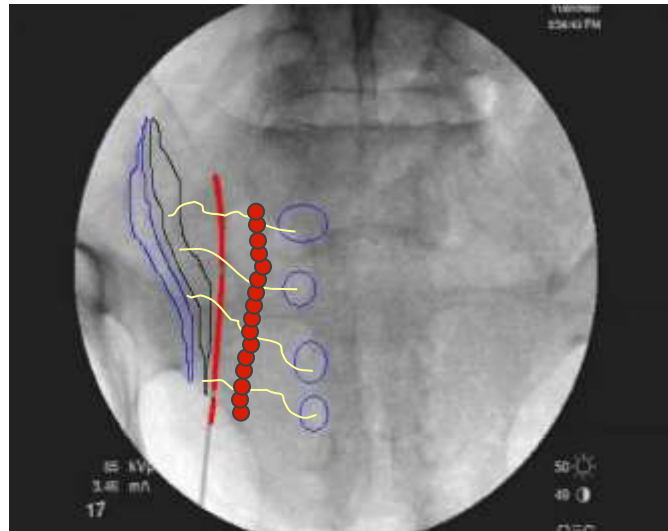
Table 2 Influence of different factors on duration of success (50% reduction in pain as compared to baseline), expressed in weeks

Factor	Hazard ratio	95% CI	<i>p</i> value
Female	1.71	0.86, 3.4	0.12
Age (years)	1.00	0.97, 1.04	0.94
Pain duration (years)	1.00	0.96, 1.03	0.94
Number of treated joints	1.95	1.14, 3.33	0.02
Previous surgery (vs. no surgery)	2.39	1.09, 5.21	0.03
Opioid use (vs. no use)	1.44	0.72, 2.89	0.30
Radiating pain	1.22	0.60, 2.49	0.58
Work inability >50%	1.96	0.82, 4.68	0.13
Depression (BDI > 16)	2.97	1.32, 6.65	0.01



Bipolar Electrode Technique

Perform dual electrode lesions in a leap frog overlapping fashion



Bipolar Lesion Size Parameters

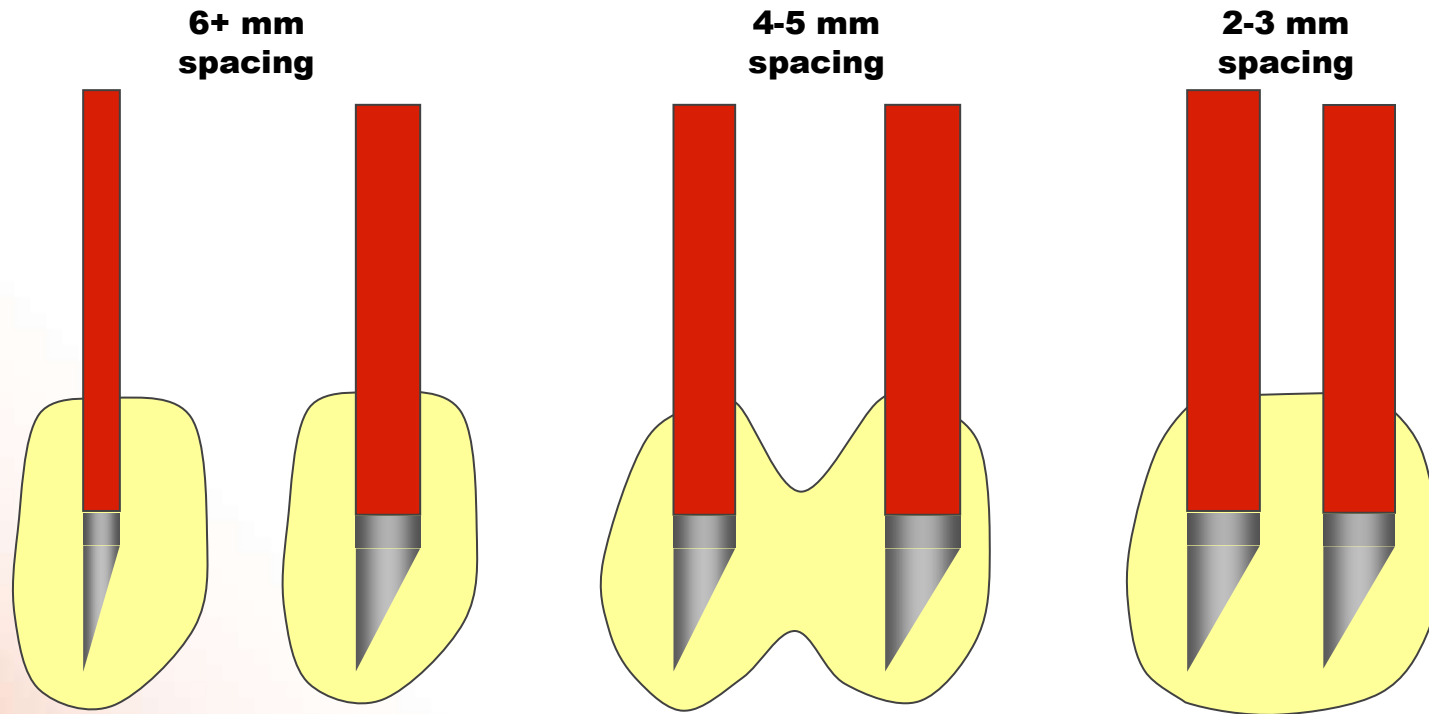
1. Tip Temperature
2. Lesion Time
3. Tip Length
4. Tip Diameter (gauge)
5. Tip Spacing

SInergy

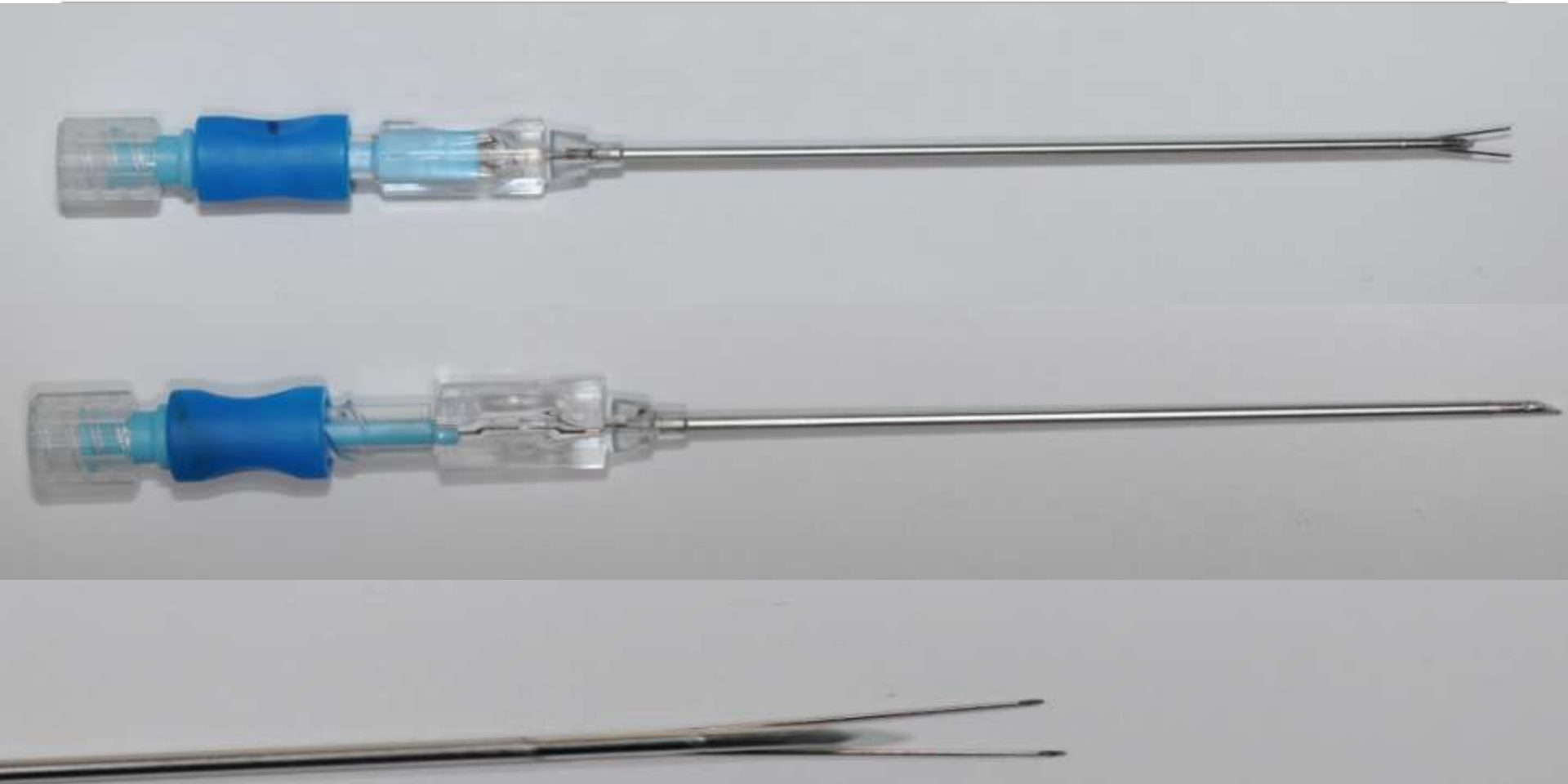


- Nine ablations still need to be performed!
- Complexity with water cooling increased chance of malfunction
- High cost
- One hour procedure
- Results remain

Dynamics of Bipolar Lesion



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

Patients Selection

Eur Spine J
DOI 10.1007/s00586-011-1891-6

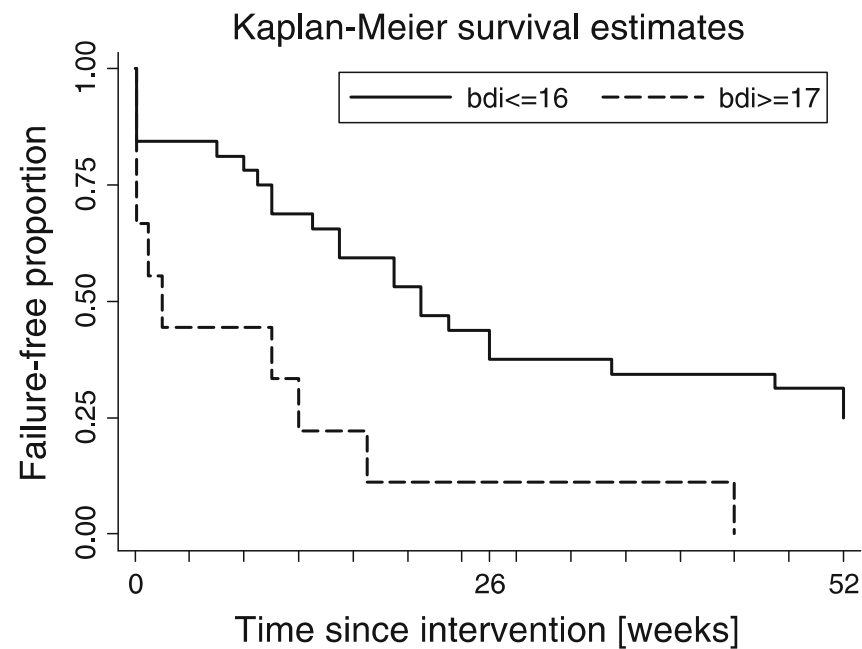
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Assuming correct diagnosis; two primary reasons why RF ablation fails to provide the desired outcome

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**

A close-up photograph of a hummingbird in flight, hovering near a vertical spike of small, tubular red flowers. The bird's wings are blurred from motion, and its long beak is pointed towards one of the flowers. The background is a soft, out-of-focus brownish-orange.

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THANK YOU