

Current Advances in Pain Intervention for the Management of Chronic Pain

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The Pain Management & Neuromodulation Team

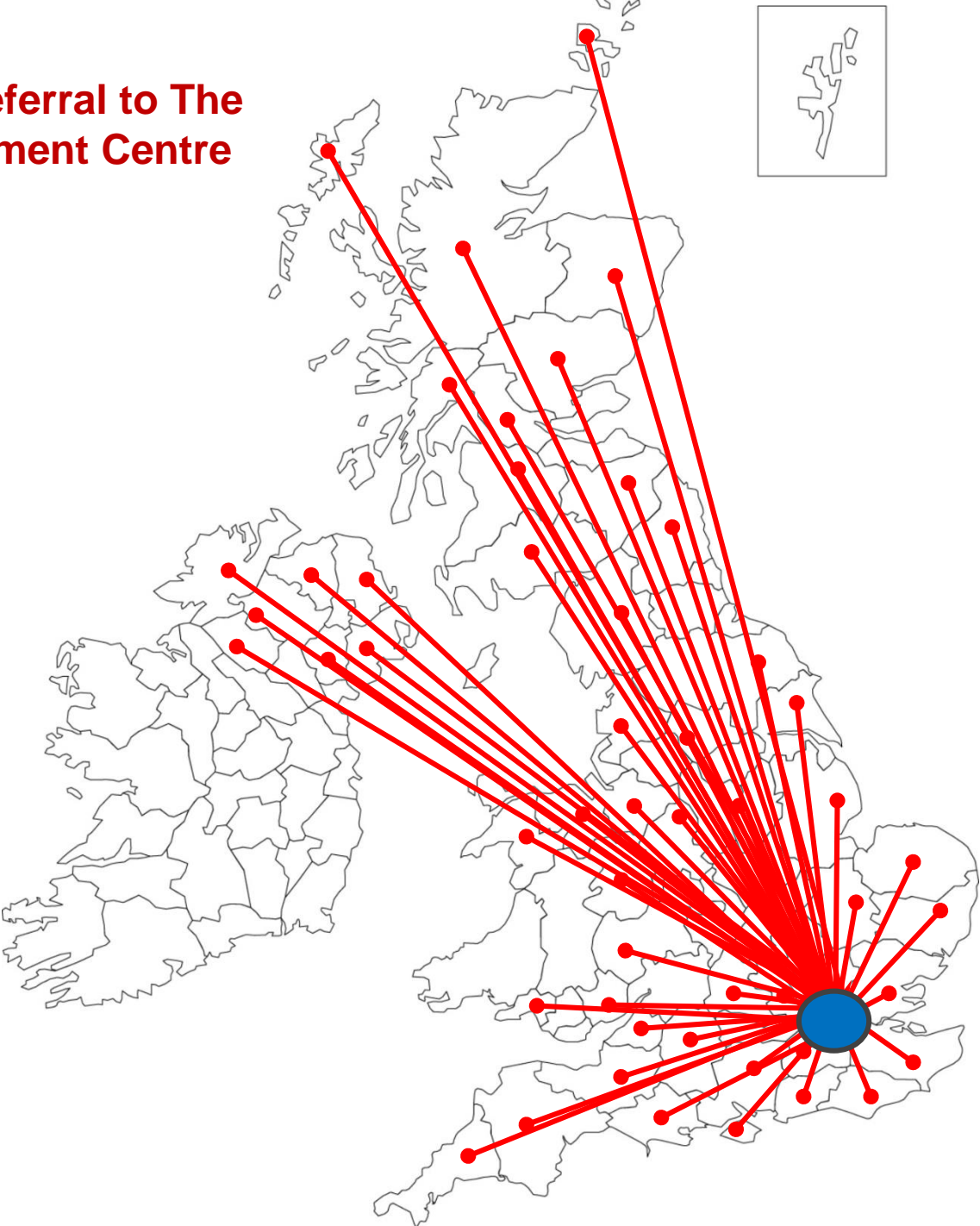
Listening. Supporting. Making a Difference.



INPUT: The Pain Management Program



**Sources of Referral to The
Pain Management Centre**



Pain & Neuromodulation Academic Research Centre PANARC



HF10 Live Master Class 2015



HF10 Live Master Class 2016



WIPUKI: Hands-On Cadaver Workshop July 2016



WIPUKI: Hands-On Cadaver Workshop July 2017



Medical Technology Awareness Week: House of Commons 2016



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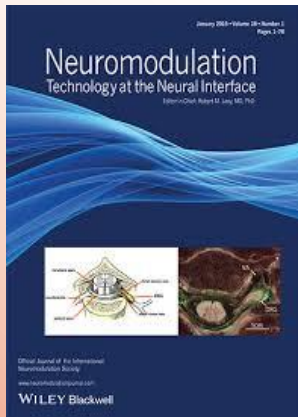


Introduction

Therapeutic Advances and Evolving Treatment Strategies in the Management of Chronic Lower Back Pain

What is Neuromodulation?

“The alteration of nerve activity through the delivery of electrical stimulation or chemical agents to targeted sites of the body”



Neuromodulation

Electrical

Spinal Cord Stimulation



Chemical

Intrathecal Drug Delivery



Early Applications of Electrical Stimulation for Pain

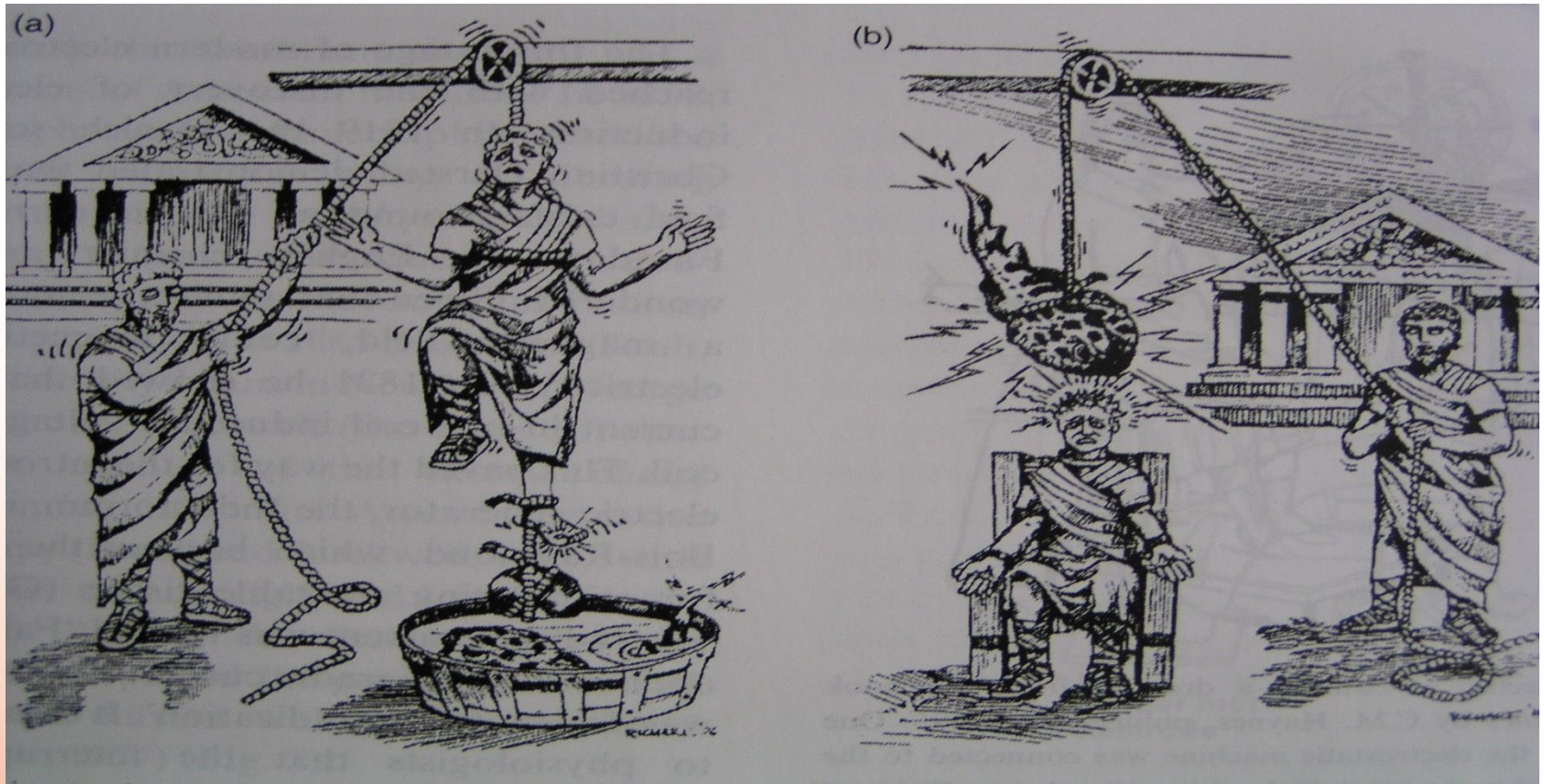


46 AD

Scribonius Largus describes the use of torpedos (aquatic animals capable of electric discharge) for medical applications.

“The live black torpedo when applied to the painful area relieves and permanently cures some chronic and intolerable headaches...carries off pain of arthrites...and eases other chronic pains of the body”

Early Applications of Electrical Stimulation for Pain



Gate Control Theory



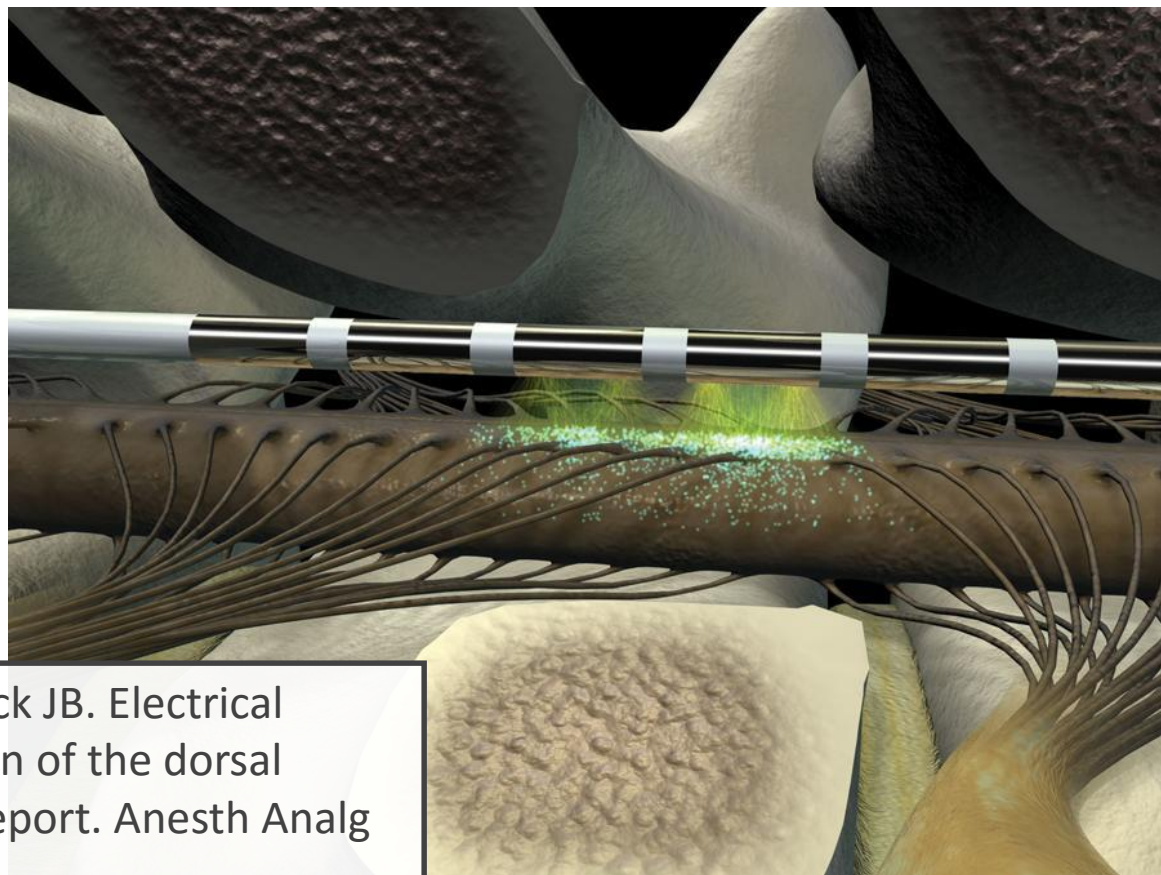
Mezack,R., and Wall,P.:Pain Mechanism: New theory.

Science, 150:971.1965

First SCS Implant



C. Norman Shealy, MD, 1967
University Hospitals of Cleveland



Shealy CN, Mortimer JT, Reswick JB. Electrical inhibition of pain by stimulation of the dorsal columns. Preliminary clinical report. *Anesth Analg* (Cleve) 1967;46:489–91

NEUROMODULATION INDICATIONS

APPROVED

DBS / CORTICAL

Essential Tremor
Parkinson's • Dystonia

COCHLEAR

Profound Deafness

VNS

Epilepsy • Depression

PNS / PNfS

Chronic Pain

SCS

Chronic Pain

SPINAL

Chronic Pain
Malignant Pain • Spasticity

SNS

Incontinence

FUTURE

OTHER THERAPIES

Hypertension • Renal Failure
Diabetes II • CHF • Paralysis
Fibromyalgia • RA • RLS
Eating Disorders

FUTURE

DBS / CORTICAL

OCD • Depression • Tinnitus • Epilepsy
Stroke • TBI • Pain • Coma • Paralysis
Tourette's

BRAIN

Epilepsy • Parkinson's • Alzheimer's

ARTIFICIAL RETINA

Retinitis Pigmentosa

ONS

Headache

VNS

CHF • Obesity

PULMONARY

Respiratory Support

SCS

Angina Pain • PVD Pain

SPINAL

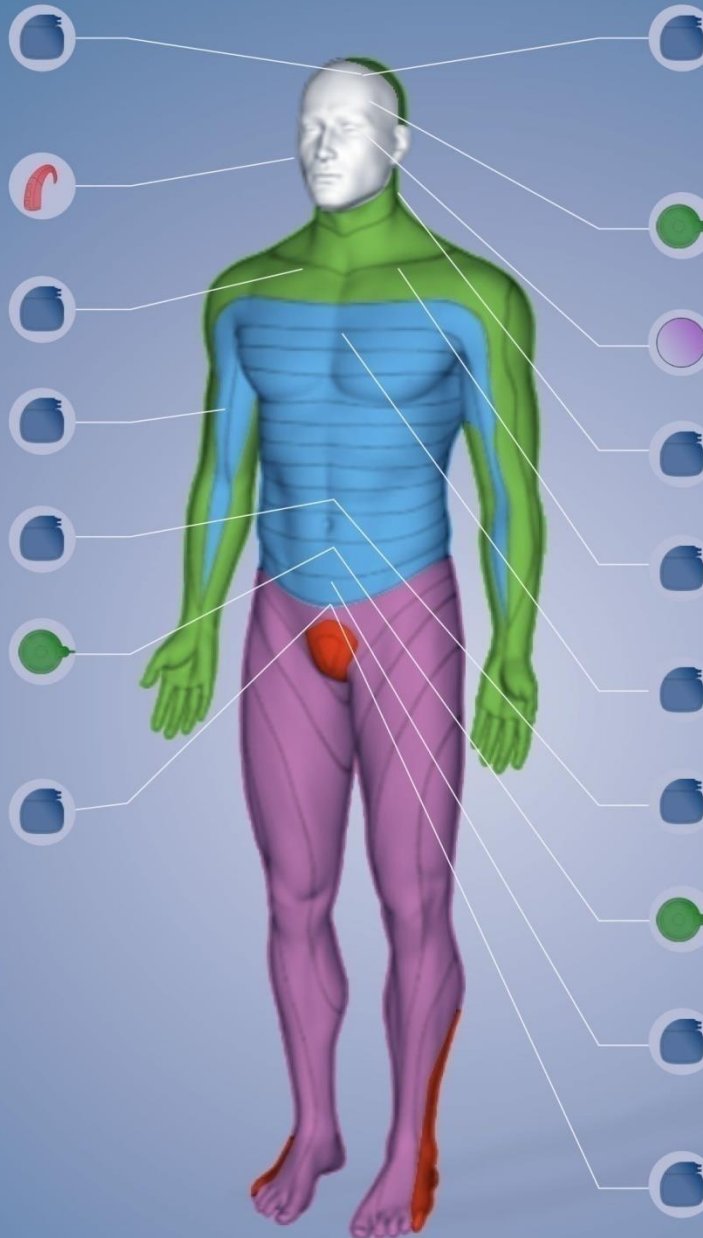
ALS • Huntington's

GASTRIC

Obesity • Gastroparesis
Irritable Bowel Syndrome

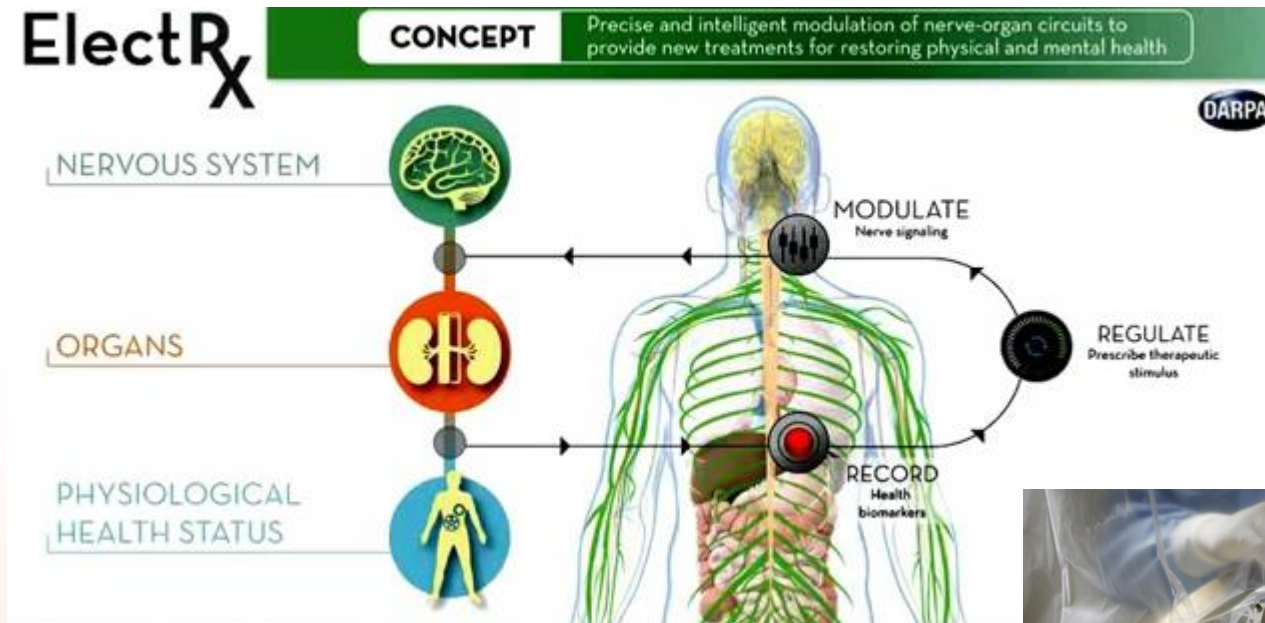
SNS

Pelvic Pain • Sexual Dysfunction



DARPA's Fascinating Self-Healing Body Initiative ElectRx

Intelligent Pacemaker



The Defence Advanced Research Projects Agency

Stimulation Peripheral Activity to Relieve Conditions (SPARC)



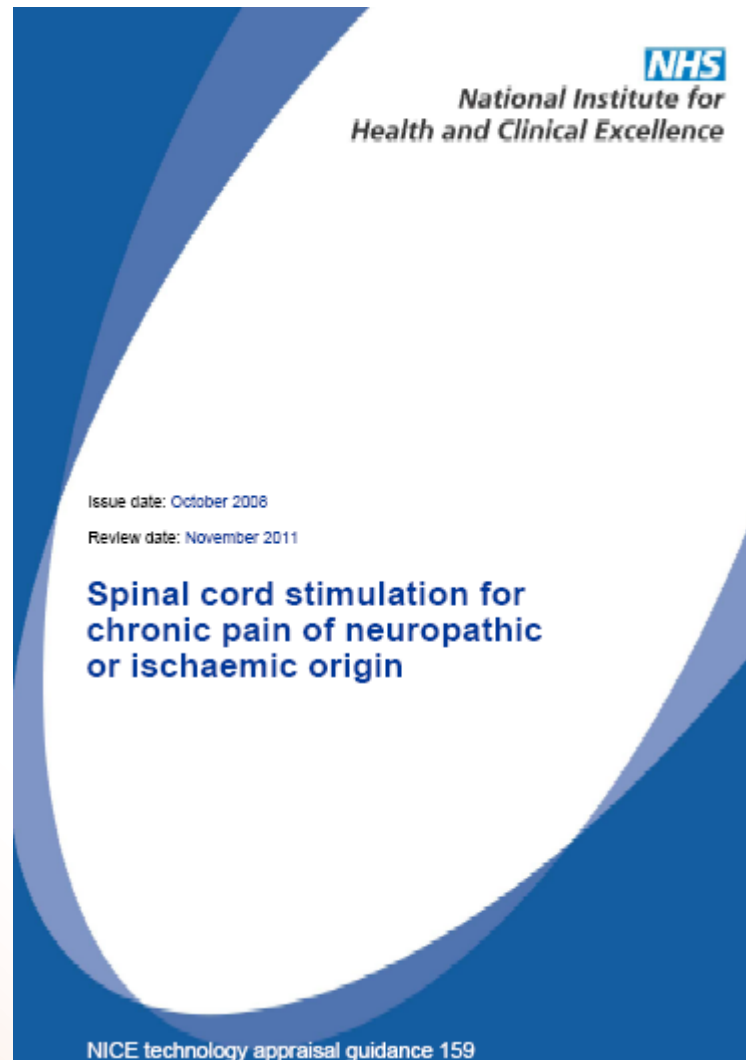
Technologies to Understand the Control of Organ Function by the Peripheral Nervous System

Is This the Future?



Our Future: Everything in Modulation

Nice Approval for Spinal Cord Stimulation for Neuropathic Pain



Good Evidence

Failed Back Surgery Syndrome

Complex Regional Pain Syndrome

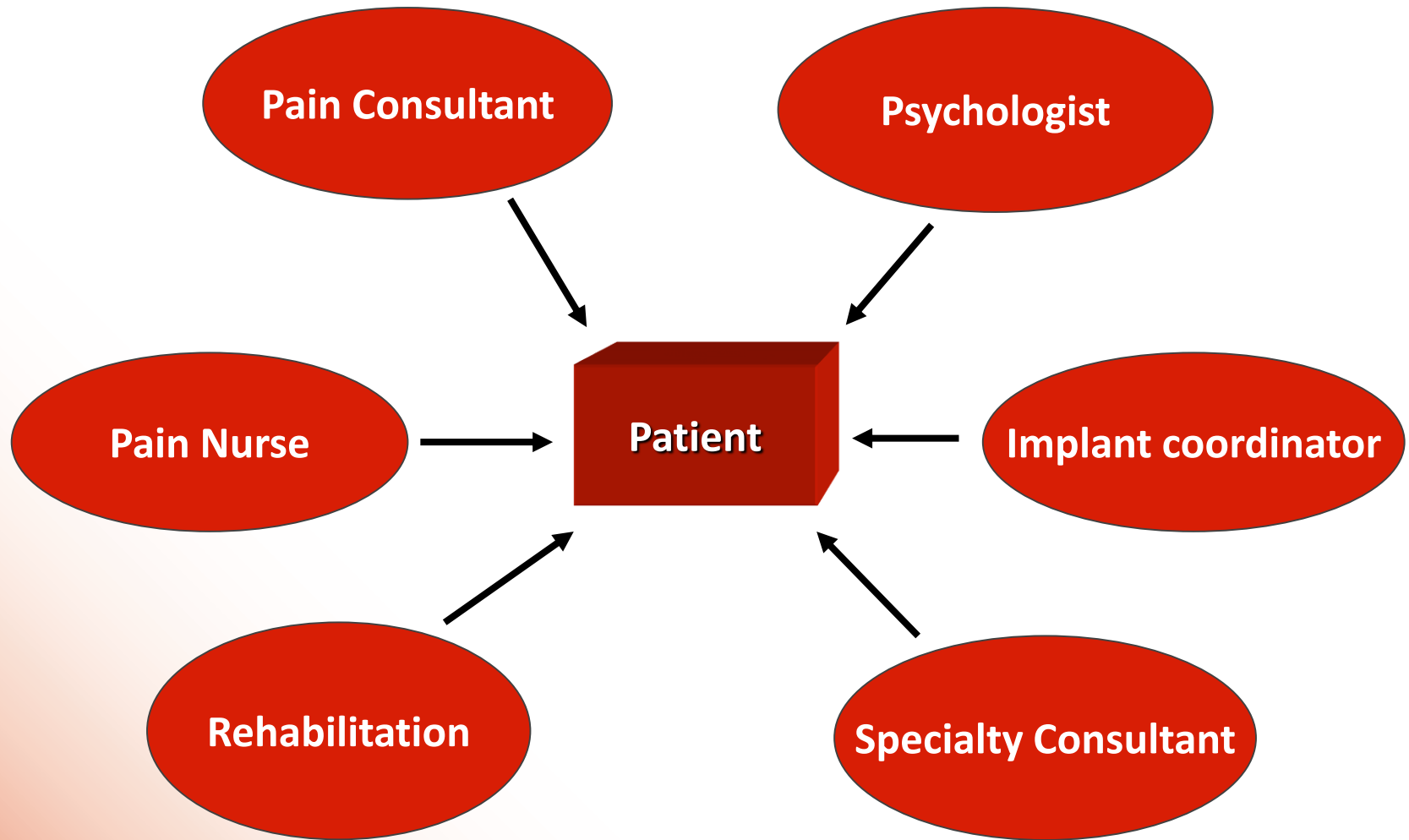
Peripheral Neuropathy

Chronic Headache

Bladder Disorders

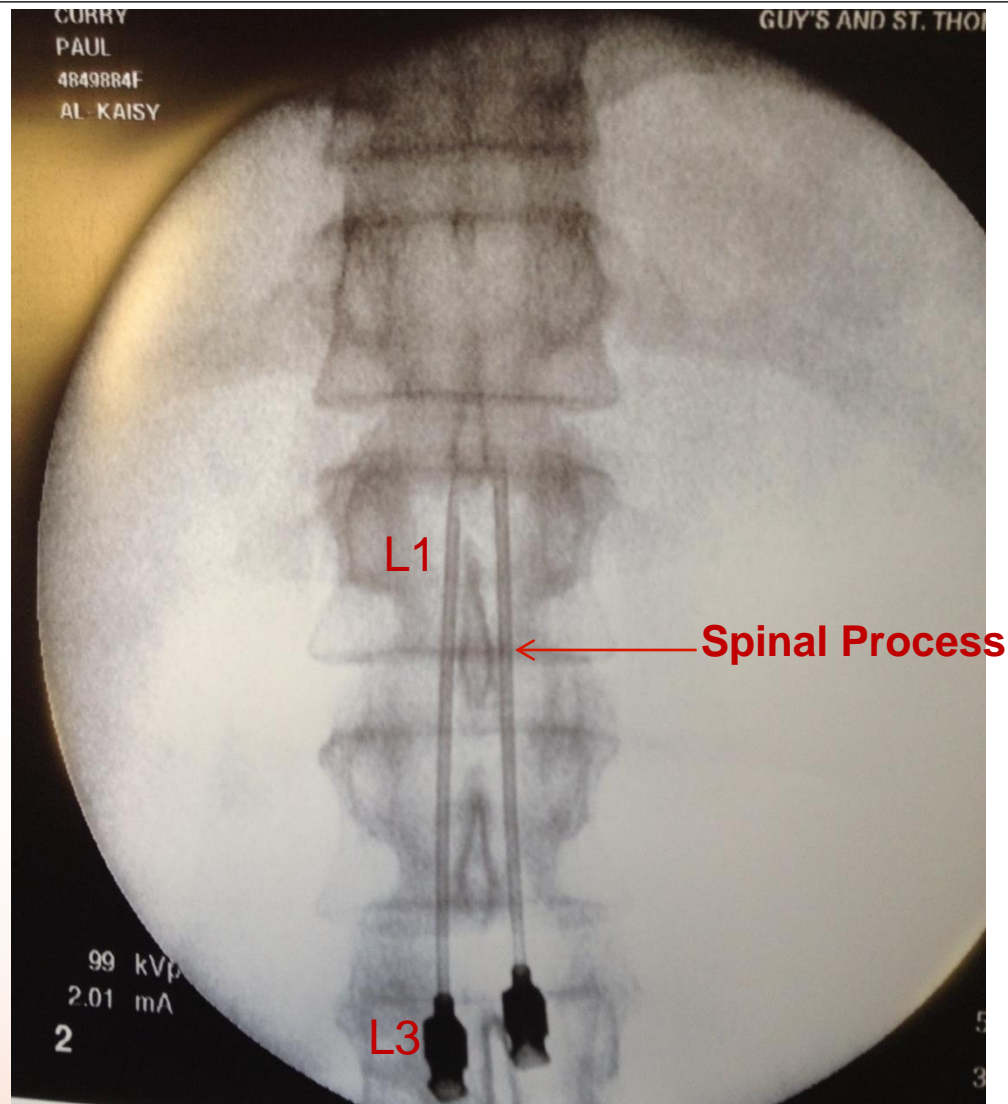
Bowel Disorders

Patient Selection Criteria/Team Approach



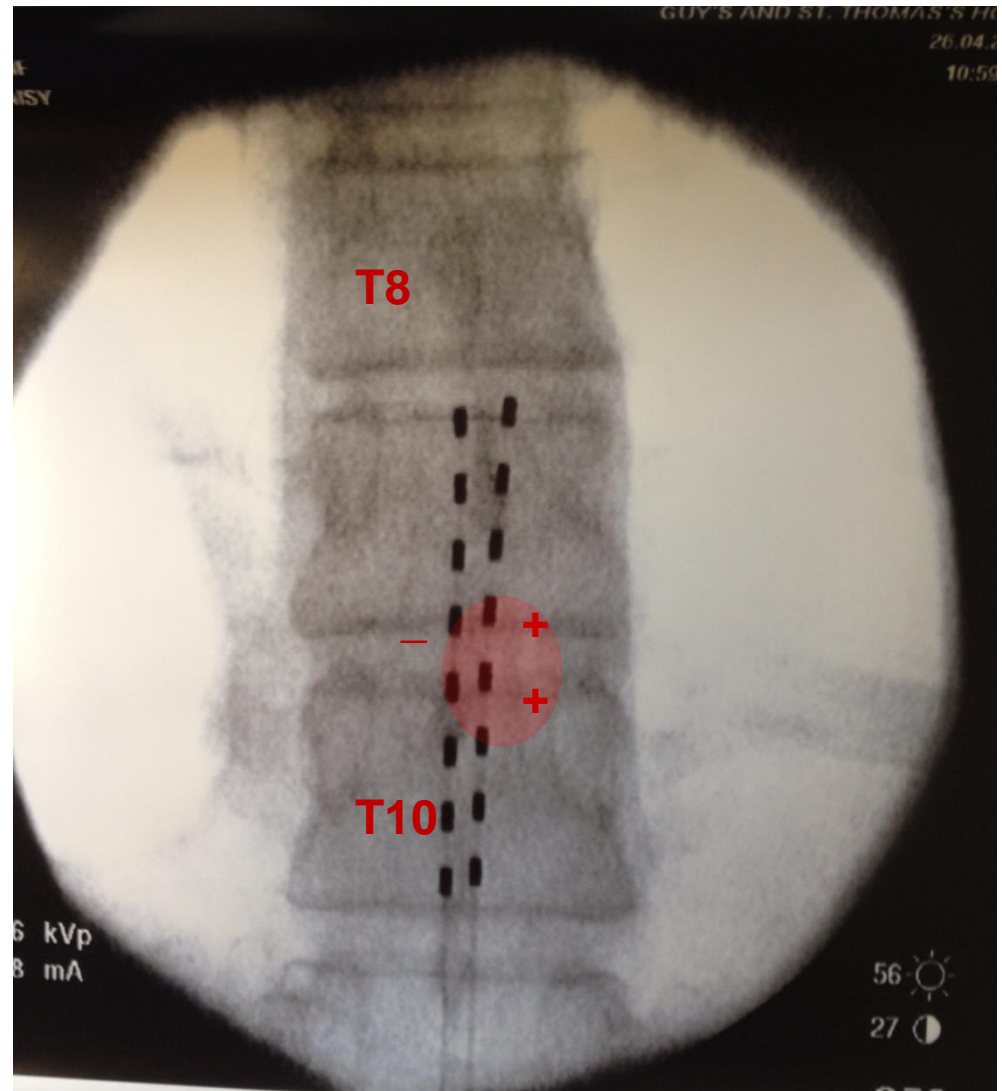
Technique of SCS Implant

Dual Epidural Needles



Dual Octad Leads

Rate: 50-1200 H
Pulse Width :30 -1200 μ s
Amplitude: 15 mA





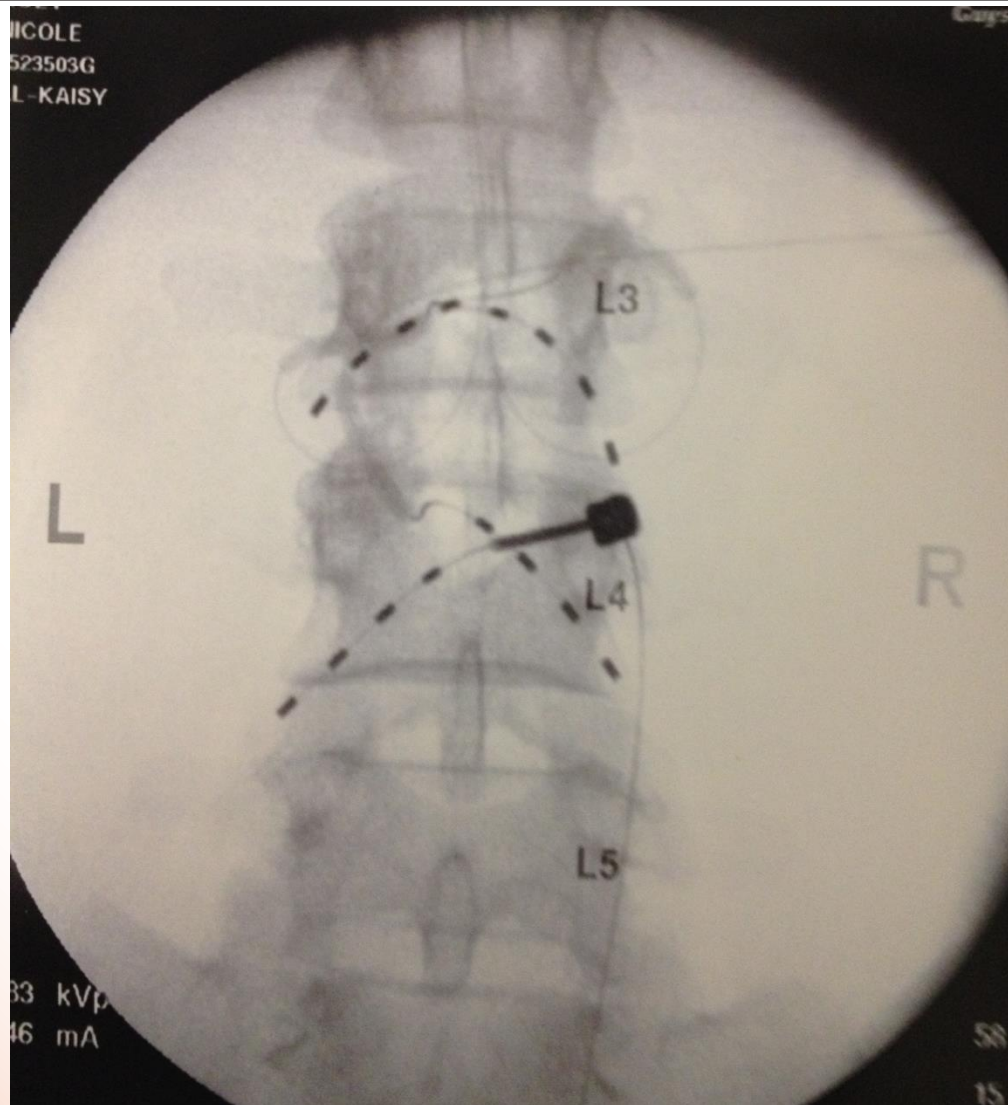
Failed Back Surgery Syndrome with Double Incontinence



Refractory Trigeminal Neuralgia..HF10 SCS



Bilateral Neuropathic pain Knee Joints



Chronic Lower Back Pain

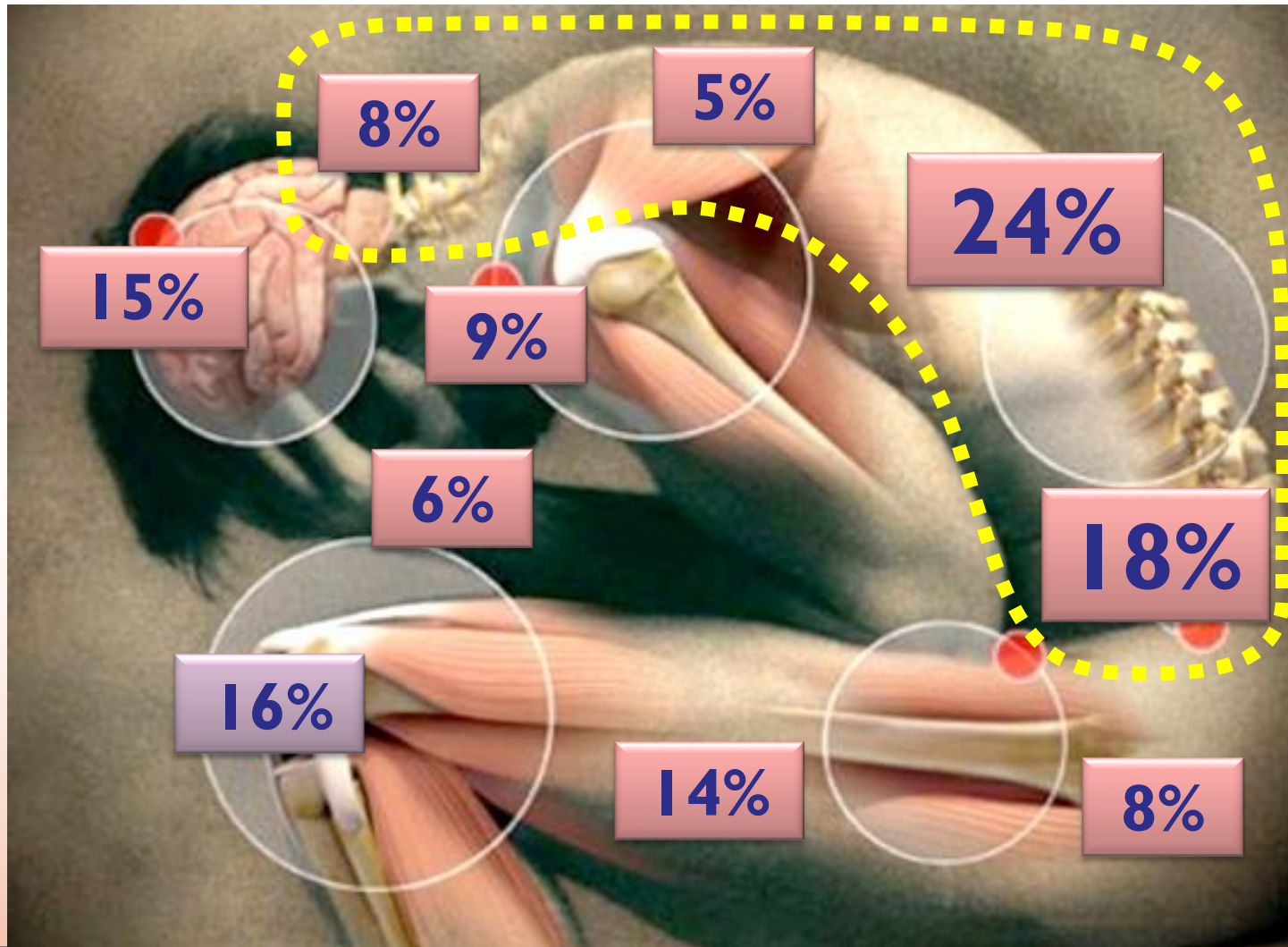
How Big is the Problem?

The Burden of Low Back Pain in the UK

- 2.6 million people in the UK will seek help from their GPs yearly for low back pain
- 10-20% of patients with low back pain will progress to chronic symptoms
- If pain persists for more than a year they are unlikely to return to work
- This will result in direct healthcare costs of £2.8 billion and lost productivity of £3.5 billion

Hong J, Reed C, Novick D, Happich M. Costs associated with treatment of chronic low back pain: an analysis of the UK General Practice Research Database. *Spine (Phila Pa 1976)*. 2013 Jan 1;38(1):75-82

Most Common Locations of Chronic Pain



Dilemma of Axial Back Pain

DOUBLE CHALLENGE:

- **DIAGNOSIS**

The tissue-source of low back pain couldn't be identified most of the time

- **TREATMENT**

There is no logical, and effective, interventions

Advances in SCS

10 kHz High-Frequency SCS (HF10 SCS)

HF10 SCS:

10 kHz High-Frequency SCS Therapy

Device:

Senza® High Frequency SCS system

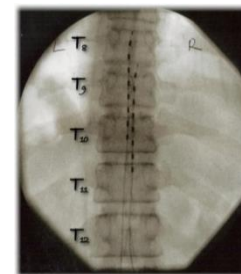
- Frequency: up to 10 kHz
- Pulse width: up to 1000 μ s
- Amplitude: up to 15 mA

Rechargeable IPG

- 10 year battery life labeling

Patient remote control

- Allows patient to increase and decrease amplitude
- Allows patient to change programs



HF10 kHz SCS Vs Current Medical/Surgical Management

	Pain Intensity Reduction	Reduction in ODI	Reduction in RM	Return to Work
Spinal Fusion	22.8/100	13.9		
Disc Replacement	14/100	10		
Multidisciplinary Biopsychosocial Rehabilitation	3.7/100		0.4	0.7%(7/1000)
<i>HF10 kHz SCS</i>	64.7/100	27		75%(6/8)

Kamper SJ Cochrane Database of Systematic Reviews 2014, Issue 9.

Jacobs W Cochrane Database of Systematic Reviews 2012, Issue 9.

Hellum *BMJ* 2011

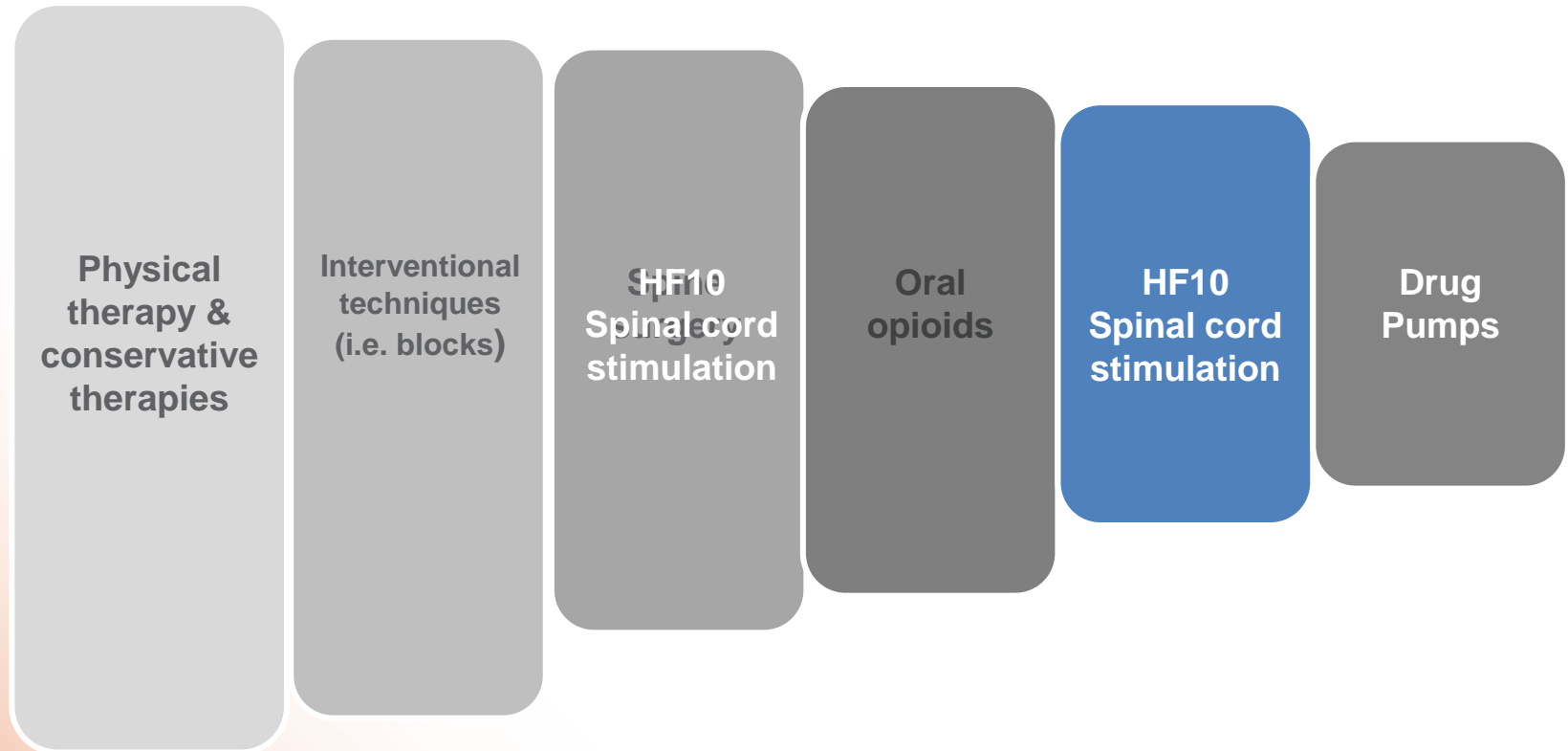
Frank M *Spine* 2013

RM=Roland Morris Disability Questionnaire

Treatment Continuum for Axial Back Pain

If these initial encouraging results are confirmed by additional studies, high-frequency SCS may represent an earlier therapeutic option, ahead of spine surgery, in the treatment algorithm for chronic back pain given it is a less invasive and fully reversible procedure

Treatment Continuum for Axial Back Pain



Neuromodulation Should Be Considered A Primary And Not A Rescue Therapy

Pain Management: New Horizons

A Five Year Vision

- **One Stop Service for Day case procedures**
- **MDT Working (e.g spinal surgery)**
- **Super specialist centre of excellence**
- **Neuromodulation**
- **Academic Agenda**
- **International Leader in Research and Development**
- **Other service developments**

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Thank You