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

INPUT was opened by
HIS ROYAL HIGHNESS
THE PRINCE OF WALES
on
11 MAY 1989

INPUT was established by major grants from
KING EDWARD'S HOSPITAL FUND FOR LONDON
THE SPECIAL TRUSTEES FOR ST. THOMAS' HOSPITAL
Sources of Referral to The Pain Management Centre
Pain & Neuromodulation Academic Research Centre
PANARC
HF10 Live Master Class 2016
Medical Technology Awareness Week: House of Commons 2016
Medical Technology Awareness Week:
House of Commons 2016
Medical Technology Awareness Week: House of Commons 2016
Introduction

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

Science, 150:971.1965
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**

- **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

**OTHER THERAPIES**

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

- Pain Consultant
- Psychologist
- Pain Nurse
- Implant coordinator
- Rehabilitation
- Specialty Consultant

Guy's and St Thomas' NHS Foundation Trust
KING'S HEALTH PARTNERS
Technique of SCS Implant
Dual Epidural Needles

![Image of spinal anatomy with marked L1 and L3 vertebrae and spinal process]
Dual Octad Leads

Rate: 50-1200 H
Pulse Width: 30 - 1200 µs
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

Most Common Locations of Chronic Pain

- 24%
- 18%
- 16%
- 15%
- 14%
- 9%
- 8%
- 6%
- 5%
- 8%
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 µs
- 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
<table>
<thead>
<tr>
<th></th>
<th>Pain Intensity Reduction</th>
<th>Reduction in ODI</th>
<th>Reduction in RM</th>
<th>Return to Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spinal Fusion</td>
<td>22.8/100</td>
<td>13.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disc Replacement</td>
<td>14/100</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multidisciplinary Biopsychosocial Rehabilitation</td>
<td>3.7/100</td>
<td>0.4</td>
<td>0.7%(7/1000)</td>
<td></td>
</tr>
<tr>
<td><strong>HF10 kHz SCS</strong></td>
<td><strong>64.7/100</strong></td>
<td><strong>27</strong></td>
<td></td>
<td><strong>75%(6/8)</strong></td>
</tr>
</tbody>
</table>

Hellum *BMJ* 2011
Frank M *Spine* 2013

RM = Roland Morris Disability Questionnaire
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

- Physical therapy & conservative therapies
- Interventional techniques (i.e. blocks)
- S1F10 Spinal cord stimulation
- Oral opioids
- HF10 Spinal cord stimulation
- Drug Pumps

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
Thank You

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