

Treatment of Neuropathic Pain by Intra - Muscular Stimulation

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Summary

Objective : To assess the effectiveness of Intra - Muscular Stimulation (IMS) in the treatment of Neuropathic Pain (NP)

Method : 200 Patients with NP at different regions were examined and treated by Gunn's IMS Technique.

Results : 64% of patients observed achieved moderate to excellent pain reduction as measured by the visual analogue score; 60.5% of the patients regained moderate to excellent functional improvement at the end of the study

Conclusion : IMS is an effective method in the treatment of NP.

Key words : Neuropathic Pain, Intra-Muscular Stimulation, Law of Nerve Denervation.

Introduction

Neural injury or malformation causes NP. The population prevalence in the US is approximately 2.4%, increasing with age to 8%. NP responds poorly to opioids and non-steroidal anti-inflammatory drugs. Drugs such as amitriptyline, carbamazepine and gabapentin have been used with some success but the outcome of treatment is unpredictable while relapses are frequent and side effects are common.

Professor C. Chan Gunn of Vancouver developed the IMS technique for the treatment of NP. This method has been successfully practiced in many pain centres worldwide, eg Institute for the Study and Treatment of Pain, Vancouver and the Multidisciplinary Pain Centre, Washington University, Seattle.

200 chronic pain patients of neuropathic origin who had failed to respond to various forms of medical and/or surgical therapy were treated using the IMS technique. The duration of treatment was 6 months from the 5th of October 2002 to the 4th of April 2003.

The outcomes of the response to the IMS technique were analysed and discussed.

Subjects and Methods

Number of Subjects : 200 patients

Sex : Female : 127 patients
Male : 73 patients

Age Group : From 28 years to 85 years
Mean age : 54.2 years

Age in years	21 to 30	31 to 40	41 to 50	51 to 60	61 to 70	71 to 80	>80
Number of patients	2	36	48	49	40	17	8

**Presenting Symptoms
(Regional pain)**

Number of Patients

Neck Pain (N)	22
Neck Pain & Upper limb pain (N + UL)	55
Backache (B)	40
Backache & Lower limb pain (B + LL)	56
Neck & Upper limb pain (N + UP) Backache & Lower limb pain (B + LL)	7
Upper limb pain & Lower limb pain (UL + LL)	16
Chest pain (C)	1
Heart pain (H)	1
Gastro-intestinal tract pain (GIT)	2

Duration of Pain

Duration of pain in years	<1	1 - 3	4 - 6	7 - 9	10-12	13-15	16-18	19-21	>22
Number of patients	55	55	33	11	31	2	2	6	5

Number of IMS Treatments

Number of IMS Treatments	1	2	3	4	5	6	7	8	9	10	11
Number of Patients	92	37	29	25	6	4	2	2	0	1	2

Manifestations of Neuropathy were identified and elicited

Sensory System : Hyperpathia , Allodynia , Hyperalgesia , Dysesthesia

Autonomic Signs : Vasomotor : Vasoconstriction , Coldness
Sudomotor : excessive sweating
Pilomotor : Cutis anserinus (goose - bumps)
Trophedema : local subcutaneous tissue oedema.
Match - stick test positive.
Trophic changes in skin or nail , eg. Hair loss.

Motor System : Muscle shortening : Ropey band
Limitation of Joint Range
Enthesopathy : thicken tendinous attachment to bone.

NP was diagnosed when the above symptoms and signs were present. The involved segments were identified both in the territories supplied by the anterior and posterior rami of the peripheral nerves.

Methods : The areas to be needled are cleaned with surgical spirit. The points of needle insertion were located at the muscle motor points or musculo – tendinous junction.

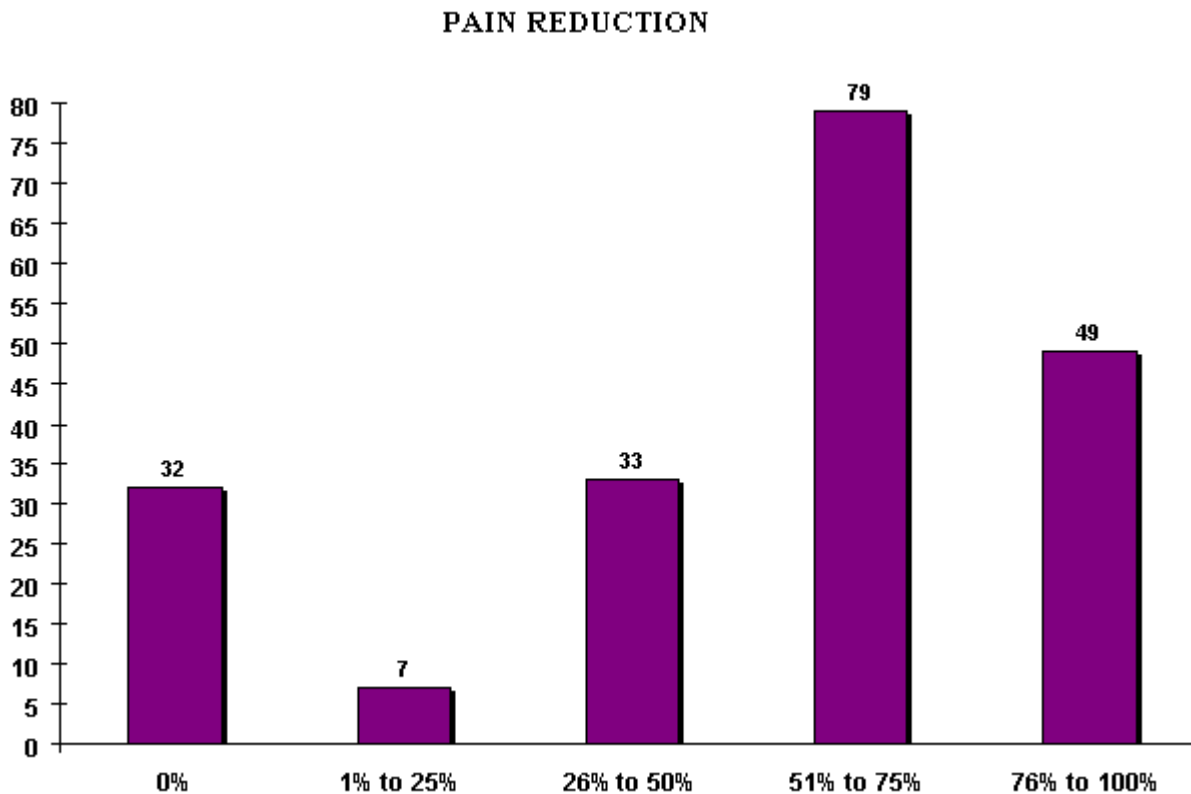
The IMS needle is fixed to the plunger and inserted perpendicular to the skin. A grasp was felt when the muscle contracts. Manual manipulation of the needle intensifies the contraction of muscle but subsequently

relaxes the muscle more quickly. A neurometer is sometimes used to help relax the muscle. The needle is removed when the muscle is completely relaxed.

Analysis : Visual analogue score was used for pain measurement.

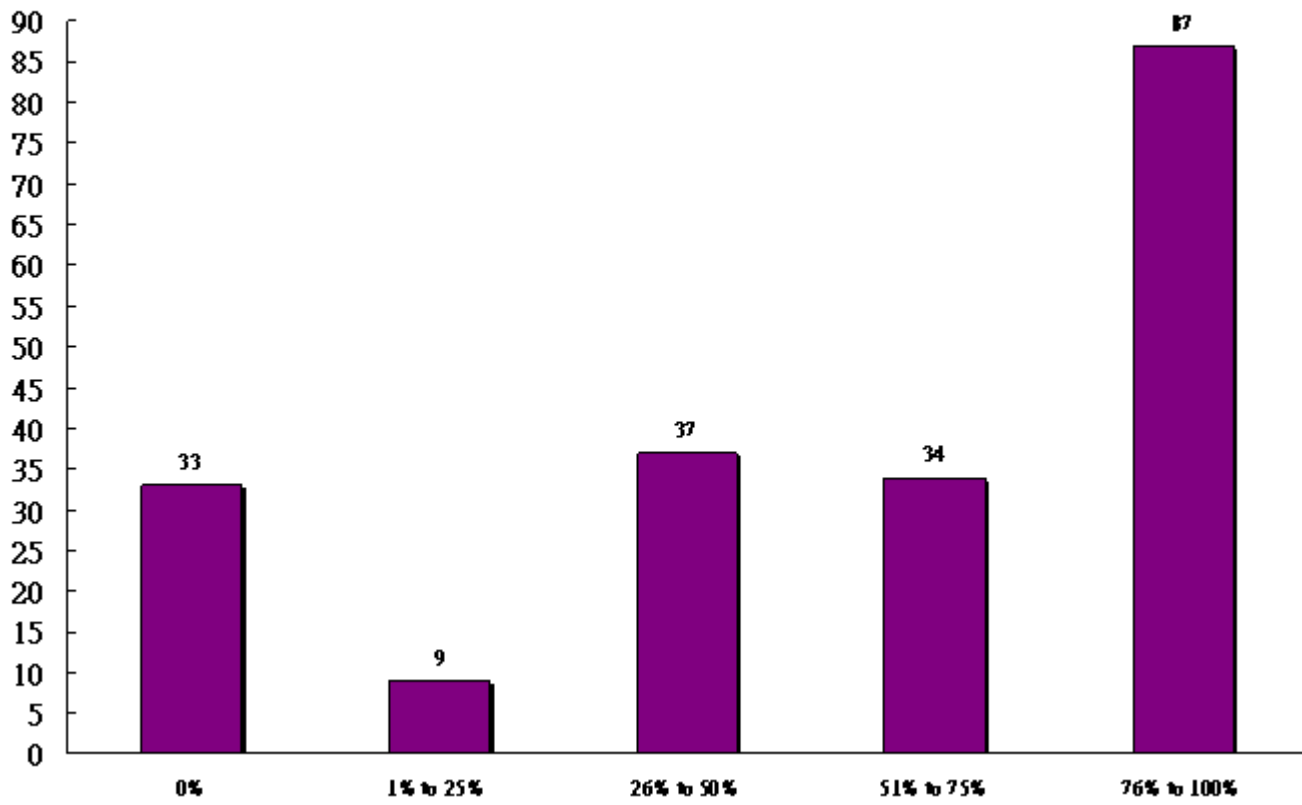
Results

Pain Reduction



0 % : No Reduction
1 % - 25 % : No Significant Reduction
26% - 50 % : Mild Reduction
51% - 75 % : Moderate Reduction
76% - 100% : Good to excellent Reduction
79 patients (39.5%) had moderate (51% - 75%) pain reduction
49 patients (24.5%) had good to excellent (76% - 100%) pain reduction

FUNCTIONAL IMPROVEMENT



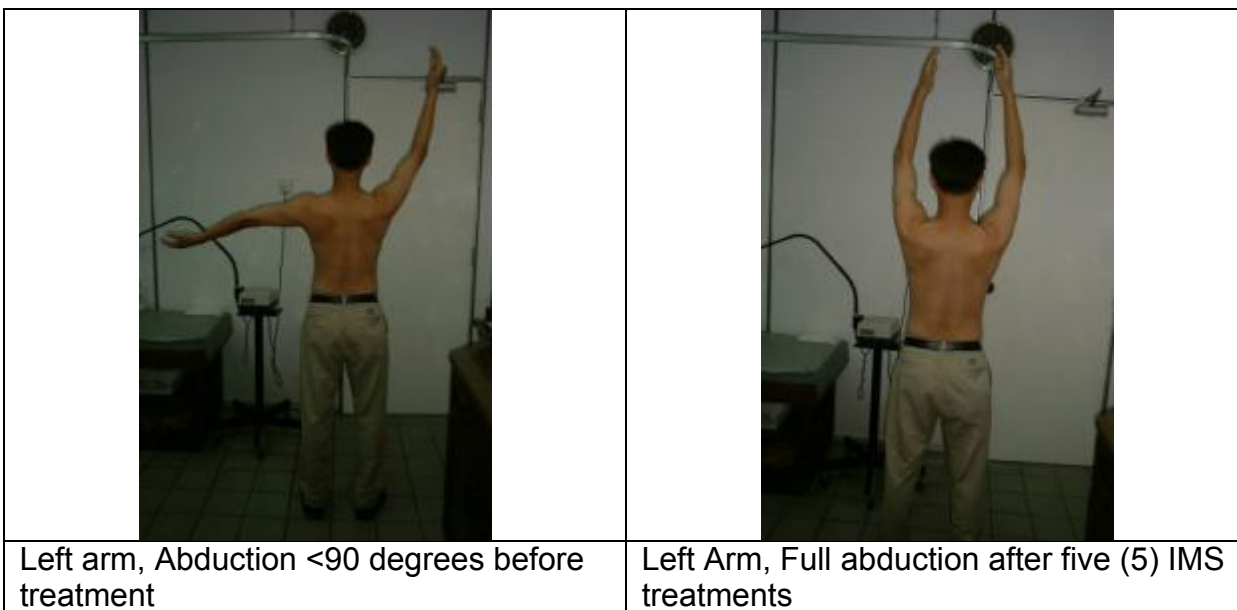
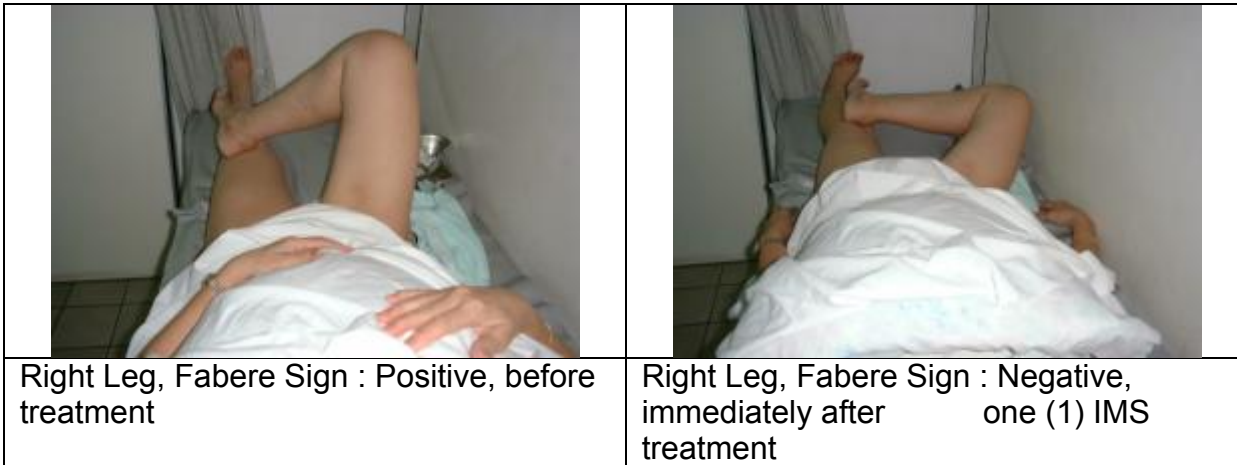
0 % : No improvement

- 1 % - 25 % : No significant improvement
- 26% - 50 % : Mild improvement
- 51% - 75 % : Moderate improvement
- 76% - 100% : Good to excellent improvement

34 patients (17%) achieved moderate (51% to 75%) functional improvement

87 patients (43.5%) achieved good to excellent (76% to 100%) functional improvement

Patient Response to IMS



Discussion

Pain is defined by the International Association for the Study of Pain (IASP) as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described by the patient in terms of such damage.”

About 10% of all pain patients continue to have pain lasting for more than 3 months, i.e. chronic pain. The majority of chronic pain patients are in fact suffering from neuropathic pain.

Cannon and Rosenblueth’s “ Law of Denervation Supersensitivity ”, Described in the 1940s explains the mechanism of NP. It states that “ when a Unit is destroyed in a series of efferent neurons , an increased irritability to chemical agents develops in the isolated structure or structures , the effect being maximal on the part directly denervated .” All denervated structures develop supersensitivity including skeletal muscles , smooth muscles , spinal neurons , sympathetic ganglia , adrenal glands & brain cells. Cannon and Rosenblueth’s law was based on work showing that total denervation and decentralization is required for the development of supersensitivity. But we now know that any disturbance to the flow of impulses over a period of time is sufficient to cause disuse supersensitivity.

The most common cause of NP is due to degeneration of spine, ie . .Spondylosis. This process irritates the nerve roots and cause “shortening Muscle Syndrome” or visceral complains. Muscle shortening strains its attachments resulting in tendonitis or epicondylitis. This upsets the alignment of the joint, causes arthralgia and bony spur formation. In addition it increases the tension between spinal joints giving rise to “ Facet Joint Syndrome ”.

Neuropathy also degrades the quality of collagen tissue which weakens the joint.

In IMS, when a needle is inserted into the muscle , it gives rise to an outburst of injury potential which relaxes the shortened muscle. This intrinsic source of energy known as the ‘ Current of Injury ‘ also heals the damaged nerve. Needling cause minute injury and bleeding in the tissue which promotes healing by releasing platelet derived growth factor (PDGF) from the blood.

My first 200 patients with NP were treated with the IMS technique , 64% of them experienced moderate to excellent pain reduction and 60.5% of them achieved moderate to excellent functional improvement. 2 patients with Irritable Bowel Syndrome were cured with IMS suggesting that IBS may be caused by neuropathy. Till today , treatment of NP with drugs and / or surgery has been disappointing. From my study , I conclude that IMS is an effective and safe mode of therapy for neuropathic pain.

Key Learning Points

- 1) Neuropathy causes denervation supersensitivity which results in muscle shortening.
- 2) Neuropathy can be easily diagnosed with clinical manifestations
- 3) Nerve segmental involvement must be correctly identified
- 4) IMS is an effective treatment of neuropathic pain

Acknowledgement

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