



Clinical Case Report Competition

West Coast College of Massage Therapy

Winter 2008

First Place Winner

Voula Soursos

Treatments for chronic pain in persons with
spinal cord injuries (SCI)

Study design: Case Report (Following Scientific Protocol)

Objectives: To test the efficacy of inhibitory Roods techniques in the treatment of neuropathic pain experienced by persons with Spinal Cord Injury.

Methods: The patient recorded his level of pain (three times daily) one week before and one week after massage therapy treatments, using a six-point Vertebral Rating Scale (VRS). The patient underwent an initial pain interview to confirm the classification of his neuropathic pain and also filled out a pain drawing for assessment purposes. The patient received six massage treatments in total using inhibitory Roods techniques.

Results: The patient was responsive to massage therapy treatments using inhibitory Rood's techniques. The pre-massage VRS average was reported as 2.90 and the post-massage VRS average was recorded as 2.52 indicating relief from neuropathic pain.

Conclusion: This case study suggests that using inhibitory Rood's techniques may offer an effective therapeutic alternative for the alleviation of neuropathic pain following spinal cord injury. This study was conducted on one patient providing the basis for more scientific research to be conducted.

I. Introduction, research questions, and aims.

Neuropathic pain after spinal cord injury (SCI) is not well understood and is very difficult to alleviate. The term “*neuropathic pain*” is used to describe different syndromes of neurological pain and includes spinal cord trauma, nerve root compression and phantom limb pain.¹ The pain can be above, at, or below the level of the lesion. The most typical terms used to describe neuropathic pain include: burning, stabbing, shooting or electric pain. Most often neuropathic pain experienced by people with SCI, is largely managed through pharmacological means.

Recent studies, however, have indicated the use of alternative treatments to combat neuropathic pain. One such study,² conducted at the University of Washington, sought to determine the degree and duration of pain relief provided by specific pain treatments used by individuals with SCI.

The results of this study concluded that “many patients are not finding adequate pain relief from commonly prescribed medications and alternative therapies should be considered”.³ The results also concluded that Massage Therapy was the most used alternative therapy with 55% of the participants receiving treatment.⁴ Of the 55% of the participants that received massage therapy treatment for chronic pain post SCI, 25% of those patients reported pain relief lasting for several days. No specific details regarding the massage therapy treatment protocols were discussed in the University of Washington’s study.

In the late 1950s Margaret Rood developed what is called “The Rood Approach”⁵ for treatment of central nervous system disorders. The Rood Approach is a modality of treatment for neurological disorders used by massage therapists. Rood’s techniques can be categorized as one of facilitation and/or inhibition of movement”. The approach uses cutaneous sensory stimulation to achieve stimulatory or inhibitory effects.

Having considered the results of the research conducted by the University of Washington, and the treatment of central nervous system disorders using the Rood Approach, this case study will further explore the effectiveness of massage therapy in treating chronic pain experienced by people with SCI. More specifically, this case study will focus on neuropathic pain experienced by people with SCI, and will determine the efficacy of inhibitory Roods techniques in treating a patient with neuropathic pain after spinal cord injury.

This study begins with an introduction to the patient’s profile, followed by an explanation of the method and treatment protocol used in the study. The results of the study will also be discussed followed by a conclusion.

¹ Galluzzi, Katherine E. 2005 “Management of Neuropathic Pain.” *Journal of the American Osteopathic Association (JOAO)* 105:4. 2005. 12-19. http://www.jaoa.org/cgi/content/full/105/suppl_4/S12

² Galluzzi 2005

³ Galluzzi 2005

⁴ Galluzzi 2005

⁵ Galluzzi 2005

II Patient Profile.

III. Recruitment Criteria.

The subject of this case study is a twenty-nine year old male, who experienced a SCI five years ago. He volunteered to participate and related personal experiences for the purposes of this research paper. Previous to his injury, he was the former Head of Security for an online gaming and media company. Currently, he is on disability.

II.ii. Mechanism of injury.

The patient was injured in a motor vehicle accident. A vehicle fell off a hoist in a shear force trauma striking the patient's back. The patient was in a position of flexion when the vehicle struck his back resulting in a spinal cord injury.

II.iii. Diagnosis.⁶

The patient provided medical records from his Doctor that confirmed his medical diagnosis as a complete ASIA A paraplegic. The records confirmed the injury site at the level of T12 and indicated that the patient did not have sensory or motor function in sacral segments S4-S5.

II.iv. Resulting vertebral injury.⁷

The patient also provided X-ray report that confirmed at the level of T12 there is an intramedullary lesion, approximately 1.5cm in size. The X-ray reports also indicated approximately 40% loss of T12- L1 vertebral body height anteriorly and a mild anterior wedge fracture extending through the mid body of L1 vertebrae. The X-rays revealed surgical fusion (rods & screws) extending from T11 to L2 vertebral levels. It is important to note that an exiting nerve root assessment (through X-ray) was limited due to the metallic artifacts (rods & screws).

II v. Prior Treatments for Neuropathic Pain (right leg).

Immediately the accident that resulted in SCI, the patient spent two months in a rehabilitation centre, where he attended daily physiotherapy sessions. During rehabilitation, the patient also received several acupuncture treatments, specifically for treatment of neuropathic pain in his right leg.

Post rehabilitation, the patient received chiropractic and massage therapy treatments twice a month for one year. It is important to note that previous chiropractic and massage therapy treatments focused only on the back, neck and shoulders. The patient did not address his neuropathic leg pain concerns with his previous massage therapist and therefore Roods techniques were not conducted on this patient until the commencement of this case study.

The patient was initially prescribed the prescription drugs to alleviate neuropathic pain. These prescription pain medications include Gabapentin, Celebrex, Oxycontin, Percocet, Methodone, Tylenol 3 and medical marijuana. To date, the patient reports little to no relief of neuropathic pain in his right leg despite various modalities of treatments and prescription

⁶ Revitt, Dr., MD. Physician/Surgeon. 2002. 203-8035 120th St., Delta, BC. 604-594-8451

⁷ Mt. Saint Joseph Hospital. X-ray reports. 2002. 3080 Prince Edward St., Vancouver, BC. 604-874-1141

medication. For the duration and purposes of this case study, the patient did not take any prescription medication and did not receive treatment of any kind from other health practitioners.

III Methods.

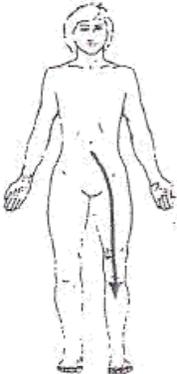
III.i. Pain intensity.

The patient's pain intensity was measured for one week prior to massage therapy treatments and for one week post massage therapy treatments in a personal pain journal. Pain intensity was rated three times daily using a six-point Verbal Rating Scale (VRS),⁸ with one being 'no pain', six being 'unbearable pain', and 'slight', 'moderate', 'severe', and 'very severe', from two to five, respectively. The strengths of using this scale include: "easy to administer, easy to score, good evidence for construct validity, [and] high compliance with measurement."⁹

III.ii. Pain classification.

The patient also underwent a pain interview to determine neuropathic pain classification and a pain assessment drawing. The patient was asked to classify the type of neuropathic pain using a description of different types of pain in spinal cord injured patients.¹⁰

The original pain classifications include:¹¹

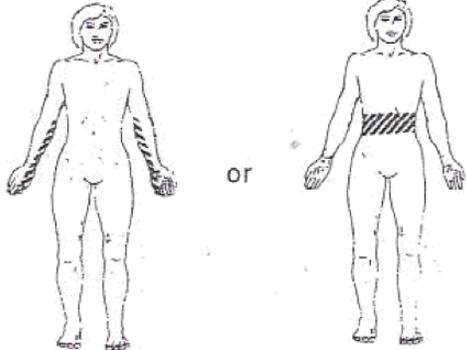
	
<p><u>Root pain</u> – Asymmetrical, segmental localized pain, sharp, with paroxysmal occurrence</p>	<p><u>Diffuse pain or "phantom body pain"</u> – multifarious characterized by constant, diffuse, generalized, burning, prickling, tingling pain in paralytic and anesthetic areas</p>

⁸ Somers, Martha Spinal Cord Injury Functional Rehabilitation

⁹ Melzack, Ronald and Dennis C. Turk.

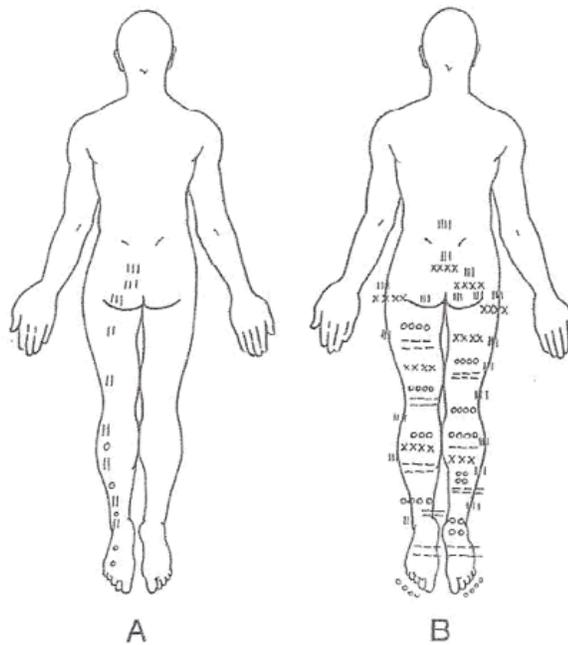
¹⁰ Christnesen F.L. & T.S. Jensen. "Disturbances of sensation and pain in patients with spinal cord lesions." *Ugeskr Loejer*: 153. 1991.

¹¹ Pain classification originally published by Christenson and Jensen, but taken from: Wagner Anke, A.G. & A.E. Stenehjem & J. Kvalvik Stanghelle.

	
<p><u>Visceral pain</u> – deep, diffuse, spastic pain in central abdomen. The attacks can be provoked by bladder or bowel distension</p>	<p><u>Segmental pain</u> – Often bilateral symmetric occurrence within two or three spinal segments of the zone of injury, spontaneous, burning character, hyperalgesic reaction (dysaesthesia)</p>

Pain descriptions, as described by patient, were recorded on a pain description form determining the classification of neuropathic pain in patients with spinal cord injury¹²

In addition, the pain drawing was used as a simple way for clinical observation of illness behaviour. With this technique, patients willingly record their pain on an outline of the body, but the way they draw the pain is strongly influenced by emotional distress.¹³ A patient's description of pain communicates both physical information about the pain and psychological information about his or her response to pain. In this case study, the patient described physical pain using the pain drawing.

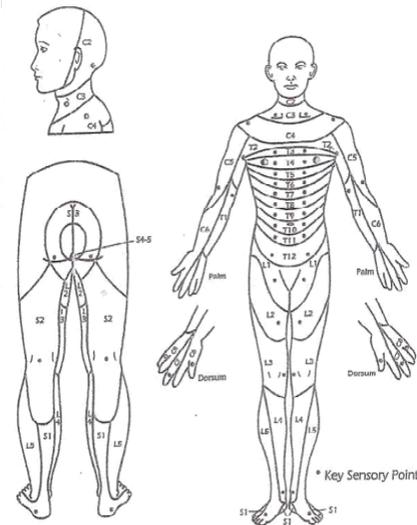


¹² Turk, Dennis C. & Thomas E. Rudy. "Classification Logic and Strategies in Chronic Pain." Turk, Dennis C. and Ronald Melzack, eds. Handbook of Pain Assessment. Guildford Press, New York: 1992.

¹³ . (Ransford, Cairns & maoney, 1976).

III.iii. Dermatome & Myotome Assessment

Dermatome and myotome testing were performed for the purposes of this case study. Two-point discrimination was used when assessing dermatomal levels. Dermatome levels were tested from T10-S2 bilaterally. Myotome testing was performed at the same level (T10-S2 bilaterally). Muscle strength was rated on a scale of 0/5 to 5/5 as follows:



- 0/5: no contraction
- 1/5: muscle flicker, but no movement
- 2/5: movement possible, but not against gravity
- 3/5: movement possible against gravity, but not against resistance by the examiner
- 4/5: movement possible against some resistance by the examiner
- 5/5: normal strength

Myotomes:

Key Muscles for Identification of Neurological Level of Injury.

Motor Level	Key Muscles
C1-C4	Same as Sensory Level
C5	Biceps, brachialis
C6	Extensor Carpi Radialis Longus & Brevis
C7	Triceps
C8	Flexor digitorum profundus, middle finger
T1	Abductor Digiti Minimi
T2-L1	Same as Sensory Level
L2	Iliopsoas
L3	Quadriceps
L4	Tibialis Anterior
L5	Extensor Hallicis Longus
S1	Gastrocnemius, Soleus
S2	Hamstrings
S3-S5	Same as Sensory Level

iii.iv. Massage Therapy Treatment.

For the purposes of this case study, the Rood's techniques chosen for their inhibitory affects were manual brushing, neutral warmth and slow neural stroking. In order for manual brushing to have an inhibitory affect, the therapist must apply the brush smoothly and distally over the muscle belly or brush over the point where dermatomes and myotomes meet. The duration of manual brushing must be at least twenty minutes to have an inhibitory effect on afferent A fibres. According to Rood, neural stroking must be slow, even rhythmic strokes in the proximal to distal direction with light pressure. Neural stroking affects the sympathetic ganglion chain resulting in inhibitory affects. Applying a constant source of general heat (neutral warmth) increases sympathetic outflow and therefore is considered by Rood to be inhibitory in its effect. A Thermafore¹⁴ heating pad was used in this case study as the constant source of heat. This type of heating pad eases stiffness, relaxes muscles, improves circulation, dilates blood vessels and increases blood flow. The Thermafore also helps to remove wastes and toxins that may have settled in the affected area and brings new healing blood cells to tissues

Through the duration of this study, the patient received six massage therapy treatments in total. Treatments occurred three times per week over a two week period and were one hour long in duration. Treatments were conducted in the patient's home due to mobility and accessibility issues. All treatments were supervised by a Registered Massage Therapist with more than three years of experience in the field of massage therapy. Six one-hour sessions were conducted in total. Prior to the first session commencing a half hour interview and assessment was conducted.

The treatment protocol performed during each of the six massage therapy treatments is laid out in section IV.v., below.

IV.iv. Precautions/Contraindications to Massage Therapy Treatment

Specific contraindications and precautions regarding massage therapy and SCI were considered prior to the commencement of treatment. These precautions or contraindications include the following: tissue fragility, patient position, metallic artifacts, sensory loss, motor loss, length of treatment, wheelchair accessibility, and patient level of ambulation.

IV.v. Treatment Protocol.

Patient Position – Supine

- *Lower body brushing* - circular motion (soft manual brush)
 - Starting proximally at left anterior superior iliac spine and brush distally (all the way down) to the dorsum of the foot (1 min. on thigh, 1 min. on leg)
 - Repeat on the right side – start proximally at right anterior superior iliac spine and brush distally (all the way down) to the dorsum of the foot (1 min. on thigh, 1 min. on leg)

Patient Position – Prone¹⁵

- *Upper Body Brushing* - circular motion (soft manual brush)

¹⁴ The Thermafore heating pad is a popular source of therapeutic heat used especially for relieving the symptoms associated with sciatic nerve pain. The Thermafore is safe, easy to use, inexpensive, and offers the unique benefit of moist heat. 2006-2007. <http://www.thermophore.com/ipp/thermafore.shtml>

¹⁵ Assisted patient in turning from supine position to prone position.

- Start proximal at the external occipital protuberance and brush distally to the base of the sacrum along spine (2 mins.)
- Move to left superior border of upper trapezius and brush distally to the iliac crest (2 mins.)
- Repeat on the right side, starting at right superior border of upper trapezius and brush distally to the iliac crest (2 mins.)

Patient Position – Prone

- *Lower body brushing* - circular motion (soft manual brush)
 - Starting at right Iliac crest, brush over right gluteals to the gluteal fold (1 min.)
 - Repeat for the left side, starting at the left Iliac crest and brush over the left gluteal to the gluteal fold (1 min.)
 - Move to the right ischial tuberosity and brush distally all the way down to the right calcaneus (2 min. on posterior thigh, 2 min. on posterior leg)
 - Repeat on the left side, starting at left ischial tuberosity and brush distally (all the way down) to the left calcaneus (2 min. on posterior thigh, 2 min. on posterior leg)

Patient Position – Prone

- *Upper body neural stroke* – slow, rhythmic finger stroke proximal to distal
 - Start proximal at the External occipital protuberance and stroke distally to the base of the sacrum along spine (2 min.)
 - Move to left superior border of upper trapezius and stroke distally to the iliac crest (2 min.)
 - Repeat on the right side, starting at right superior border of upper trapezius and stroke distally to the iliac crest (2 min.)

Patient Position – Prone

- *Lower body neural stroke* – slow, rhythmic finger stroke proximal to distal
 - Starting at right Iliac crest, stroke over right gluteals to the gluteal fold (1 min.)
 - Repeat on the left side, starting at the left iliac crest and stroke over the left gluteal to the gluteal fold (1 min.)
 - Move to the right ischial tuberosity and stroke distally all the way down to the right calcaneus (2 min. on posterior thigh, 2 min. on posterior leg)
 - Repeat on the left side, starting at left ischial tuberosity and stroke distally (all the way down) to the left calcaneus (2 min. on posterior thigh, 2 min. on posterior leg)

Patient Position – Supine¹⁶

- *Lower body neural stroke* – slow, rhythmic finger stroke proximal to distal
 - Starting proximally at the right anterior superior Iliac spine stroke distally to dorsum of right foot (2 min. on anterior thigh, 2 min. on anterior leg)
 - Repeat on the left side, starting proximally at the Left Anterior Superior Iliac Spine and stroke distally to Left dorsum of foot (2 min. on anterior thigh, 2 min. on anterior leg)

¹⁶ Assisted patient in turning from prone position to supine position.

Patient Position – Supine

- Neutral warmth – Thermafore heating pad
 - Assist Patient to Sit up and align Thermafore at level of C7 to base of sacrum
- Assist patient to lie back down on table with Thermafore underneath back (ensuring heating pad still remains at C7 level to base of sacrum)
- Turn on Thermafore heating pad and apply heat (5 mins.)
- Remove heat and allow patient to rest without heat (2 mins.)
- Assist patient off table

End of treatment

Results.

In order to determine the effectiveness of treatment, a pain interview was conducted to determine the neuropathic pain classification and the patient filled out a pain drawing assessment form. The patient classified his neuropathic pain as being root pain and drew the pain pattern in a distinct manner on the pain drawing assessment form. The patient also described his pain as brief waves of stabbing or sharp pain that originates in his genitals and extends down to the medial aspect of the thigh ending at the medial aspect of the knee. The pain began immediately after his injury and has continued up to and including the present time. Dermatome testing concluded the last normal sensory level as T12 bilaterally and partial sensory preservation at L1-L3 dermatomes. Myotome testing was conducted from the level of T10 – S2 bilaterally. Myotome testing concluded a partial flicker in the Hamstrings muscles (1/5) and Iliopsoas muscles (1/5). All abdominal muscles remained healthy and normal (5/5). At the L3-S1 levels there was no muscle contraction at all (0/5). The patient's dermatomes and myotomes were re-tested post massage therapy resulting in absolutely no changes. The patient also kept a pain journal tracking his level of pain one week before and one week after massage therapy sessions. He used the six point VRS scale to record his level of pain and entered his score three times daily into the journal. It is important to note that the patient was not able to see his previous VRS scoring to prevent being influenced by previous entries. Prior to massage treatment the mean VRS score was 2.90 (*Table 1*). Post-massage therapy treatments the mean VRS score was 2.52 (*Table 2*) resulting in a 0.38 decrease in VRS scoring. The mode for VRS scoring pre-massage and post-massage treatments was 3.00. There was no difference in the mode before or after massage therapy treatments. It is important to note that the patient recorded his highest level of pain in the evening. This information is helpful when determining the most appropriate time for massage therapy treatment.

Directly prior to massage therapy treatments				
Day		<i>Morning (08h00)</i>	<i>Afternoon (14h00)</i>	<i>Evening (20h00)</i>
1	<i>VRS scale rating</i>	2	3	3
	<i>Pain type</i>	Root	Root	Root
2	<i>VRS scale rating</i>	2	3	3
	<i>Pain type</i>	Root	Root	Root
3	<i>VRS scale rating</i>	3	3	4
	<i>Pain type</i>	Root	Root	Root
4	<i>VRS scale rating</i>	2	3	3
	<i>Pain type</i>	Root	Root	Root
5	<i>VRS scale rating</i>	2	3	4
	<i>Pain type</i>	Root	Root	Root
6	<i>VRS scale rating</i>	2	3	4
	<i>Pain type</i>	Root	Root	Root
7	<i>VRS scale rating</i>	2	3	4
	<i>Pain type</i>	Root	Root	Root
Average		2.14	3.00	3.57
7-day average			2.90	

Table 1 VRS score pre-massage treatment.

Directly after massage therapy treatments

Day		<i>Morning (08h00)</i>	<i>Afternoon (14h00)</i>	<i>Evening (20h00)</i>
1	<i>VRS scale rating</i>	2	2	3
	<i>Pain type</i>	Root	Root	Root
2	<i>VRS scale rating</i>	2	2	3
	<i>Pain type</i>	Root	Root	Root
3	<i>VRS scale rating</i>	2	3	3
	<i>Pain type</i>	Root	Root	Root
4	<i>VRS scale rating</i>	2	3	3
	<i>Pain type</i>	Root	Root	Root
5	<i>VRS scale rating</i>	2	2	3
	<i>Pain type</i>	Root	Root	Root
6	<i>VRS scale rating</i>	2	3	3
	<i>Pain type</i>	Root	Root	Root
7	<i>VRS scale rating</i>	2	3	3
	<i>Pain type</i>	Root	Root	Root
	Average	2.00	2.57	3.00
	7-day average		2.52	

Table 2. VRS rating post-massage treatment.

IV. Conclusions.

This case study suggests that using inhibitory Rood's techniques may offer an effective therapeutic alternative for the alleviation of neuropathic pain following spinal cord injury. With so little understanding of Neuropathic pain, patients and those that care about them are often left feeling hopeless and suffer in silence. The results of this study appear promising and may offer hope to both patients and their loved ones.

The inhibitory Rood's techniques demonstrated in this case study are simple and effective enough to be implemented by caregivers or spouses. This case study could be used as the foundation for creating treatment plans for patients that their spouses or caregivers could use at home to improve quality of life. More research involving Rood's techniques along with other Massage Modalities are required. To date the field of neuropathic pain research and treatment is still ongoing, with many unmet goals. In the coming years, several advances are expected in the basic and clinical sciences of neuropathic pain, which will provide new and improved therapies for patients who continue to experience this disabling condition.

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