The Quarterly Report
a publication of the Home Health Section - APTA
Winter 2011, Vol 46, No 2

Table of Contents
Special Focus: Diabetes

1 Treatment of Distal Diabetic Symmetric Polyneuropathy Utilizing Microcurrent Point Stimulation

9 The Impact of Diabetic Footh Ulcers on the Home Care Environment and the Role of Physical Therapy

13 The Influence of Medications in Treating Patients with Diabetes

16 Practice Ethics in the Home Health Setting

19 Delta Therapy Project Update

22 Editor's Note

26 Diabetes-Related Balance Impairment

30 CSM 2011 Home Health Highlights

34 President's Message

Case Report

Treatment of Distal Diabetic Symmetric Polyneuropathy Utilizing Microcurrent Point Stimulation

By Ann Pospisil, PT, DPT, MA

INTRODUCTION

Diabetic neuropathy is a common manifestation of diabetes mellitus affecting nearly fifty percent of diabetic patients, often causing severe debilitation. There are two primary forms of diabetic neuropathy, autonomic and sensorimotor. The most common form is a sensorimotor neuropathy, known as distal symmetric polyneuropathy (DSP). DSP usually affects the feet, but may affect the hands, exhibiting a stocking and glove presentation.[1,2] Almost forty percent of patients diagnosed with diabetes of greater than twenty-five years will have DSP.[1] DSP is also commonly referred to in the literature as diabetic peripheral neuropathy (DPN).[3,4]

DPN has a high occurrence of comorbidities which doubles the incidence of limb infections and almost tenfold increases the rate of amputations as compared to diabetic patients without peripheral neuropathy.[3] Eighty seven percent of the 65,000 amputations in the United States were linked to peripheral neuropathy as a primary contributing factor.[5] Patients with DPN were 2.6 times more likely to be hospitalized one or more times during a year than diabetic patients without peripheral neuropathy.[3] One study estimates that 27% of health care costs spent on diabetic care are related to the treatment of DPN. Secondary injuries due to falls are not reported in the literature as part of this cost.[3] Diabetic patients with peripheral neuropathy report fifteen times the number of injuries as diabetic patients without peripheral neuropathy.[6] Postural instability due to sensory loss is reported as a major risk factor for falls.[6-8]

DSP causes pain in a minority of diabetic patients (11-32%),[5] but this can be excruciating and debilitating. Pain typically increases at night and is often reported in any combination of the following: burning, aching, tingling, cold sensation, numbness, lancinating, and hypersensitive to normal touch. Small afferent nerve fibers conduct warmth, touch, and nocioceptive stimuli. Large afferent fibers conduct both motor and sensory impulses, including cold sensation, position sense, and vibration perception. DSP may present with sensory loss, pain, absent or decreased reflexes, or weakness.[1,5] Patients may become dependent on narcotics and still not receive the pain relief they seek.[5] Pharmacological agents may also include tricyclics, selective reuptake inhibitors, anticonvulsants, and topical analgesics. Many of these drugs have side effects which may be troublesome to patients [9] so patients frequently seek alternatives to drug therapy. Maintaining tight glycemic control is considered the hallmark of treatment in hopes of preventing all complications of diabetes, including diabetic peripheral neuropathy.[1-2, 5]

continued on Page 2

APTA
American Physical Therapy Association

The Quarterly Report

Published by the Home Health Section - APTA
a component of the American Physical Therapy Association

Editor
Diana L. Kornetti, PT, MA, HCS-D, COS-C

Managing Editor / Design
Robin Childers

Publications Committee
Cheryle Atwater, PT, MPH, COS-C; Rayne Counts, PT; Colin Elliot, PT, OCS, Cert.MDT; Bud Langham, PT, MBA; Ken Miller, PT, DPT; Tonya Miller, PT, DPT, COS-C; Shyam Sao, PT

Section Officers
President ..... Cindy Krafft, MS PT, COS-C
Vice President..... Tonya Miller, PT, DPT, COS-C
Secretary ..... Kurt Baumgartel, PT
Treasurer ..... Ray Bilecky, PT, COS-C

Executive Director ..... Robin Childers, CAE
rlchilders@homehealthsection.org

The Home Health Section *Quarterly Report* is the official publication of the Home Health Section of the American Physical Therapy Association. It is published four times per calendar year (April, August, October, and December). The newsletter will be received by members approximately 6 weeks after press deadlines. If you do not receive your copy in this time frame, please notify the Section.

Article & Content Contributions
Guidelines for contributions are available from the Home Health Section website. If you have materials you would like considered for publication, please email them to the Editor:

Content and advertising deadlines:
Spring Issue ..... March 15
Summer Issue ..... June 15
Fall Issue ..... September 15
Winter Issue ..... November 15

Advertising
Advertising rates and details are available from the Section website, www.homehealthsection.org, or by contacting the Section office at 866-230-2980 (Mountain Time).

Subscriptions to the Home Health Section *Quarterly Report* are included in Section membership dues. Nonmember subscriptions are also available at a rate of $35 per year. Contact the editor for further information.

Postmaster: Send address changes to Home Health Section - APTA, PO Box 4553, Missoula, MT 59806-4553.

www.homehealthsection.org

PO Box 4553 • Missoula, MT 59806-4553 • 866.230.2980

Continued from page 1

Monochromatic infrared photo energy (MIRE) is one alternative used for the treatment of peripheral neuropathy. Research studies on the effectiveness of MIRE reveal varied results. Three large retrospective studies are reported in the literature favorably supporting the use of MIRE.[10-12] Acupuncture is another treatment alternative which may provide relief of diabetic neuropathy symptoms.[13-15] Microcurrent Point Stimulation (MPS) is another modality used for pain control, but this has not specifically been studied for diabetic neuropathy.[16,17] The developer of MPS, Dr. Bruce Fa Shong describes MPS as a hybrid modality which delivers concentrated direct current through a point stimulator. This approach combines various therapeutic systems utilizing "principles of acupuncture, osteopathic trigger points, neuromuscular and neural therapies."[16, p. 668]

> "He describes the six pillars of MPS therapy, the core foundation of knowledge upon which the synthesis of different modalities is built. They are (1) acupuncture; (2) the relationship between radiculopathy, neuropathy, and chronic pain; (3) the relationship between dermatomes and chronic pain; (4) the relationship between gait and chronic pain; (5) the relationship between scar therapy (neural) and chronic pain; and (6) MPS stimulation."[16, p.668]

A controlled study of patients, experiencing various musculoskeletal pains, compared the effectiveness of traditional physical therapy to MPS treatment. Twenty-three subjects were in each group and matched by the region of pain and time of initial onset. Following treatment both groups had reduced pain, but a substantially greater reduction was achieved in the MPS group.[17]

The purpose of this case report is to present a patient with DSP/DPN who received MPS treatment. This patient had previously received MIRE treatment with minimal success. MPS for the treatment of diabetic neuropathy has not previously been reported in the literature and may be an effective treatment alternative. Research is needed to establish the effectiveness of MPS for the treatment of DSP/DPN.

CASE DESCRIPTION

History and Systems Review

A 61-year-old obese woman was referred to home care physical therapy by her primary care physician for treatment of diabetic peripheral neuropathy, initially diagnosed several years ago by a neurologist. This patient was selected for this case report as she had a favorable outcome to the physical therapy intervention utilizing MPS. The recommendation for physical therapy was initiated by the occupational therapist providing lymphedema therapy for this diabetic patient with distal symmetric polyneuropathy. The patient's major complaint was

severe burning pain in her lower legs which would awaken her every two hours at night. She reported that she had experienced this severe pain for several years without relief. She had a history of chronic cellulitis of her lower legs secondary to the lymphedema and had just completed a course of antibiotics. Immediately prior to the treatment for the cellulitis, she had received home care physical therapy through another home care service which included four anodyne (monochromatic near infrared photo energy- MIRE) treatments for peripheral neuropathy. She reported that she did feel some benefit from this therapy as her legs felt less heavy and she could walk slightly better, but she did not experience any improvement in the burning pain at night. The patient stated that her goals were to sleep better without being awakened by pain, to have more feeling in her feet, and to walk better so that she could become more active in her home and church.

This patient had been in a motor vehicle accident twenty-four years ago, resulting in severe compression fractures of T6-T9. She reported she had a spinal fusion, with two surgical entry sites through the right chest wall, utilizing a right floating rib for grafting. The patient was diagnosed with Type 2 diabetes mellitus twenty-one years ago and had been insulin dependent for nineteen years. She reported that she had maintained tight control of her blood sugar levels. Approximately fourteen years ago, she developed fibromyalgia, describing her pain as "affecting her all over," and was treated with methadone which she believed had led to fluid retention in her legs. Three years ago, a morphine pump was implanted into her abdomen, delivering medication to the intrathecal space of her spinal canal, enabling her to reduce her need for pain medications. Since the pump was implanted, she reported that she experienced much less back pain, but she still had general aching of her arms and legs with frequent flare-ups of fibromyalgia, which also affected her energy and ability to walk. This patient reported that her activities were limited at home and she could walk slowly to the bathroom and kitchen using a small base quad cane. She had difficulty performing light housekeeping, laundry, and cooking due to leg pain and general fatigue when standing and walking. Her husband helped her with donning her stockings for lymphedema management and helped her with household chores. She was usually too exhausted to leave her home and rarely went out except for medical appointments. She also complained of severe right shoulder pain which increased when using a four-wheeled walker, so she preferred to only use a quad cane. She reported she was unable to lift her right arm overhead due to her pain and could not effectively perform her lymphedema massage with this arm at the time of the physical therapy evaluation.

Physical Examination

A large circular scar was present from her right lateral chest wall to just medial to the inferior angle of the right scapula. A smaller horizontal scar was present at approximately the level of the eleventh rib on the right lateral chest wall. These surgical scars were a result of her surgery for the spinal fusion of the T6-T9 compression fractures. In addition, she had a large near midline vertical scar in her lumbar region secondary to a previous infection which she developed after the placement of her pain pump. Further visual inspection revealed intact skin on both lower extremities, but her lower legs exhibited pinkish red coloration. Palpation of skin revealed the skin on her lower legs was thick, bumpy, and firm with slightly increased warmth to touch. Skin rolling of the lumbar spine did not reveal trophedema.[16] Dr. Fa Shong states "trophedema is a col-

The Quarterly Report welcomes your letters and e-mails. We will consider for publication letters that relate to specific articles in the publication and letters of general interest to the physical therapy profession. Letters may be edited for clarity, style, and space.

Send letters to the Home Health Section, PO Box 4553, Missoula, MT 59806-4553; fax 866-861-4675; e-mail admin@homehealthsection.org. In all correspondence, please include your full name, credentials (if applicable), city, and state.

Published letters, editorials, and articles do not necessarily reflect the positions or opinions of *The Quarterly Report* or the Home Health Section of the American Physical Therapy Association.

lagenic change in the skin that occurs when impinged nerves reduce the flow of motor impulses through pathways."[16, p.671].

The patient was examined for strength in both upper and lower extremities with modified positioning using the break test as she was unable to tolerate sidelying and prone positioning. Her standing tolerance was also limited. Muscle testing was performed as a part of the assessment as strength deficits could affect her mobility. She was tested in sitting for upper extremity shoulder flexion, shoulder extension, elbow flexion, and grip strength and for lower extremity hip flexion, knee extension, knee flexion, and dorsiflexion. In supine, she was tested for elbow extension, hip abduction, hip extension, and plantarflexion. Strength was graded as 4/5 throughout except for right shoulder flexion which was 3+/5 as she could withstand minimal resistance due to pain and for weakened bilateral grip strength as she also experienced finger pain. A dynamometer was not available for this evaluation.

Range of motion was also tested as restrictions in range could affect her ability to get out of a chair and the quality of her gait pattern. Upper extremity active assistive range of motion (AAROM) was within normal limits except for tightness in bilateral shoulder flexion (approximately150 degrees by visual inspection). She was able to lift her left arm overhead in sitting through the available range, but could only lift the right arm to 90 degrees of flexion in sitting due to pain. She exhibited forward head posturing with an increased thoracic kyphosis. In her lower extremities, AAROM was limited by obesity and lymphedema. Hip flexion was 90 degrees bilaterally and extension was neutral by visual inspection. Her left knee flexion was 100 degrees and right was 95 degrees by goniometric measurements as measured in sitting. Left dorsiflexion was full range and right dorsiflexion was limited by 10 degrees as measured by a goniometer in supine with knees extended.

In standing, the patient was forward flexed and stood with an increased base of support to maintain her balance. The Tinetti Mobility Test (TMT)[18] was performed to assess her gait and balance. Kegelmeyer, et.al.[19] reported the TMT to be a valid and reliable test with good to excellent interrater and intrarater reliability when this test was given to patients with Parkinson's disease. Similarly, Kloos**,** et al.[20] found good inter-rater and intrarater reliability when testing patients with amyotrophic lateral sclerosis (Stages I-III). In the Kegelmeyer study,[19] 156 subjects with Parkinson's disease demonstrated that a score of less than 20 was sensitive to identifying subjects who fall. This patient had an overall Tinetti score of 14/28 with 6/12 on the gait portion and 8/16 on the balance portion. She exhibited short uneven strides with an increased base of support and decreased weight shift over the left stance leg resulting in a shortened stride on the right. She used her quad cane in her left hand as she was bothered by right shoulder pain when weight bearing. She generally described greater discomfort of her left leg in standing. She needed more than one attempt to rise from a normal height chair, but she was steady upon immediate rising as long as her quad cane was available for support. She could not stand with her feet completely together due to the girth of her thighs, but needed to have her feet an additional few inches apart to maintain her balance. She had discontinuous steps while turning, but she was steady.

Ankle and knee reflexes were tested with the patient sitting in a relaxed position without weight bearing through the feet. Reflexes were tested as large afferent fibers conduct motor impulses and decreased reflex response could indicate impairment in neural conductivity.[1,5] Smieja, et.al. [21] reported reflex testing to have "the best reproducibility," along with monofilament testing, having moderate agreement when performing tests to assess the diabetic foot. Both knee and ankle reflexes were checked twice and the stronger response was noted if there was an inconsistency. The right knee jerk was within normal limits and the left knee jerk was absent. Both ankle jerk reflexes were weak with the least response noted on the left.

Monofilament testing was performed on both feet using a 10-g (5.07) monofilament. Nine sites were chosen on each foot: the pads of the great toe, third toe, fifth toe; first, third and fifth metatarsal heads; the plantar surface of lateral mid foot; the plantar surface of the heel; and the dorsum of the foot between the second and third metatarsals. Smieja, et.al.[21] tested 10 sites on each foot as he added one site on the medial arch. He determined that a simplified monofilament testing procedure which included only four points on each foot (great toe; first, third, and fifth metatarsal heads) detected 90% of the patients with loss of protective sensation as compared to the more extensive evaluation. Shaffer, et.al.[22] studied elderly community dwellers with distal sensory neuropathy utilizing monofilament testing, quantitative vibration perception threshold, and balance measures (functional reach, four square step test, and timed get up and go). The monofilament testing was the only measure that had a significant correlation with falls over the past year and had good to excellent inter-rater reliability for collective monofilament testing sites.

The test was performed by first placing the monofilament on the patient's forearm and asking her to say "yes" as soon as she felt the touch. This was practiced two to three times to assure she was comfortable with the instructions. She was positioned comfortably in her recliner with her feet elevated. She was asked to close her eyes and say "yes" as soon as she felt the touch of the monofilament. The monofilament was bent at close to a right angle and held in place for up to two seconds. The sites were tested in random order and at random time intervals (approximately 2 to 7 seconds apart). If she did not say "yes" while the monofilament was held in place, the site was marked as insensate. Initially, this patient had no perception of sensation to the touch of the 10g monofilament in all the metatarsal heads of both feet, except the first metatarsal head of the right foot and she had no sensation in any of the six toes. She also did not perceive sensation on the dorsum of either foot, but she was able to feel sensation on both lateral mid feet and heels.

Pain was assessed for both lower extremities using the revised version of the Short-form McGill Pain Questionnaire (SF-MPQ-2). I23 The Short- form McGill Pain Questionnaire was revised to include additional questions that are specific to neuropathic pain without excluding questions that address non-neuropathic pain or a mixture of non-neuropathic and neuropathic pain. The SF-MPQ-2 was chosen as an assessment tool for this patient as she had a history of chronic pain secondary to fibromyalgia as well as chronic neuropathic pain secondary to diabetic DSP. This tool uses a visual analogue scale of 0 to 10, instead of 0 to 4 in the original Short-form McGill Pain Questionnaire so that smaller increments of improvement could be reported. A clinical trial was conducted with 226 patients with peripheral diabetic neuropathy and 882 participants with diverse symptoms of chronic pain. This tool was shown to have excellent reliability and validity. The questionnaire lists 22 pain items which the patient scores on a visual analog scale of 0 (no pain) to 10 (worst possible) over the past week.[30] She was instructed to limit her response to lower extremity pain only. She listed hot-burning pain as 10/10 which she stated reached this peak at night; tender and numbness 8/10; shooting pain, stabbing pain, sharp pain, and aching pain 7/10; tingling or "pins and needles" 6/10; gnawing pain and tiring exhausting 5/10; aching pain and itching 4/10; throbbing pain and cramping pain 2/10. She rated splitting, sickening, fearful, punishingcruel, electric-shock pain, cold-freezing pain, and pain caused by light touch 0/10. The total score was 82.

Evaluation

This patient's complaints of severe burning pain along with the other symptoms mentioned were consistent with her diagnosis of diabetic peripheral neuropathy.

Goals were discussed and the patient was in agreement with the following goals:

1. Patient to have decreased complaints of burning pain in lower legs and feet at night from 10/10 to 3/10.
2. Patient to have lessened complaints of other pain sensations in both legs as evidenced by improved scoring on the SF-MPQ-2.
3. Patient to have improved sensation to light touch in both feet as measured by 10g monofilament testing.
4. Patient to increase Tinetti (TMT) score from 14/28 to 19/28.
5. Patient to ambulate with a quad cane with increased ease and confidence on level and unlevel surfaces.

The plan was to provide MPS, primarily utilizing the diabetic neuropathy protocol as established by Dr. Fa Shong.[24] Additionally, the patient would be given limited exercises for balance and strengthening as part of a simple home exercise program and gait training. Even though this patient had mild weakness which was likely due to her deconditioned state secondary to pain and fatigue, her general strength was functional and was not to be specifically addressed as a goal. Since the treatment for diabetic neuropathy would be extensive, this patient agreed that her right shoulder pain would not specifically be addressed during this course of treatment. Rehabilitation potential was considered to be good for the above goals and was expected to be achieved in six visits (twice weekly for three weeks).

Intervention

MPS treatment was initiated on the same day the initial evaluation was completed. Since this patient had a history of fibromyalgia, a decision was made to progress slowly with the MPS to assure this patient had good tolerance to the treatment as some fibromyalgia patients may experience an exacerbation of symptoms if over stimulated.[16] The diabetic neuropathy protocol by Dr. Fa Shong is extensive and includes ten steps (see protocol available from the Home Health Section website, www.homehealthsection.org). The first step includes stimulating parasympathetic points on the wrists, lower legs, ankles, and chest which, as stated by Dr. Fa Shong, "deregulates the autonomic nervous system"[24, p.1], producing a calming effect to allow for further treatment.The point locations are described in the protocol. The exact location of the point was found when the point electrode was applied to the skin and moved slightly until the device made a high pitched sound. After a point was located, the stimulator was activated for 20 beeps. Most of the protocol for fibromyalgia is very similar to step one of the diabetic neuropathy protocol, only adding a few additional points. Step one and some of these additional points were treated bilaterally on the first treatment (K27-, two thumbs width away from the midline of the sternum, just below the clavicle; Li11-, the outer crease of the elbow with the elbow flexed at 90 degrees; Li 10-, two fingers width distal to Li 11-). The patient tolerated the treatment well and immediately stated that her feet were lighter and walking was easier. She demonstrated the ability to take longer steps. ***Details of treatments 2 – 7 are outlined in Table 1.***

OUTCOMES

Retesting was performed two days after the final MPS treatment. The patient had developed more edema in her lower legs in the previous two days as she had not been using her compression stockings or bandages. Knee and ankle reflexes were retested. Knee jerk reflexes were now equal and within normal limits. The left ankle jerk remained weak, but the right ankle jerk showed an increased response and was within normal limits. The patient filled out another SF-MPQ-2. She indicated significant improvement in all areas, noting burning pain to be 2/10. She rated tender and numbness as 3/10; throbbing, sharp, burning, tiring- exhausting, and itching as 2/10; shooting, stabbing, cramping, aching, heavy, piercing, pain caused by light touch, tingling or 'pins and needles' as 1/10; splitting, sick-

ening, fearful, punishing- cruel, electricshock, cold-freezing as 0/10. The total score was 25 as compared to 82 on initial assessment. Monofilament testing showed significant improvement in the right foot as she could feel 7 out of the 9 sites as compared to 3 out of the 9 sites initially. The left foot showed minimal change as she could feel 3 out of the 9 sites as compared to 2 out of the 9 sites initially. The Tinetti Mobility Test increased from 14/28 to 24/ 28 indicating a lower fall risk. The patient consistently reported that she felt more sensation in her feet including cold, warmth, and textures. Her activity level had increased and she was walking with greater speed and confidence on level and unlevel surfaces, sometimes even forgetting her quad cane.

Table 1: Treatments 2 – 7

Treatment	Parameters	Subjective Findings	Objective Findings	Additional Comments
2	Steps 1 & 2, plus K27-, Li10-, Li11- (fibromyalgia points). Modifications, step 2: Gait release done supine, MPS done sitting. Gb41- stimulated end of Rx (rescue point).	Constant pain in LE decreased to no pain post treatment, but c/o itching increased. Gb41- administered. Itching decreased.	Gait improved with increased step length and left weight shift	Overstimulation may produce unusual sensations (itching) which is decreased or eliminated with Gb41
3	Entire protocol followed (Steps 1-10)	During Rx of both lateral chest wall scars, reported radiating sensations into right shoulder. Post Rx, reported no right shoulder pain and could feel her toes and balls of feet for first time.	Could raise arm overhead	Scars restrict energy flow and disrupt the circulatory and lymphatic systems
4	Entire protocol. Added home exercises: standing hip abduction, marching in place, wall slides.	Reported, no longer waking because of burning pain at night - mild burning pain at night; none during the day, only tingling sensations. Reported using right arm better (no pain) for lymphedema massage, walking more in home, performing more household chores.	Still able to lift arm overhead	
5	Entire protocol, except step 10	Prior to Rx, reported feeling warmth and wet sensations on the floor when walking. Reported minimal sensitivity when scars Rx now. Small lateral chest scar most sensitive.		
6	Entire protocol, except step 10; only Rx small lateral chest scar	Reported improved sensitivity to temperature, no pain in legs during the day, improved ability to walk and perform activities in her home. Able to tolerate wearing diabetic shoes post Rx for the first time.		
7	No MPS, reviewed home exercise program, retesting	Reported she was able to comfortably wear diabetic shoes throughout the day following Rx 6.		

DISCUSSION

Physical therapists frequently evaluate and provide treatment for patients with DSP/DPN as many of these patients demonstrate an unsteady gait and have a history of falls.[7-8, 12-13] In addition to the higher risk of falls, patients experiencing decreased sensation have a higher risk of developing foot lesions which may not heal, resulting in amputations. Severe pain and parasthesias may also be debilitating, resulting in a greater need for medications which can have potential side effects. Maintaining blood sugar in a normal range is the first course of treatment, but many patients still have persistent pain, loss of protective sensation, and loss of balance.[1-5] Additional treatment options need to be offered to patients. MIRE treatment has been studied and utilized by our profession with varied results.[10-12] Acupuncture, although not utilized directly by our profession, appears to demonstrate effectiveness as a treatment option, but the research is very limited.[13-16] MPS treatment, which incorporates principles of acupuncture, has not been reported in the literature except for one study of general musculoskeletal pain; however, this modality may be helpful in the treatment of DSP/DPN.[17]

This patient was able to achieve and exceed all of her goals with the exception of minimal improvement in sensation to her left foot as tested with a 10g monofilament. As noted on the evaluation, the patient's left foot was more insensate than the right foot and she exhibited decrease weight shifting to the left during stance phase. Leonard, et.al[25] noted in their study that the patients with more severe sensory impairment did not exhibit significant improvement in sensation, pain reduction, or neuropathic pain symptoms with MIRE treatment while those with less severe impairment did. Results with this patient were consistent with Leonard, et. al's findings for sensory testing, but not for pain and neuropathic symptoms as the patient reported a significant decrease in pain and neuropathic symptoms in both legs. As I also noted, this patient had not worn her compression stockings for two days and was experiencing more edema in her left leg at the time of final testing. Possibly the increased edema affected the testing results.

Of the six MIRE studies using monofilament testing, four used only one monofilament (10g -5.07)[10,11,26,27] as I did. The other two studies tested subjects with two or four monofilaments at each site in order to determine the degree of insensitivity.[25,28] Possibly, if I had used a 6.65 monofilament, which is easier to detect, in addition to the 5.07 (10g), this patient may have demonstrated the ability to feel the monofilament. Interestingly, there was not agreement with sites tested or sites were not specified in these research studies.

Monofilament testing is used to access the small afferent fibers which conduct touch, warmth, and nocioceptive impulses; whereas, vibration testing is used to access large afferent fibers which conduct both motor and sensory impulses, including cold sensation, position sense, and vibration perception.[1,5] Vibration testing was not done on this patient and may have provided additional insight. Interestingly, her left knee jerk reflex improved from being absent to normal and her right ankle jerk reflex improved slightly but remained weak. Possibly this improvement was due in part to the increased parasympathetic input [16], which promoted relaxation and allowed for a more normal reflex response.

Acupuncture is an ancient treatment that is not well understood in western culture, but it is based on the belief that energy (chi) flows through channels (meridians) in proper balance and the blockage of this energy flow will cause painful symptoms and dysfunction. Acupuncture increases endogenous morphine production which may be responsible in part for the pain relief experienced by this patient.[15,16] This patient was contacted five weeks following the cessation of treatment and she reported that the burning pain in her legs had not returned. I would conclude that the explanation can not be solely due to endogenous morphine production as this effect would not be lasting.

As mentioned, this patient had severe pain in her right shoulder prior to the onset of treatment. When the scars on her right chest wall were treated with MPS, she was immediately able to raise her arm overhead without pain. The release of the scars would allow for energy to flow freely, eliminating painful symptoms and allowing increased range of motion according to acupuncture theory. [16]

This case report provides insight into another treatment modality which may be effective in treating patients with DSP/DPN. MIRE has been studied extensively, but minimal research has been performed utilizing acupuncture or MPS for the treatment of DSP/DPN. Controlled research studies to examine the effectiveness of MPS could be valuable in the quest to provide effective treatment for these patients.

REFERENCES

1 Aring AM, Jones DE, Falko JM. Evaluation and prevention of diabetic neuropathy. *AAFP.* 2005; 71(11): Available at: http://www.aafp.org/afp/20050601/2123.html Accessed 9 September 2008.

2 Duby JJ, Campbell RK, Setter SM. White JR, Rasmussen KA. Diabetic neuropathy: an intensive review. *American Journal of Health-System Pharmacy.* 2004. Available at: http://www.medscape.com/viewarticle/467524-print Accessed 18 June 2009

3 Gordois A, Scuffham P, Shearer A, Oglesby A, Tobian JA. The health care costs of diabetic peripheral neuropathy in the U.S. *Diabetes Care.* 2003; 26(6):1790-1795.

4 Ritzwoller DP, Ellis JL, Korner EJ, Hartsfield CL, Sodosky A. Comorbidities, healthcare service utilization and costs for patients identified with painful DPN in a managed- care setting. *Current Medical Research and Opinion.* 2009; 25(6): 1319-1328

5 Vinik AI, Park TS, Stansberry KB, Pittenger GI. Diabetic neuropathies. *Diabetologia*. 2000; 43: 957-973.

6 Simoneau GG,Ulbrecht JS, Derr JA, Becker MB, Cavanaugh PR. Postural instability in patients with diabetic sensory neuropathy. *Diabetes Care.* 1994; 17(12):1411-1421.

7 Cavanaugh PR, Derr JA, Ulbrecht JS, Maser RE, Orchard TJ. Problems with gait and posture in neuropathic patients with insulin-dependent diabetes mellitus. *Diabetic Medicine.* 1992; 9:469-474.

8 Richardson J, Hurvitz EA. Peripheral neuropathy: a true risk factor for falls. *Journal of Gerontology: Medical Sciences.* 1995, 50A(4), M211-M215.

9 Boulton AJM. Management of diabetic peripheral neuropathy. *Clincial Diabetes.* 2005; 23(1): 9-15.

10 Harkless LB, DeLellis S, Carnegie DH, Burke TJ. Improved foot sensitivity and pain reduction in patients with peripheral neuropathy after treatment with monochromatic infrared photo energy – MIRE. *Diabetes and Its Complications*. 2006; 20: 81-87.

11 DeLellis SL, Carnegie DH, Burke TJ. Improved sensitivity in patients with peripheral neuropathy- effects of monochromatic infrared photo energy. *Journal of the American Podiatric Medical Association.* 2005; 95(2):143-147.
12 Powell MW, Carnegie DH, Burke TJ. Reversal of diabetic peripheral neuropathy with phototherapy (MIRE) decreases falls and the fear of falling and improves activities of daily living in seniors. *Age and Aging.* 2006; 35:11-16.
13 Abuaisha BB, Castanzi JB, Boulton AJM. Acupuncture for the treatment of chronic painful peripheral diabetic neuropathy: a long term study. *Diabetes Research and Clinical Practice.* 1998; 39: 115-121.
14 Xiao-qin Z, Zong-peng C. Clinical observations on the treatment of diabetic peripheral neuropathy with acupuncture. *Zhong Guo Zhen Jiu (Chinese Acupuncture and Moxibustion)*. 1999; 3:236-237. Translation by Wolfe HL. Available at: http://www.bluepoppy.com/cfwebstorefb/index.cfm/fuseaction/feature.display/feature-id/919/index.cfm Accessed 20 May 2009.
15 Green J, McClennon J. Acupuncture: an effective treatment for painful diabetic neuropathy. *The Diabetic Foot*. 2006. Available at: http://findarticles.com/p/articles/mi_m0MDQ/is_4_9/ai_n17216762/ Accessed 20 May 2009.
16 Weiner RS. *Pain Management- A Practical Guide for Clinicians, 6th ed.* Boca Raton, FL: CRC Press. 2001: 667-691.
17 Freed M. MPS stimulation combined with physical therapy improves outcomes. *Rehab Report.* 2003
18 Tinetti ME. Performance oriented assessment of mobility problems in elderly patients. *J Am Geriatr Soc.* 1986; 34: 119-126.
19 Kegelmeyer DA, Kloos AD, Thomas KM, Kostyk SK. Reliability and validity of the Tinetti Mobility Test for individuals with Parkinson disease. *Phys Ther*. 2007; 87(10): 1369-1378.
20 Kloos AD, Bello-Haas VD, Thome R. Inter-rater and intrarater reliability of the Tinetti Balance Test for individuals with amyotrophic lateral sclerosis. *Journal of Neurologic Physical Therapy.* 2004
21 Smieja M, Hunt DL, Edelman D, Etchells E, Cornuz J, Simel DL. International Cooperation Group for Clinical Examination Research. Clinical examination for the detection of protective sensation in the feet of diabetic patients. *J Gen Intern Med.* 1999; 14(7): 418-424. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1496604 Accessed 26 March 2009.
22 Shaffer S, Harrison A, English M, Brown K, Brennan K, LeFever C. The reliability and validity of lower extremity sensory testing in older community-dwelling adults. *Physiotherapy.* 2007;93(S1):S317. Available at: http://www.wcpt.org/abstract2007/abstracts/3231.htm Accessed 11 July 2009.
23 Dworkin RH, Turk DC, Revicki DA, et.al. Development and initial validation of an expanded and revised version of the Short-form McGill Pain Questionnaire (SF-MPQ-2). *Pain.* 2009; 144: 35-42.
24 Dr. Bruce Fa Shong. Treating diabetic neuropathy. *MPS NeuroMechanical Therapy.* 2000; pdf file 4-7.
25 Leonard DR, Hamed Farooqi M, Myers S. Restoration of sensation, reduced pain, and improved balance in subjects with diabetic peripheral neuropathy. *Diabetes Care.* 2004; 27 (1):168-172.
26 Kochman AB. Monochromatic infrared photo energy and physical therapy for peripheral neuropathy: influence on sensation, balance, and falls. *J Geriatr Phys Ther* 2004; 27(1): 16-19.
27 Clift JK, Kasser RJ, Newton TS, Bush AJ. The effect of monochromatic infrared energy on sensation in patients with diabetic peripheral neuropathy. *Diabetes Care.* 2005; 28: 2896-2900.
28 Lavery LA, Murdoch DP, Williams J, Lavery DC. Does Anodyne light therapy improve peripheral neuropathy in diabetes? *Diabetes Care.* 2008; 31(2): 316-321.

Ann Pospisil is a physical therapist with Florida Hospital Home Care Services, Inc. She has provided direct patient care as a home care physical therapist in the Orlando area for more than 23 years. Ann has been an APTA member since 1975 and is also a member of the Home Health Section. She can be reached at ann.pospisil@flhosp.org.