



Clinical Case Report Competition

West Coast College of Massage Therapy

Fall 2009

Third Place Winner

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Treatment of pressure ulcer using
manual lymphatic drainage

Treatment of Pressure Ulcer using Manual Lymphatic Drainage

Case Study Synopsis

Abstract

A 31 year-old paraplegic male developed a Stage II pressure ulcer at his left ischial tuberosity. An intern massage therapist applied Manual Lymphatic Drainage (MLD) using Dr. Vodder's in an attempt to facilitate healing of the wound. Within a two-week period, the patient received 13 treatments of standard sequences for Nape of Neck and Buttocks. Success was gauged by tracing wound parameters onto plastic film and measuring their length and breadth in millimeters. Photographs were also taken at six intervals during course of treatment. Expectations of a positive outcome were hypothetical, as a literature review produced no precedent for treating pressure ulcers with MLD. 88% wound closure took place during course of treatment, although isolating positive effects of MLD from other factors that support healing would require further study.

Pathology

Pressure ulcers develop where circulation is impaired by external pressure, typically at points where a bony prominence is pressed against a supporting surface. Compressive forces that exceed 32 mmHg (the pressure at the arterial end of a capillary bed) cause local ischemia resulting in tissue necrosis. Standard clinical practice is to turn patients at two-hour intervals to prevent pressure ulcer formation, though there is debate over how long it takes for damage to occur and what the exact mechanism of injury is. Goodman et al (2003) postulate that muscles and tendons have a lower tolerance to ischemia than skin, so tissue damage begins deep, manifesting superficially after significant damage has begun. Krouskop et al. (1978) contend that tissue integrity can be maintained for up to 13 hours when capillaries are occluded, and that damage occurs because the lymphatic vessels are unable to clear metabolic wastes. Regardless of the etiology, the National Pressure Ulcer Advisory Panel (NPUAP) estimates that 60,000 Americans die from tissue necrosis, associated infections and complications associated with pressure ulcers each year, and estimates health care costs to be between \$10-15 billion per annum (NPUAP, 2009).

There are four commonly recognized stages of pressure ulcer development:

Stage I: Intact skin with non-blanchable redness of a localized area usually over a bony prominence.

Stage II: Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough. May also present as an intact or open/ruptured serum-filled blister.

Stage III: Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscle are not exposed.

Stage IV: Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed.

Treatment of Pressure Ulcers

Emphasis for pressure ulcers is on prevention, and failing that, removing causative factors (Rattray, 2000). Allopathic pressure ulcer treatments include electrical stimulation, ultrasound, proper medical bandaging, removal of necrotic tissue by means of autolytic or chemical debridement, use of medical maggots, O₂ therapy, negative pressure therapy, or surgical excision to remove necrotic tissue and open pockets for drainage. Stage III or IV pressure ulcers may require subsequent skin grafting or musculocutaneous flaps (Goodman, 2003).

None of the aforementioned therapies fall within the scope of practice for Registered Massage Therapists. Existing protocols for massage therapists treating existing pressure ulcers consists of brief applications of cold hydrotherapy (to reduce swelling), and relieving the pressure that caused the ulcer (Rattray, 2000). No massage modalities were specifically recommended for active treatment.

Manual Lymphatic Drainage and Rationale for Treatment

Although a literature review revealed no studies of any specific protocols being used to aid in the healing process of a pressure ulcer, aspects of Dr Emil Vodder's Manual Lymphatic Drainage (MLD) qualified it as a hypothetically safe and effective modality for massage therapist use.

Treatment of Pressure Ulcer using Manual Lymphatic Drainage Case Study Synopsis

- Manual contacts are designed to be light enough not to occlude lymphatic vessels - pressure should range between 20 and 40 mm Hg, for lymphatic vessels temporarily collapsed with a pressure of 60 mm Hg (Rattray, 2000).
- Strokes are rhythmic, monotonous and repeated 5 to 7 times in order to have a calming effect on the sympathetic nervous system, which relaxes the smooth muscles in vascular and lymphatic vessel walls, allowing greater volume in the lumen between contractions (Harris, 2001).
- A stretching affect with recoil of skin under the hand between strokes is required, rather than sliding the hand over the skin as is common in Swedish massage (Kasseroller, 2000). This subtle but crucial nuance is responsible for stimulating the smooth muscle in the larger, valved lymph vessels called 'angions' (Kasseroller, 2000; Wittlinger, 1998).

CMTBC currently lists decubitus (or pressure) ulcers as an absolute local contraindication due to tissue fragility, compromised vasculature and risk of infection (Judy Crowhurst, CMTBC, 2009). Hypothetically, MLD is a light and superficial enough technique to use in proximity to the lesion site without causing further harm due to tissue drag. Applying it proximally would ensure that blood, lymph and interstitial fluids were not forced into the wound, while simultaneously increasing the ability of the lymphatic system to decrease the transit stretch between capillaries and target tissue cells, facilitating fast and efficient nutrient delivery and waste removal, and better tissue health.

Basic Level Vodder MLD is currently taught in all CMTBC accredited massage colleges in British Columbia. Vodder's MLD is highly structured; many variables including depth of pressure, rate, duration, direction of pressure, strokes used, the number of strokes, and the approximate time each sequence should take for the various body regions are all clearly outlined. The formulaic nature of MLD makes it well suited for use in clinical case studies, where it is important that an established protocol can be reproduced by the same therapist with various subjects, or by other therapists seeking to test the modality using scientific method. Unlike most other allopathic treatments for pressure ulcers, MLD is within an RMT's scope of practice.

Assessment

Assessment was limited to observing and recording the size of the pressure ulcer over the course of the two-week treatment. Primary wound measurements were taken by laying food-grade plastic wrap directly over the wound and tracing its boundaries with a black felt-tipped pen; the tracings were then scanned into a computer to create an electronic record. Secondary wound measurements were recorded by holding a square ruler in close proximity to the wound and taking a picture with a digital camera. Subjective descriptions of the wound were recorded in chart notes upon each treatment by the intern therapist.

Treatment Plan

The original goal was two one-hour treatments each day for 14 days (one a.m., one p.m.); due to patient availability, 13 total treatments were implemented within 14 days. Each treatment consisted of Vodder's MLD sequences for Nape of Neck, Treatment of Buttocks (both in prone position) and an abridged Neck Treatment (with patient supine); the abridged neck treatment was a courtesy to the patient and not the focus of the protocol. No hydrotherapy was given to limit the variables that influence wound closure.

Subject Case History

The subject was a 31-year old male who was injured in a motor vehicle accident in January 2002, at which time he was rendered paraplegic (complete T-12 Asia A). Aside from his paralysis, he is in good general health, moderately active, has a good diet, is well-hydrated and is a non-smoker. Although he experiences neuropathic pain in both lower limbs he, experiences imperfect sensation in dermatomes L1 – L3, and no dermatomal sensation below L4. He spends the majority of his day in a wheelchair, and his

Treatment of Pressure Ulcer using Manual Lymphatic Drainage
Case Study Synopsis

surface support has primarily been a Supracor StimuLITE contoured seat cushion. As a result of chronic, intermittent neuropathic pain, which is slightly worse in his right leg, he has a slight postural list to the left.

Pressure Ulcer Measurements

The patient experienced two separate incidents of pressure ulcers. The first occurrence is referenced in this study to provide a reasonable comparison for this specific patient's rate of healing.

In May 2008, six years after becoming wheelchair-bound, the patient developed his first Stage II pressure ulcer, at his left ischeal tuberosity, but did not recognize it as such. Impaired cutaneous sensation meant that the patient frequently incurred small injuries without being aware of them; bilaterally, his maleoli were marked with small nicks from hitting struts on his wheelchair when transferring into and out of it. For this pressure ulcer, the patient received home visits from a nurse with the Fraser Health Authority (FHA) who cleaned, monitored and dressed the ulcer until it healed. The FHA was unable to provide measurements for this study, but the patient remembers the wound as "smaller than a dime". FHA treated the patient from May 27 to July 20, 2008 (55 days, or 7.5 weeks).

In January 2009, the patient developed a second Stage II pressure ulcer at the same site, and was initially also treated by a home healthcare nurse. During the healing process, the wound was re-injured during a sledge-hockey game. At the time that the patient engaged the intern massage therapist for treatment, the wound measured 26x23 mm, was wet with exudate, and had a perceptible depth (which was not measured) (Fig 1). At the end of two weeks of MLD treatments, the dimensions of the wound were 9x8 mm, it was flush with surrounding tissue, and was covered by a thin, dry crust (Fig 2). Treatment to the point of complete tissue recovery was not possible because of patient availability.



Figure 1
February 12, 2009 – Stage II pressure ulcer before first MLD treatment measured 26mm in x 23mm, roughly the size of a "Loonie".



Figure 2
February 24, 2009 – pressure ulcer measured 9mm x 8mm, roughly half the size of a dime.

Discussion/Conclusion

Within a one-year period, an otherwise healthy paraplegic man developed a Stage II pressure ulcer on his left ischial tuberosity on two separate occasions. Although the exact dimensions of the first ulcer were not available for comparison, the patient believes it was smaller than the second one. Even if the two ulcers had been the same size, the ulcer treated with MLD closed in 14 days, approximately four times faster than the pressure ulcer that the FHA monitored and dressed for 55 days.

The effects of MLD in promoting closure of the pressure ulcer was the main purpose for this study, so extraneous influences were limited as much as possible, but there were three other noteworthy factors besides MLD that differed between the patient's first and second ulcer occurrences:

Treatment of Pressure Ulcer using Manual Lymphatic Drainage
Case Study Synopsis

1. In January 2009, shortly after the second ulcer developed, the patient began using a ROHO seat support with his wheelchair. Although the ROHO can decrease the maximum point-pressure, Hamanami et al. (2004) concluded from a study of 34 people with spinal cord injury that the ROHO failed to reduce it below 80 mmHg, which exceeds the defined threshold for pressure ulcers. If the ROHO played an accessory role in healing in this case, measuring it was outside the scope of this study.
2. In January 2009, the patient also acquired a standing frame, which allows him to achieve a standing position independent of other people. The patient was asked to track standing frame usage for a week, and encouraged to maintain it as ADL. During treatment he averaged 20 minutes per day in a pressure relieving position, standing vertically.
3. In order to implement the MLD sequences, the patient was placed in the prone position for approximately an hour for each treatment. Consequently, the patient was in a pressure relieving position for one to two hours per day, and placing the patient in a relief position is the primary goal in treatment of pressure ulcers.

MLD is one of the few massage modalities available to therapists that is designed to impact circulation of blood and lymph without heavy manual pressure on body tissues. Expectation of positive outcome for this case study could only be based on the theory behind MLD, since no existing studies on implementing the modality to treat pressure ulcers was available. In order to isolate the effects of MLD from other influencing factors, results would be required from a larger group of case studies, or access to a patient population pool where activities and other mechanical variables can be controlled. Results from this study were promising, but further research is warranted.

Treatment of Pressure Ulcer using Manual Lymphatic Drainage
Case Study Synopsis

References

- Clark, A. (1950) Skeletal Suspension in the Treatment of Decubiti. *California Medicine*, vol. 72(6): 447-449. Retrieved June 15, 2009 from <http://www.pubmedcentral.nih.gov/picrender.fcgi?artid=1520356&blobtype=pdf>
- Dorner, Posthauer & Thomas (2008). *The Role of Nutrition on Pressure Ulcer Prevention and Treatment: National Pressure Ulcer Advisory Panel White Paper*. Retrieved May 10, 2009 from NPUAP: <http://www.npuap.org/Nutrition%20White%20Paper%20Website%20Version.pdf>
- Dr. Vodder School International (2008), Basic Movements of Dr. Vodder's Manual Lymphdrainage [Class handout]. P.O. Box 5121, Victoria, B.C. Canada
- Elliot, J. (2009). How one nurse helped stop killer bedsores. Retrieved June 11, 2009 from <http://news.bbc.co.uk/2/hi/health/7952519.stm>
- Goodman, Fuller & Boissonnault (2003). *Pathology: Implications for the Physical Therapist*. Philadelphia: Elsevier.
- Giampietro L., Miller, S., McBrier, N., & Buckley, W. (2009). Systematic Review of Efficacy for Manual Lymphatic Drainage Techniques in Sports Medicine and Rehabilitation: An Evidence-Based Practice Approach. *The Journal of Manual & Manipulative Therapy*
- Grous, C., Reilly, N. & Gift A. (1997). Skin integrity in patients undergoing prolonged operations. *Journal of Wound, Ostomy and Continence Nursing*. Vol 24(2):86-91.
- Hamanami, Tokuhiko & Inoue (2004). Finding the Optimal Setting of Inflated Air Pressure for Multi-cell Air Cushion for Wheelchair Patients with Spinal Cord Injury. *Acta Med. Okayama*, Vol 58, No. 1, pp. 37-44.
- Harris, R. (2001). The science behind Dr.Vodder method of Manual Lymph Drainage. *Lymphedema Awareness Foundation – Lymph Notes*. Retrieved May 10, 2009 from <http://www.elymphnotes.org/detail.asp?ci=45&it=IPI>
- Kasseroller, R. (2000). The Vodder school: The Vodder method. *Cancer*, Vol 83, Issue S12B, pp 2840-2842
- Krouskop, Reddy, Spencer & Secor (1978). Mechanisms of decubitus ulcer formation – An hypothesis. *Medical Hypotheses*, Volume 4, Issue 1, Jan-Feb 1978, pp 37-39.
- National Pressure Ulcer Advisory Panel (2009). www.npuap.org/pr2.htm
- Rattray & Ludwig (2000). *Clinical Massage Therapy: Understanding, Assessing and Treating Over 70 Conditions*. Elora, Ontario: Talus Incorporated.
- Szabo, L. (2004). Spinal cord injury patients often succumb to bed sores. Retrieved June 10, 2009 from <http://www.spinalcord.org/news.php?dep=1&page=6&list=73>
- Yates, J. (1990). *Physician's Guide to Therapeutic Massage*. Vancouver: Massage Therapists' Association of British Columbia
- Wittlinger, G. & Wittlinger, H. (1998). *Textbook of Dr. Vodder's Manual Lymph Drainage: Volume 1: Basic Course*. Heidelberg: Haug International