Articles of Interest
Literature Review

Reviewers

Dr. Shane Inlow reviews two articles on the treatment of diabetic peripheral neuropathy.

Dr. David Keast and **Heather Orsted** review articles on wound infection.

Static Magnetic Therapy for Symptomatic Diabetic Neuropathy: A Randomized, Double-Blind, Placebo-Controlled Trial

Author: Weintraub MI, Wolfe GI, Barohn RA, Cole SP, Parry GJ, Hayat G, Cohen JA, Page JC, Bromberg MB, Schwartz SL, the Magnetic Research Group

Publication: *Arch Phys Med Rehabil.* 2003;84:736-46

Reviewer: Shane Inlow, MD

This is the first scientific study exploring the therapeutic use of insole magnets in medicine. Dr. Weintraub, a neurologist, organized a randomized, double-blind study in 48 centres involving 375 diabetic patients. The objective of this study was to determine if static insole magnets can reduce the painful symptoms of diabetic peripheral neuropathy (DPN).

The article starts with an excellent review of the pathophysiology of DPN. A review of the oral medications currently used show them to have disappointing results, with significant side effects.

Next is a detailed description of the methods of enrolment, randomization, materials, outcomes and statistical analysis. Important to note is that the insoles used are 450 gausse in strength, with a triangle pattern of continuous magnetic poles in every direction, sold under the brand name Magsteps by Nikken Inc. Outcome measures were both subjectively (up to 3x/day) and objectively followed weekly with neurologic exam and three different electrophysiological tests, including nerve conduction velocities.

The results show statistically significant reduction in neuropathic pain in DPN, most pronounced in the third and fourth month. Discussion covers various methods of possible influence by the static magnetic fields. The anti-nociceptive effect was the most significant, but several other mechanisms of action are theorized. Further studies involving epidermal nerve fibre biopsy are needed to confirm the mode of action.

The present study provides convincing data confirming that the constant wearing of static magnetic insoles produces statistically significant reduction of neuropathic pain after two months. The results are comparable or superior to those observed with various conventional drugs, with the advantage of being non-invasive, less expensive and with no side effects.

The 10^5 Bacterial Growth Guideline: Reassessing its Clinical Relevance in Wound Healing

Author: Bowler PG

Publication: *Ostomy/Wound Management* 2003;49(1):44-53

Reviewer: Heather Orsted, RN, BN, ET, Clinical Specialist: Skin and Wound Management

The hot topic at wound conferences currently is wound bioburden — and why not?

"In war, you must know your enemy because in knowledge there is power. You can only defeat your enemy if you know how and why he acts as he does." — *Author unknown*

Phil Bowler, through this article, explores the nature of bacteria and their reaction (both helpful and harmful) with their environment. He describes the symbiotic relationship that bacteria have with the body (skin, mouth and gut) and then demonstrates how the relationship changes as the bacteria are introduced into a new ecosystem, the wound.

The complex challenge of bioburden management is reviewed through discussions revolving

around microbial virulence factors (isolates, numbers, synergies and increased pathogenicity), location (superficial or deep), host response (in chronic and acute wounds), diagnosis of infection (clinical signs and symptoms, sampling and analysis) and treatment methods based on both clinical and microbiological findings. Bowler encourages the reader to be aware of the "Microbial Continuum," which follows the microbial progression to wound infection through a series of stages that reflect on host control vs. microbial control. Through the use of figures and a clinically applicable discussion, this article provides an informative and excellent resource for the wound-care clinician.

Preventing Foot Ulceration and Amputation by Decompressing Peripheral Nerves in Patients with Diabetic Neuropathy

Author: Dellon AL

Publication:
Ostomy/Wound Management. 2002;48(9):36-45

Reviewer: Shane Inlow, MD

The article starts with a comprehensive review of the pathophysiology of peripheral nerve compression in people with diabetes (PWD). The treatments for neuropathy are reviewed, acknowledging the poor outcomes and frequent side effects of current medications. Selection of patients for surgical decompression is then discussed. While the monofilament #5.07 is useful in identifying the loss of protective sensation, by the time the monofilament test is positive, axonal loss is severe and most often past the point of successful surgical intervention. The author uses the Pressure-Specific Sensory Device (PSSD), which measures two-point discrimination and can identify the earliest degree of chronic nerve compression.

But what if you don't have access to a PSSD? In the author's opinion, "The most valid prognostic indication for a good result from decompression of a nerve in the person with diabetes with symptoms of neuropathy is the presence of a positive Tinel's sign."

The results of surgical decompression of peripheral nerves in carefully selected people with diabetes is then discussed. The author reports that, on average, pain was "relieved in 86% of patients, and 72% recovered useful two-point discrimination." Of great interest is that, of the 43 patients currently in this ongoing study, none has developed an ulcer or amputation on the surgically decompressed side, while seven ulcers and two amputations occurred in the contralateral leg of this same group.

The conclusion discusses the importance of evaluating a limb for the presence of a Tinel's sign over sites of peripheral nerve compression (back to the anatomy/neurology texts!). The next step is to refer to a surgeon trained in peripheral nerve decompression techniques. This procedure offers the hope of preventing ulcers or amputations in PWDs at risk.

The Validity of Clinical Signs and Symptoms Used to Identify Localized Chronic Wound Infection

Author: Gardiner SE, Frantz RA, Doebbeling BN

Publication:
Wound Rep Reg. 2001;9:178-186

Reviewer:
David H. Keast, MSc, MD, FCFP

The diagnosis of wound infection in chronic wounds remains a significant challenge for clinicians. Classically, wounds with $>10^5$ cfu per gram of tissue are considered to be infected, but this diagnostic tool is unavailable to the majority of wound-care clinicians. Surface swabs are fraught with many difficulties and are the subject of much debate. While the classic signs and symptoms of infection (pain, erythema, edema, heat and purulence) may be present in grossly infected acute wounds, more subtle signs of infection in chronic wounds were postulated by Cutting and Harding in 1994[1]. These included increased serous exudate, delayed healing, discoloration of granulation tissue, friable granulation tissue, pocketing at the base of the wound, foul odour and wound breakdown. Bowler[2] has also suggested that not only the number of bacteria in the wound but also their virulence and host defenses must be considered in diagnosing infections (see Orsted review of Bowler article).

Gardiner and her colleagues developed a 12-item clinical signs and symptoms checklist to test the validity of these signs and symptoms in identifying wound infection. The checklist was tested for content validity and inter-rater reliability. The wounds were biopsied for quantitative culture. In all, 36 wounds were studied. Arterial ulcers were excluded. Thirty-one per cent of the wounds were found to be infected. Increasing pain, friable granulation tissue, foul odour and wound breakdown were found to be valid clinical markers of infection, based on sensitivity, specificity, discriminatory power and positive predictive value.

This is a landmark study. It provides clinicians with a validated practical set of clinical signs and symptoms for the diagnosis of infection in chronic wounds.

References

1. Cutting KF, Harding KG. Criteria for identifying wound infection. *J Wound Care*. 1994;3:198-201.
2. Bowler PG. The 10^5 bacterial growth guideline: reassessing its relevance in wound healing. *Ostomy/Wound Management*. 2003;49(1):44-53.

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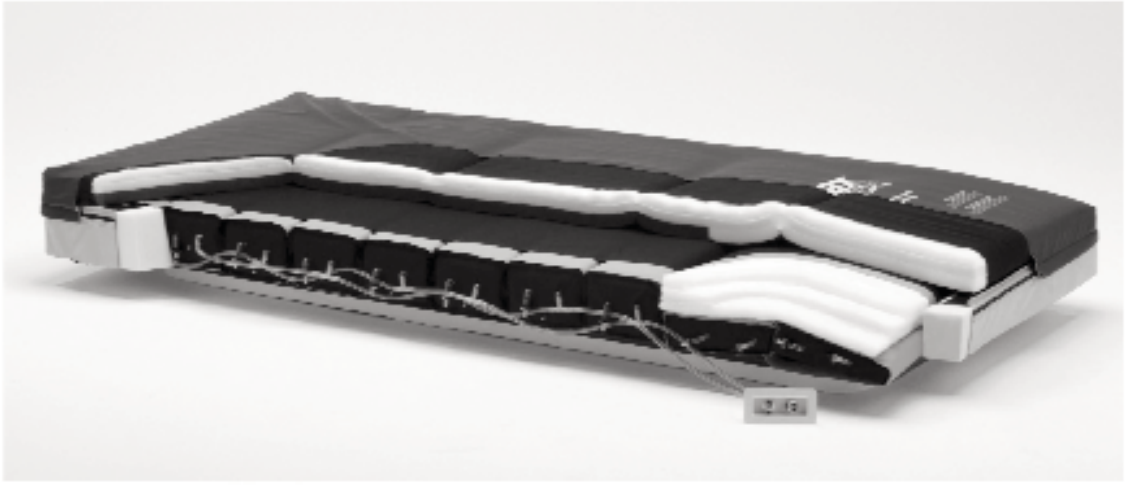

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