

# Electro-acupuncture therapy for Pressure Ulcer: A Case Report

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## Abstract

**Background:** Pressure ulcers are one of the most common complications in patients with spinal cord injury (SCI). Treatment with drugs has limited response and potential significant side-effects. Electrical stimulation has been reported to be effective in treating pressure ulcers. There has not been reported on the effect of electro-acupuncture (EA) for pressure ulcers specifically. Here, we report a successful case of using EA to promote wound healing of pressure ulcers. **Methods:** A woman with SCI, who presented with a stage III pressure ulcer on sacral region, was treated with EA therapy. **Results:** The result produced a significant reduction in wound surface area (WSA) and an improvement in wound appearance after four weeks treatment. **Conclusion:** EA therapy should be considered to accelerate wound healing of pressure ulcers.

**Key words:** Electro-acupuncture; Pressure ulcer; Wound healing; Spinal cord injury

## Introduction

Pressure ulcers (also known as bedsores, pressure sores or decubitus ulcers) are areas of localized injury to the skin and/ or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear. They are widespread, expensive, and painful health care problems, with prevalence rates ranging from 0.4% to 38% in acute care, 2.2% to 23.9% in long-term care and 0% to 17% in home care (Lyder, 2003). In addition, these kinds of ulcers often represent a major burden of sickness and reduced quality of life for patients and their carers, and are costly to health service providers. It is estimated that 60% patients with SCI might develop pressure ulcers, and the cost of treating a single full-thickness pressure ulcer is about \$70 000 (Garber *et al.*, 2003). In this study, we describe a successful case report of pressure ulcer patients with EA intervention.

## Case Presentation

A 42-year-old woman was admitted to our department because of a pressure ulcer on her sacral region, which had lasted for four months. She suffered from SCI at C6-7 level because of tumbling injury in March 2012, causing paraplegia, and developed a sacral pressure ulcer one month later due to a long-term bed rest and impaired hemodynamics. She had treated in other hospital for 5 months with standard wound care (moving around and changing position two hours at a time, and using mattresses) before the current hospitalization, but the efficacy was negative.

Physical examination performed on admission to our hospital. A grade III pressure ulcer (4.0 cm long and 2.5cm wide) with WSA 7.77cm<sup>2</sup>, measured by KP-21C (Placom Digital Planimeter, Japan) was in the sacral region (Figure 1). The ulcer appearance was red, and a (0.5 cm × 0.5 cm × 2.5cm) hole with yellow pus in the wound center. The patient was not fever and had normal diet.

Initially, she was admitted to a surgery department, and underwent surgical debridement. Then, she was transferred to acupuncture department, and treated with EA intervention. Two

disposable, sterile needles (0.30× 13mm) were inserted 1cm away from the bilateral wound margins. EA apparatus (Bio Medical™ Life Systems, USA) was connected to the needles with frequency of 0.5Hz and current intensity of 500μA for 30 minutes, five days a week. The ulcer was covered with gauze after each treatment.

### Results

No significant changes except little exudation of ulcer were found one week later after EA intervention. The WSA showed a little change after two weeks, however, the depth of wound decreased obviously, from original depth of 2.5 cm (Figure 1) to present depth of 1.0 cm (Figure 2). WSA decreased from 7.77cm<sup>2</sup> to 1.45 cm<sup>2</sup>, and depth declined to 0.2 cm after four weeks treatment with a total of 20 times EA intervention (Figure 3). Unfortunately, the patient was transferred to Respiratory Ward because of serious pneumonia before the ulcer healed, so the final data of the pressure ulcer was not collected.

### Discussion

Though encouraging effects of electrical stimulation and acupuncture for pressure ulcers (Ovington, 1999), arterial and venous ulceration (Bacchini *et al.*, 1979), using EA for treating pressure ulcers is less reported (Di Bernardo *et al.*, 1980). We used EA for a pressure ulcer in sacral area and achieved successful outcome. WSA has been used as an important healing index in previous reports (Griffin *et al.*, 1991). So, we evaluated the EA effectiveness by the change of WSA, and it showed positive effects and no side-effects during the treatment.

EA on pressure ulcers is thought to be through both acupuncture effect and microcurrent electrical stimulation action. It has been reported that acupuncture can relieve inflammation (Scognamillo Szabô *et al.*, 2004), improve local blood circulation (Guangjun *et al.*, 2012; Huang *et al.*, 2012), and stimulate wound healing factors, such as fibroblast growth factors (FGF) and platelet-derived growth factors (PDGF) in experimental study (Wang *et al.*, 2005).

In addition, it has also been reported that microcurrent electrical stimulation can promote adenosine triphosphate (ATP) production (Cheng *et al.*, 1982); stimulate dermal fibroblasts and U937 cells to secrete transforming growth factor-β1, which can regulate cell-mediated inflammation and tissue regeneration (Todd *et al.*, 2001); and also might work as antioxidants to enhance normal function of β-cells and vascular tissue (Lee *et al.*, 2009).

In sum, the both effect of acupuncture and microcurrent electrical stimulation can promote wound healing, so EA also might enhance pressure ulcers healing. For example, a study reported that EA can speed up the recovery process of wound healing, because of increasing blood flow to ulcerous tissue (Di Bernardo *et al.*, 1980).

The result of this case report suggested that EA may promote the healing of pressure ulcers. We used EA device with microcurrent, and it is reported that microcurrent has been investigated to enhance wound healing successfully (Bach *et al.*, 1991; Carley *et al.*, 1985).

### Conclusion

This case report demonstrated that EA therapy should be considered to promote wound healing of pressure ulcers. Further study is still needed to prove efficacy and explore its mechanism of EA therapy for pressure ulcers.

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### References

- Bacchini M, Conci F, Rocchia L, Carrossino R. Circulatory disorders and acupuncture. *Minerva Med.* 1979; 70(24):1755-1857.
- Bach S, Bilgrav K, Gottrup F, Jorgensen TE. The effect of electrical current on healing skin incision: an experimental study. *Eur J Surg.* 1991; 157(3):171-174.

- Carley PJ, Wainapel SF. Electrotherapy for acceleration of wound healing: low intensity direct current. *Arch Phys Med Rehabil.* 1985; 66(7):443-446.
- Cheng N, Van Hoof H, Bockx E, Hoogmartens MJ, Mulier JC, De Dijcker FJ, Sansen WM, De Loecker W. The effects of electric currents on ATP generation, protein synthesis, and membrane transport of rat skin. *Clin Orthop Relat Res.* 1982; 171:264-272.
- Di Bernardo N, Crisafulli A, Gemelli F, Ferlazzo F, Cucinotta E, Foti A. Experimental research on the effect of electro-acupuncture on reparative processes. *Minerva Med.* 1980; 71(51):3709-37013.
- Garber SL, Rintala DH. Pressure ulcers in veterans with spinal cord injury: a retrospective study. *J Rehabil Res Dev.* 2003; 40(5):433-441.
- Griffin JW, Tooms RE, Mendius RA, Clift JK, Vander Zwaag R, el-Zeky F. Efficacy of high-voltage pulsed current for healing of pressure ulcers in patients with spinal cord injury. *Phys Ther.* 1991; 71(6):433-444.
- Guangjun W, Yuying T, Shuyong J, Tao H, Weibo Z. Change of blood perfusion in Hegu acupoint after contralateral Hegu acupoint was stimulated. *J Altern Complement Med.* 2012; 18(8):784-788.
- Huang T, Wang RH, Zhang WB, Han B, Wang GJ, Tian YY, Zhang YQ. The influence of different methods of acupuncture on skin surface perfusion. *J Tradit Chin Med.* 2012; 32(1):40-44.
- Lee BY, Al-Waili N, Stubbs D, Wendell K, Butler G, Al-Waili T, Al-Waili A. Ultra-low microcurrent in the management of diabetes mellitus, hypertension and chronic wounds: Report of twelve cases and discussion of mechanism of action. *Int J Med Sci.* 2009; 7(1):29-35.
- Lyder CH. Pressure ulcer prevention and management. *JAMA.* 2003; 289(2):223-236.
- Ovington LG. Dressings and adjunctive therapies: AHCPR guidelines revisited. *Ostomy Wound Manage.* 1999; 45(1A):94S-106S.
- Scognamillo Szabô MVR, Bechara GH, Cunha FQ. Involvement of Corticoid and Cytokines in the Anti-Inflammatory Effect of Acupuncture on Carrageenan-Induced Peritonitis in Rats. *J Chinese Soc Trad Vet Sci.* 2004; 84-96.
- Todd I, Clothier RH, Huggins ML, Patel N, Searle KC, Jeyarajah S, Pradel L, Lacey KL. Electrical stimulation of transforming growth factor-beta 1 secretion by human dermal fibroblasts and the U937 human monocytic cell line. *Altern Lab Anim.* 2001; 29(6):693-701.
- Wang TT, Yuan Y, Kang Y, Yuan WL, Zhang HT, Wu LY, Feng ZT. Effects of acupuncture on the expression of glial cell line-derived neurotrophic factor (GDNF) and basic fibroblast growth factor (FGF-2/bFGF) in the left sixth lumbar dorsal root ganglion following removal of adjacent dorsal root ganglia. *Neurosci Lett.* 2005; 382(3):236-241.



**Figure 1.** Pressure ulcer before EA intervention.      **Figure 2.** Two weeks after EA treatment.



**Figure 3.** Four weeks after EA treatment.

## **The clinical application review of fire needle in Acne, Herpes Zoster and Wart**

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**Abstracts:** Fire needle therapy has its unique advantages, such as short course, simple and easy treatment. It has been more and more applied in clinical up to now. Especially for treating Acne, Herpes Zoster and Wart, it can dispel cold, remove dampness, dissipate stasis, unblock collateral, clear heat, remove toxin, expel pus and relieve pain by stimulating yang. Therefore, the author reviews the three dermatoses treated by fire needle recently. In order to explore its further scope and objects, promote its rapid development and provide more reliable theoretical bases.

**Keywords:** Fire needle, Acne, Herpes Zoster, Wart, Review

### **1 Introduction**

Fire needle is a kind of moxibustion in the ancient. It was called big needle, burnt needle, white needle and warm needle. It is made by burnt-red metal. Doctors with fire needle quickly insert the acupoints or lesions to treat disease. It has been widely used in clinical, especially in Dermatology, with short course and quick effect.

### **2 Pathogenic Mechanisms**

At present, the study on the mechanism of fire needle is very few. Zhang Xiaoxia<sup>[1]</sup> thinks there is an overlap of the pain stimulation effect, exciting lesions and regulating leukocyte. Fire needle can not only enhance local blood supply<sup>[2]</sup>, but also promote leukocyte exudation and improve phagocytic function. Therefore, fire needle can soften hardness, relieve pain and promote the absorption of inflammation<sup>[3]</sup>.

### **3 Case report**

#### **3.1 Acne**

An 24-year-old female patient was hospitalized due to the face, chest and back acne for three years. The pressure of work and study may make the symptoms worse. Pain affects normal life so that the patient had been treated for several dermatologists with poor efficacy.