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## REVIEW OF LITERATURE

### MANAGEMENT OF PRESSURE ULCER IN SPINAL CORD INJURY SUBJECTS

\*Dr. Sneha Bhatia

Vinayaka Institute of Physiotherapy, Anand, Gujarat, India

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#### ABSTRACT

**Introduction:** Pressure ulcer is the lifelong and serious complications following the spinal cord injury. They have a potential to interfere with Physical, psychological and social wellbeing and to impact the quality of the life. Pressure ulcers are defined as the lesion caused by unrelieved pressure resulting in damage of underlying tissue (Bergstorm *et al.*, 1992). They usually occur over the bony prominence and are classified as degree of tissue damage.

**Materials and Methodology:** A through literature search was done Through mentioned database and a total of 37 articles were obtained out of which 19 articles were included in the study. The results of the studies were analyzed.

**Discussion:** Different studies showed effects of different treatment techniques on pressure ulcer. It has been classified as positive, negative and conflicting evidence in this review.

**Conclusion:** Decubitus direct current treatment, turning every 4 hours on a Visco Elastic mattress, Ultraviolet radiation (type B), electrical stimulation, foam mattress and multi layered high compression is found to be effective to treat pressure ulcer in patients with spinal cord injury.

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## INTRODUCTION

**Pressure ulcer** is the lifelong and serious complications following the spinal cord injury. They have a potential to interfere with physical. Psychological and social wellbeing and to impact the quality of the life. Pressure ulcers are defined as the lesion caused by unrelieved pressure resulting in damage of underlying tissue (Bergstorm *et al.*, 1992). They usually occur over the bony prominence and are classified as degree of tissue damage (Cuddigan and Frantz, 1998). Pressure ulcer prevalence rates range from 8 percent 1 year following the onset of SCI to 33 percent for community-resident individuals with SCI.<sup>1</sup>

➤ The following figure shows the predominant pressure points: Figure 1

So many treatment options are available at present for the management of pressure ulcer. Therefore evidence based treatment should be followed. Evidence based physiotherapy is defined as 'The conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients.' It consist of clinical experience, research evidence and patients goals and values. (Sackett, D.L. Rosenberg)

## Goal

1. To find out the role of physiotherapy in the management of pressure ulcers.
2. To propose Evidence based protocol for the effective management of pressure ulcers

## MATERIALS AND METHODS

A through literature search was done thorough above mentioned database and a total of 37 articles were obtained out of which 19 articles were included in the study.

## GRADING OF PRESSURE ULCER

**Grade 1:** Non-blanch able erythema of intact skin. Discoloration of the skin, warmth, edema, in duration or hardness may also be used as indicators, particularly on individuals with darker skin - in whom it may appear blue or purple.

**Grade 2:** Partial thickness skin loss involving epidermis, dermis, or both. The ulcer is superficial and presents clinically as an abrasion or blister. Surrounding skin may be red or purple.

\*Corresponding author: Dr. Sneha Bhatia,  
Vinayaka Institute of Physiotherapy, Anand, Gujarat, India.

**Findings**

Source	Method	Outcome	Result
Treatment of pressure ulcer MadhuriReddy et al. (2008)	A systematic review including 103 RCT	healing	Little evidence for dressing, surface support and adjunctive therapy
The effect of various combinations of turning and pressure reducing devices on the incidence of pressure ulcers Tom Defloor, Dirk De Bacquer and Maria H. F. Grypdonck (2005)	A comparative study using different mattress	incidence	Turning every 4 h on a ViscoElastic mattress showed reduction in the number of pressure ulcer lesions.
Decubitus direct current treatment of pressure ulcers Abraham Adynskya, AviOhry (2005)	A RCT double blinded including 63 patients	Healing ulcers.	of DDCT is useful for accelerating healing in grade 3 pressure ulcers.
The effect of ultraviolet radiation (type B) on decubitus ulcers Onigbinde AT, Adedoyin RA (2010)	Case series using 10 subjects.	Healing ulcers.	of UVB had significant effects in promoting would healing.
A systematic review of electrical stimulation for pressure ulcer prevention and treatment in people with spinal cord injuries. Liu LQ, Moody J. (2014)	Systematic review.	Healing ulcers.	of A significant effect of ES on enhancement of PU healing is shown in limited Grade I evidence.
Effect of electromagnetic therapy on healing of pressure ulcers Olyaeemanesh A And Flemming K And Cullum NA (2010)	Review of randomized controlled trial.	Healing ulcers	of No evidence to support this.
Repositioning for treating pressure ulcers MooreZeh And Cowman S. (2012)	Review of RCTS of different positioning with no repositioning.	Healing ulcers.	of No evidence to support this.
Ultrasound and treatment of pressure sores T McDiarmid, P N Burns. (1985)	Preliminary double blind RCT	Healing	Ultrasound increases the rate of healing.
Wound care management: beds and compression and laser therapy and ultrasound and electromagnetic therapy Cullum N and Nelson E A. (2001)	Systematic review	Healing	Foam alternatives reduce the incidence of pressure sores. Multi layered high compression > compression > no compression. Insufficient evidence about the effectiveness of laser and ultrasound and electromagnetic therapy.
Comparison of ultrasound /ultraviolet C and laser in patients with SCI Ethle L and Nussbaum and Betsy Mustard. (1994)	Comparison study of 22 patients.	Healing	Ultrasound/ultraviolet C may decrease healing time.
Efficacy of high voltage pulsed current for healing of pressure ulcers in patients with SCI Judy W Griffin and Robert E Tooms. (1991)	Case series with 17 patients randomly assigned.	Healing	HVPC in conjunction with good nursing care can increase the healing rate.
Therapeutic ultrasound for pressure ulcer Baba Akbari Sari A, Cullum NA (2006)	Systematic review	Healing of pressure ulcer	of No evidence of benefit of Ultrasound therapy.
Efficacy of multiwavelength light therapy in the treatment of pressure ulcers in subjects with disorders of the spinal cord Arun B. TalyDMA, Krishan P. Sivaraman Nair DMA (2004)	Double blind RCT	Total healing of ulcer	Multi wavelength light therapy reduces the time taken for healing.
The effects of non-thermal pulsed electromagnetic energy on wound healing of pressure ulcers in spinal cord-injured patients Salzberg CA, Cooper-Vastola SA (1995)	A Randomized double blind study	Healing of pressure ulcers.	Stage II pressure ulcers, active non-thermal pulsed electromagnetic energy treatment significantly improved healing.

Figure 1: Pressure Points

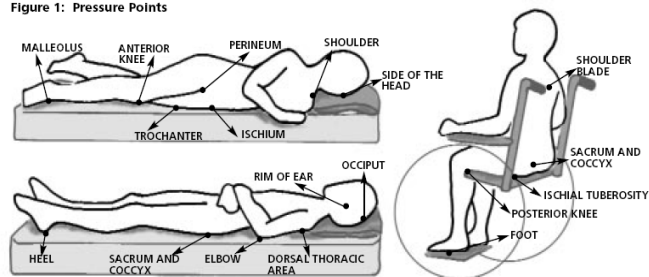
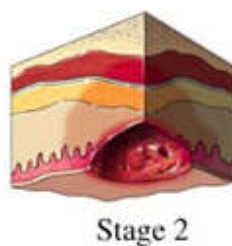


Figure 1.

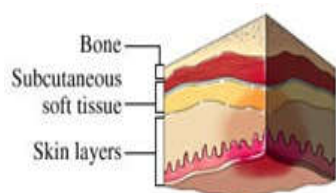


Stage 2



Figure 3.

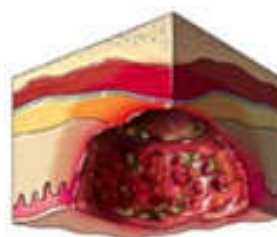
Stage 3: full thickness skin loss involving damage to or necrosis of subcutaneous tissue that may extend down to, but not through underlying fascia.



Stage 1



Figure 2.

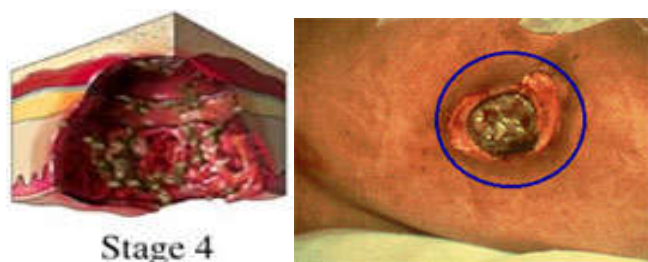


Stage 3



Figure 4.

**Stage 4:** Extensive destruction, tissue necrosis, or damage to muscle, bone, or supporting structures with or without full thickness skin loss. Extremely difficult to heal and predispose to fatal infection.



**Figure 5.**

## DISCUSSION

Pressure ulcer is one of the major complications which patients of spinal cord injury experience. If not treated properly it can be devastating. Secondary infections may occur and can even lead to death of the patient. Physiotherapists can play a major role in preventing as well as providing treatment for pressure ulcer. Literature review done in this study showed that turning patients every four hours, electrical stimulation, UVB, decubitus direct current treatment can be very effective in treating pressure ulcer. There are different studies available on efficacy of LASER, ultrasound, UVC, electromagnetic therapy on pressure ulcer, but conflicting evidence was found. Future studies should focus on the effect of various techniques for treating pressure ulcer. Grade wise treatment protocol will be more effective than general guidelines.

## Conclusion

### Positive Evidence

1. Decubitus direct current treatment
2. Turning every 4 h on a ViscoElastic mattress
3. Ultraviolet radiation (type B)
4. Electrical stimulation
5. Foam mattress and multi layered high compression
6. High voltage pulsed current in conjugation with nursing care
7. Multi wavelength light therapy in grade 3 and 4 pressure ulcer
8. Non thermal pulsed electromagnetic energy in grade 2 pressure ulcer

### Negative Evidence

1. Electromagnetic therapy
2. Repositioning for treating pressure ulcers

### Conflicting Evidence

1. Dressing and surface support
2. Laser
3. Ultrasound
4. Electromagnetic therapy
5. Ultraviolet radiation type C

### Conflict of interest

Author reports no conflict of interest.

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