

Influence of Physiotherapy in the Vigilant Revitalisation of Decubitus Ulcer: A Case Report

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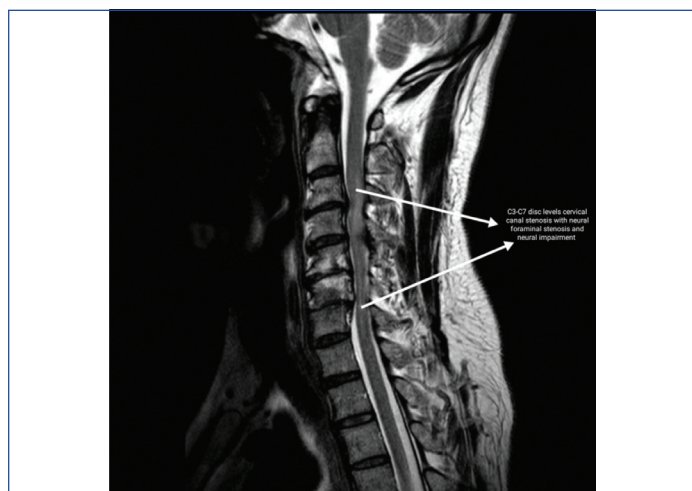
ABSTRACT

Decubitus ulcer seems to be the most typical side-effects seen in chronic patients due to postspinal cord injury, various neurological conditions and prolonged periods of immobilisation. This is a type of skin and soft tissue lesion that develops as a result of prolonged or continuous skin pressure. All of the pressure sensitive sites are the occiput, trochanters, sacrum, malleoli and heel. A 43-year-old male patient experienced road traffic accident that resulted in cervical spinal cord injury and was bed ridden for the past five months, developing grade 4 bed sores over bilateral buttocks and sacral region. Magnetic Resonance Imaging (MRI) of the dorsal spine revealed cervical canal stenosis with neural foramina stenosis and neural impairment at C3-C4 to C6-C7 disc levels. Braden score and functional independence measures were the outcome measures used to evaluate patient condition. Physiotherapy was initiated to deal with symptoms such as lower limb weakness, bed sores in the bilateral buttock and sacral region and hand activities. It entailed a variety of therapeutic approaches aimed at teaching patient transfers and bed mobility as well as making the patient functionally independent. Laser therapy had been used to speed wound healing and to explore if it is beneficial in combating massive, chronic pressure sores. In this case, it was also demonstrated that advanced physiotherapy rehabilitation, which included laser therapy, was advantageous to the patient and led to significant outcomes after a spinal cord injury.

Keywords: Cervical spinal cord injury, Laser therapy, Outcome measures, Physiotherapy rehabilitation

CASE REPORT

A 43-year-old male patient came to the Casualty Department with the main complaint of lower limb paraparesis. The patient had a history of a Road Traffic Accident (RTA) that occurred five months back, resulted in head trauma, loss of consciousness and cervical cord injury. Cervical canal stenosis with neural foramina stenosis and neural impairment at C3-C4 to C6-C7 disc levels revealed on Magnetic Resonance Imaging (MRI) of the dorsal spine on day three of the accident. There was minimal collection of fluid in the prevertebral region at the C4-C5 vertebral level [Table/Fig-1]. Patient underwent surgery to treat cervical myelopathy after a month. Antibiotics, analgesics, antacids, antiepileptics, and other supportive medicines were given to the patient postoperatively. Vital signs, haemodynamics and neurological state were all stable in the patient. The patient had been bed ridden for the past five months. Grade 4 bed sores over bilateral buttocks and sacral region were present [1].



[Table/Fig-1]: Magnetic resonance imaging of dorsal spine.

After taking the informed consent from the patient, for symptoms such as weakness in both lower limbs, bed sores in the bilateral

buttock and sacral region and for hand activities physiotherapy was initiated. Admission to the hospital was done after five months for the present complaint and physiotherapy rehabilitation began after five days of admission according to the timeframe. The patient was attentive, oriented to time, place and person. Intelligence and memory were normal on general evaluation, according to the Mini-Mental State Examination (MMSE) [2]. When limbs were palpated, they had reduced muscle strength in their bilateral lower limbs, scoring a 0/5 for lower limb and 3/5 for upper limb on the Manual Muscle Testing (MMT) scale [3]. Deep and cerebral sensations were unaffected but active Range of Motion (ROM) in the joints of both lower limbs was compromised. Babinski sign was positive in the right ankle jerk response. Bladder and bowels were both significantly affected. On local examination, a bed sore measuring 10×15 cm on the left side and 8×12 cm on the right side was found, along with skin discoloration that seemed to be black with foul smelled drainage. The Functional Independence Measures (FIM) score was 75/126 and the Braden score was 7/23 [4,5]. [Table/Fig-2,3] showing illustrations of bed sores before and after therapy.



[Table/Fig-2]: Decubitus ulcer before treatment.

[Table/Fig-3]: Healing of ulcer after therapy. (Images from left to right)

Therapeutic Intervention

The patient was given the following interventions while in bed: upper limb strength training, lower extremity passive motions, position into prone and lateral lying, hand activities, passive stretches [Table/Fig-4]. Laser therapy was also given for four weeks with a 15 day

follow-up. The non contact, continuous beam emission (non pulsing) at 658 nm wavelength, Light cure Gallium-Aluminum-Arsenide (GaAlAs) class IV near-infrared laser was applied. The following dosage parameters were used: 7-10 watts power; dose range 6 J/cm²-9 J/cm²; sacral area (10×5) cm² at different energy densities; treatment time ranged between 8-15 minutes for ulcer five times per week for one month [6]. The grid method was used to spread the wound area and the application was done with a non contact probe moving at 1cm/second [Table/Fig-5]. The pretreatment and post-treatment follow-up and outcomes are shown in [Table/Fig-6].

Goals	Reasoning	Intervention (activities given)
To explain the condition to the patient and their relatives.	Skin discolouration, ulceration, drainage, or a foul odour from the ulcer site, as well as sense of discomfort, are all warning indicators [7].	Patient education: As indicated in [Table/Fig-7], the patient's position was changed for every two hours. Water mattresses were recommended to the patient. They were also taught about eating a healthy, balanced diet, washing their bodies with a gentle sponge or cloth, and using a moisturiser and lotion on the skin. The patient was instructed to keep his groin clean and dry.
To relieve joint pain by lengthening painful and tight muscles.	Stretched muscles can support more weight and achieve full range of motion with ease [7].	Stretching: To prevent contractures quadriceps, hamstrings and adductor muscles of both lower limbs were administered.
To encourage blood flow and prevent stiff joints.	It can help the patient by stimulating and strengthening neuronal connections in the spinal cord [7].	Range of motion exercises: The patient was given ankle toe movements, heel slides, straight leg raises and hip abduction ROM exercises. Because the patient's upper limbs are strong enough, ROM exercises had been tried on his own [7].
To sustain muscle mass.	Maintaining muscle mass will make daily chores easier to perform and regain independence after a spinal cord injury [7].	Strengthening exercises: Transitions, bed mobility, and locomotor re-education all demand upper arm muscular strengthening as seen in [Table/Fig-8,9]. The patient was given task-oriented reaching, manipulating and grasping activities using a smiling ball, rubber band, and holding glass, as well as upper extremity weight-bearing exercises for postural support.
To maintain physical and mental fitness.	Neuroadaptive alterations rarely emerge after a single physiotherapy session. As a result, physiotherapy activities must be performed at home [7].	Home-based physiotherapy programs: When patients with sacral ulcers sit properly in upright or forward lean positions, their weight moves onto their thighs and away from the sacrum, speeding up the healing process of grade III-IV bed sores.

[Table/Fig-4]: Shows therapeutic intervention with goals and reasoning.

Treatment week	Power (watts)	Site and time (minutes)	Dosage (joules/cm ²)
Week 1	10	Sacral area- 15 minutes	9
Week 2	10	Sacral area- 15 minutes	9
Week 3	7	Sacral area- 8 minutes	6
Week 4	7	Sacral area- 8 minutes	6

[Table/Fig-5]: Depicts the laser therapy intervention week by week.

Outcome measures	Day of admission	Day of discharge (After a month of treatment)	Follow-up (After 15 days of discharge from hospital)
Braden scale	7/23	13/23	17/23
Functional independence measures	75/126	95/126	95/126
Manual muscle testing	0/5 for lower limb muscles 3/5 for upper limb muscles	1/5 for lower limb muscles 4/5 for upper limb muscles	1/5 for lower limb muscles 4/5 for upper limb muscles

[Table/Fig-6]: Illustrates the pretreatment and post-treatment follow-up and outcomes.



[Table/Fig-7]: Positioning done with the help of pillows.

DISCUSSION

Decubitus ulcers, commonly known as bed sores or pressure ulcers, are skin and soft tissue injuries that develop as a result of continual or sustained skin pressure over bony areas [8]. First, second, third and fourth stage incidence rates for pressure ulcers were 45% (95% CI: 34-56), 45% (95% CI: 34-56), 4% (95% CI: 3-5) and 4% (95% CI: 2-6), respectively. The orthopaedic surgery ward's patients had the highest incidence of pressure ulcers (18.5%) (95% CI: 11.5-25) [9]. Pressure ulcers are progressive in nature, largely caused by pressure and shear and are most frequently observed in



[Table/Fig-8]: Patient was performing upper limb (90° upper limb flexion).

[Table/Fig-9]: Patient was performing full range exercise. (Images from left to right)

bedridden, chair bound, or immobile individuals. The failure of the reactive hyperaemia cycle in the pressure prone area continues to be the most significant etiopathology [10]. The diagnosis of infection is difficult and is dependent on a mix of primary and secondary clinical symptoms, tissue in the wound, the condition of the wound environment, inflammation indicators and findings from the gold-standard microbiological investigation of targeted samples. Important clinical criteria known as NERDS-STONEES are used to distinguish between deep tissue infection and critical colonisation when making an infection diagnosis. Pressure ulcer infections occur 5-80% of the time and biofilm is present in 90% of cases [11].

In this case report, it was shown that in contrast to the other studies listed below, very advanced physical therapy rehabilitation, which included patient education, laser treatment, stretches, strength training, range of motion exercises, and home-based exercise regimens, had a significant positive impact on the patient's quality of life. The present state of knowledge and improved therapeutic options for pressure ulcers has received special attention. Similar to a study done by Bhattacharya S and Mishra RK, role of stress relieving items like pillows and mattresses in the therapy strategy was also highlighted in the case report [10]. Exercises were used in spinal cord injury treatment to increase functioning. Because each spinal cord injury is different, each person needs a customised rehabilitation approach. Following a spinal cord injury, a physiotherapist will assess one's functional skills, provide a specific training program, and assist patients in achieving realistic recovery

objectives [12]. There are currently a number of different ways to treat a wound, like debridement, improved dressings, use of antibiotics and reconstructive surgery.

The benefits and drawbacks of both the present and newer approaches have also been examined, along with novel therapeutic possibilities such as negative pressure wound therapy, hyperbaric oxygen therapy and cell therapy [10]. The treatment of pressure ulcers using laser therapy at a wavelength of 658 nm appeared to be successful. In one investigation, the wavelengths of 808 and 940 nm had no impact [6]. Physical methods with an emphasis on lasers, shockwaves, photodynamic treatment, Ultraviolet B (UVB) therapy and lights, are most frequently employed in the management of wound healing. These modalities require further attention and should be kept in mind while treating persistent ulcers in order to determine the ideal wavelength, dosage, approach and crucially proper treatment protocols [13]. More gait retraining and standardised Activities of Daily Living (ADL) programs are needed to perhaps enhance healing and rehabilitation, as well as to promote therapy in the gym rather than the ward as often as possible to lessen the impact of pressure sores [14]. The goal of the study was to determine how physiotherapists handle patients with paraplegia and sacral pressure ulcers as well as the efficacy of laser therapy for treating large and severe pressure ulcers.

CONCLUSION(S)

In this case study, it was demonstrated that very advanced physical therapy rehabilitation, which included laser treatment, stretches, strength training, range of motion exercises and home-based exercise regimens, had a considerable positive influence on the patient's quality of life. Authors found that physiotherapy helped the patient to understand about the condition by giving them the

necessary training, by using different therapeutical techniques. Effect of Laser therapy in treating large, chronic pressure sores had also been studied.

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