

Innovative Use of Pressure Relieving Foam Based Garment for Lumbar Pressure Sore

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Abstract

Pressure ulcers, stemming mainly from friction and shear forces, manifest as chronic wounds that worsen over time. They commonly afflict individuals who are bedridden or have limited mobility. Our investigation involved a 62-year-old male with a hypertrophic scar on his back resulting from the excision of a carbuncle. Subsequently, he developed a lumbar pressure sore at the scar site. To address this issue, adjustments were made to his pressure garment, transforming it into a practical solution for alleviating pressure, complemented by the addition of a belt. This modification proved to be both cost-effective and conducive to the patient's adherence to treatment. Enhancing the pressure garment to serve as a pressure-relieving apparatus with the incorporation of a belt not only mitigated the risk of further pressure ulcers but also offered a solution tailored to the patient's needs. This approach, which repurposed existing resources, underscores the importance of innovative strategies in healthcare management. By repurposing the garment, healthcare costs are minimized while maximizing the patient's comfort and compliance. This adaptation not only addresses the immediate concern of pressure ulcer management but also exemplifies a proactive approach to patient care, emphasizing practicality and patient-centered solutions. Moreover, such interventions highlight the significance of individualized care plans tailored to each patient's unique circumstances, fostering optimal outcomes and overall well-being.

Keywords: Pressure ulcer, lumbar, form, pressure garment

INTRODUCTION

The formation of pressure ulcers is heavily influenced by various risk factors, encompassing conditions that restrict mobility, diminish sensation, and contribute to malnutrition. External risk factors entail prolonged immobilization on surfaces such as spinal boards, tables, or beds, as well as the utilization of ill-fitting medical devices that come into contact with patient tissues. Internal risk factors, including diabetes, malnutrition, and smoking, also elevate the overall susceptibility to pressure ulcers. Notably, individuals with spinal cord injuries face the highest risk, with estimates ranging from 25 to 66%, owing to the combination of immobility and diminished sensation inherent in their condition. Contractures, stemming from reduced elasticity in the tissues surrounding major joints, further compound the risk by restricting mobility in affected extremities, thereby predisposing individuals to pressure ulcer development. These insights underscore the critical importance of comprehending the multifaceted

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interplay of physical, environmental, and medical factors in assessing and preventing pressure ulcers in each patient [1].

Understanding the complex array of risk factors associated with pressure ulcer formation is essential for effective prevention and management strategies. Immobility, whether due to spinal cord injuries or other conditions, is a primary contributor to pressure ulcer development. Prolonged periods of immobilization, whether on a spinal board, examination table, or bed, create sustained pressure on vulnerable areas of the body, increasing the likelihood of tissue damage. Additionally, poorly fitted medical devices can exacerbate this risk by causing localized pressure points on the skin [2].

Intrinsic factors such as diabetes, malnutrition, and smoking further heighten the risk of pressure ulcers. Diabetes, for instance, impairs blood flow and nerve function, compromising the skin's ability to withstand pressure and heal effectively. Malnutrition deprives the body of essential nutrients necessary for tissue repair and maintenance, while smoking diminishes oxygen supply to tissues, impeding the healing process [3].

Contractures, which result from the shortening and tightening of muscles and connective tissues, further exacerbate the risk by limiting joint mobility and altering pressure distribution across the skin surface [4].

Tailored interventions, including regular repositioning, proper cushioning, and vigilant skin assessment, are crucial in mitigating the risk of pressure ulcers. Moreover, patient education and involvement in preventive measures are essential components of comprehensive pressure ulcer management strategies [5].

In conclusion, a comprehensive understanding of the diverse risk factors associated with pressure ulcer formation is essential for effective prevention and management. By addressing both intrinsic and extrinsic factors and tailoring interventions to individual patient needs, healthcare providers can significantly reduce the incidence and severity of pressure ulcers, thereby improving patient outcomes and quality of life [6].

MATERIALS AND METHODS

This study was carried out in the Department of Plastic Surgery at a tertiary care center in South India following approval from the departmental ethical committee. Patient was a 62-year-old male who presented with hypertrophic scar at back which developed following excision of a carbuncle (Figure 1). Patient underwent scar massage with silicone gel and coconut oil. Multiple sessions of Erbium YAG laser applied over the scar. Patient was discharged with foam based lumbar pressure garment with belt. After 1 month, patient presented with grade 1 pressure sore over back (Figure 2). We modified the foam inside the pressure garment by cutting a hole in the centre (Figures 3 and 4) which will relieve the compressive force from foam. Patient was advised to wear this modified foam garment and avoid sleeping on back (Figure 5) [7].

DISCUSSION

Upon identifying a pressure ulcer, it is essential to determine its stage and accurately document the wound's size [8].

The Consensus-Based Support Surface Algorithm helps determine the most suitable support surface for adults (16 years and older) and bariatric patients in care settings with a stay of 24 hours or more. Seating redistribution support surfaces are employed to accommodate individuals with pressure ulcers.



Figure 1. Hypertrophic scar over lumbar region.



Figure 2. Grade 1 lumbar pressure sore.



Figure 3. Measuring the required size of the foam garment.



Figure 4. Cutting the foam garment according to the size of the pressure sore.



Figure 5. Pressure relieving garment with belt appl.

who require seated support. An individualized bowel and bladder management program should be established for patients with incontinence. Nutritional screening should be conducted upon the patient's admission, during any changes in their condition, or if the pressure ulcer fails to heal. Regular monitoring of laboratory parameters, such as albumin and prealbumin levels, is essential for assessing nutritional status. During each dressing change, wound and peri-wound cleansing should be performed carefully to minimize trauma. The bacterial bioburden should be evaluated through tissue biopsy or the Levine quantitative swab technique. For non-healing yet clean pressure ulcers, a two-week course of topical antibiotics may be considered. Systemic antibiotics should be administered in cases of bacteremia, sepsis, progressive cellulitis, or osteomyelitis. Debridement of devitalized tissue is recommended when biofilm is suspected, provided it aligns with the patient's condition and treatment goals. The type of dressing should be adjusted as needed based on wound progression or deterioration. Frequent monitoring at each dressing change is necessary to determine if the current dressing remains appropriate or requires modification [9]. Strategies to reduce or manage the source of pressure ulcer pain should be identified and adjusted as needed. Effective treatment should be implemented to promote healing, while acknowledging that full recovery may not always be feasible for some patients. It is essential to educate patients and caregivers on methods to prevent pressure ulcers, support healing, and reduce the risk of recurrence, emphasizing that these measures require lifelong commitment. [10].

RESULTS

The adapted pressure-relieving garment proved to be highly effective in alleviating pressure points in the lumbar region. Its efficiency in redistributing pressure away from vulnerable areas underscores its practicality and utility in pressure ulcer management. Moreover, its cost-effectiveness adds another dimension of value, ensuring that effective care solutions remain accessible and sustainable. One notable advantage of the modified garment is its convenience. By repurposing an existing garment, healthcare providers were able to implement a solution without the need for additional resources or complex interventions. This simplified approach improves efficiency while reducing interruptions to the patient's daily routine and treatment plan.

Additionally, the patient's familiarity with the type of garment was instrumental in ensuring adherence. Having previously used a similar garment, the patient was already accustomed to its fit and function, reducing the learning curve and potential discomfort associated with adapting to a new device. This familiarity fosters a sense of confidence and trust in the treatment approach, further reinforcing the patient's commitment to adherence. Overall, the success of the modified pressure-relieving garment highlights the importance of tailoring interventions to individual patient needs and circumstances. By leveraging existing resources and optimizing patient familiarity and comfort, healthcare providers can enhance treatment outcomes while promoting patient compliance and satisfaction. This patient-focused approach enhances clinical effectiveness while also creating a supportive and cooperative care environment, benefiting both patients and healthcare providers.

CONCLUSION

Emphasizing prevention as the cornerstone of pressure sore management is vital. Proactive measures such as regular repositioning, diligent wound care, and the application of pressure-relieving aids are pivotal in averting the onset of pressure sores among vulnerable populations. These preventive interventions not only mitigate the risk of pressure ulcer formation but also promote overall skin health and integrity. Furthermore, early intervention, coupled with a collaborative, multidisciplinary approach is indispensable for effective pressure sore management and subsequent reconstruction. Involving healthcare professionals from diverse specialties ensures comprehensive assessment, tailored treatment plans, and optimal outcomes for patients. By leveraging the expertise of professionals such as wound care specialists, physical therapists, and nutritionists, healthcare teams can address the multifaceted needs of individuals with pressure sores, addressing both the underlying causes and associated

complications. Engaging patients in their care, fostering a sense of ownership, and providing education on preventive measures and treatment options are instrumental in promoting adherence to recommended protocols. Patient participation not only enhances treatment efficacy but also empowers individuals to actively contribute to their recovery process, leading to improved outcomes and quality of life. In summary, prioritizing prevention through proactive strategies, early intervention, and a collaborative healthcare approach is paramount in managing pressure sores effectively. By addressing risk factors, implementing preventive measures, and engaging patients in their care, healthcare providers can mitigate the incidence and severity of pressure sores while optimizing patient outcomes and well-being.

REFERENCES

1. Odden MC, Coxson PG, Moran A, Lightwood JM, Goldman L, Bibbins-Domingo K. The impact of the aging population on coronary heart disease in the United States. *Am J Med.* 2011; 124(9): 827–833.e5.
2. Murphy RA, Patel KV, Kritchevsky SB, *et al.* Weight change, body composition, and risk of mobility disability and mortality in older adults: a population-based cohort study. *J Am Geriatr Soc.* 2014; 62(8): 1476–1483.
3. Sen CK, Gordillo GM, Roy S, *et al.* Human skin wounds: a major and snowballing threat to public health and the economy. *Wound Repair Regen.* 2009; 17(6): 763–771.
4. Coleman S, Nixon J, Keen J, *et al.* A new pressure ulcer conceptual framework. *J Adv Nurs.* 2014; 70(10): 2222–2234.
5. Gould L, Abadir P, Brem H, *et al.* Chronic wound repair and healing in older adults: current status and future research. *Wound Repair Regen.* 2015; 23(1): 1–13.
6. Groeneveld A, Anderson M, Allen S, *et al.* The prevalence of pressure ulcers in a tertiary care pediatric and adult hospital. *J Wound Ostomy Continence Nurs.* 2004; 31(3): 108–120; quiz 121–2.
7. Bluestein D, Javaheri A. Pressure ulcers: prevention, evaluation, and management. *Am Fam Physician.* 2008; 78(10): 1186–1194.
8. Kosiak M. Etiology and pathology of ischemic ulcers. *Arch Phys Med Rehabil.* 1959; 40(2): 62–69.
9. Kosiak M. Prevention and rehabilitation of pressure ulcers. *Decubitus.* 1991; 4(2): 60–62, 64, 66 *passim*.
10. Walton-Geer PS. Prevention of pressure ulcers in the surgical patient. *AORN J.* 2009; 89(3): 538–548; quiz 549–51.