



Reviving Mobility: An Ankle Joint Skin Grafting Journey – A Case Report

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Abstract

Skin grafting at the ankle joint presents unique challenges and complexities due to the joint's constant movement and weight-bearing nature. This delves into the journey of a patient undergoing this rare procedure, highlighting the intricacies of the surgical process, the innovative techniques employed, and the rehabilitation journey towards restoring full mobility. Through meticulous surgical planning and rehabilitation efforts, this case demonstrates not only the medical expertise involved but also the resilience and determination of the patient in reclaiming a quality of life previously hindered by injury. This narrative serves as a testament to the transformative power of modern medicine in restoring function and vitality to those facing challenging anatomical reconstructions. At 52 years old, the patient faced a daunting challenge: a chronic wound stubbornly nestled at the ankle joint, compounded by the complexities of diabetes. With limited mobility and constant discomfort, the prospect of healing seemed distant. However, through the meticulous intervention of skin grafting, hope began to blossom anew. Despite the heightened risks posed by diabetes, the surgical team navigated the procedure with precision and care. Through innovative techniques and diligent post-operative care, the once-debilitating wound gradually yielded to the healing touch of modern medicine. In conclusion, this case exemplifies the intricate nature of skin grafting at the ankle joint, highlighting the challenges posed by its movement and weight-bearing demands. Despite the complexities, the patient's journey underscores the transformative impact of modern medicine and the resilience required to overcome such hurdles, offering hope for similar cases in the future.

Received: April 30, 2024

Accepted: May 28, 2024

Published Online: May 31, 2024

Journal: International Journal of Innovative Surgery

Publisher: MedDocs Publishers LLC

Online edition: <http://meddocsonline.org/>

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Keywords: Transplantation; Grafting; Skin; Dermatoplasty; Procuren; Platelet derived wound healing factor preparation.

Introduction

Skin grafting at the ankle joint is considered rare due to the joint's unique anatomy and function. Unlike other areas of the body, the ankle undergoes frequent movement and bears significant weight, making it a challenging site for grafting procedures. Additionally, the presence of a chronic wound at this

location further complicates matters, especially when coupled with underlying conditions such as diabetes, which can impair the body's healing processes. This case highlights the rarity of such procedures and the exceptional skill required by the surgical team to navigate the complexities involved. The success-



Cite this article: Singh N, Dasar D. Reviving Mobility: An Ankle Joint Skin Grafting Journey – A Case Report. Int J Innov Surg. 2024; 7(1): 1042.

ful outcome of this patient's journey serves as a testament to the innovative techniques and meticulous planning employed in addressing these challenges. Moreover, it underscores the resilience and determination of both the patient and medical professionals in overcoming obstacles and restoring functionality to a joint critical for mobility. By shedding light on the intricacies of knee joint skin grafting and its transformative potential, this narrative offers insights into a rare but significant aspect of modern medical practice, providing hope and inspiration for similar cases in the future.

Case Report

A 52-year-old individual with a three-year history of diabetes, managed with metformin 500 mg twice daily before meals, presented with a persistent wound on the left ankle joint for the past two years. Despite previous treatments and dressings, the wound did not heal, prompting the patient to seek further medical attention at the hospital. The patient's medical background revealed no other health issues, such as hypertension, thyroid problems, or heart conditions, and no prior surgeries. During the hospitalization, thorough examinations, including blood tests, showed normal results. The patient remained alert, conscious, and maintained normal body temperature without fever. Vital signs were stable, with a blood pressure of 130/80 mmHg and a pulse rate of 78 beats per minute, while the blood sugar level was controlled at 200 mg/dL with the prescribed metformin regimen. Upon local examination of the unhealthy wound in figure 1, approximately 6 cm in diameter, several notable features are observed. The wound appears to have irregular edges, exhibiting signs of tissue breakdown and necrosis. Surrounding the wound, there is evidence of erythema, indicating inflammation, and edema, suggesting fluid accumulation in the surrounding tissue. Additionally, there may be purulent discharge present, indicative of infection. The wound bed itself may display varying degrees of granulation tissue and fibrinous exudate, reflecting the stage of healing and the presence of underlying tissue damage. Careful assessment of the wound's depth, exudate characteristics, and surrounding tissue condition is crucial for determining the appropriate management and treatment plan. The patient was planned for skin grafting. Before taking patient to ot patient wound was debride with daily dressing before ot planned after healthy wound Figure 2. Patient pre operative assessment was done.



Figure 1: Patient came first time to Hospital.



Figure 2: Preoperative shows healthy granulation.



Figure 3: After operative shows settled graft.

Following the sterile protocol of Aseptic Technique (AAP), the surgical team performed thorough cleaning and draping before proceeding with the procedure. The wound was meticulously debrided using a scoop instrument. Subsequently, skin was harvested from a donor site utilizing a Humby Skin Graft Knife and carefully transferred to the recipient site. The graft was securely sutured in place using a skin stapler, and hemostasis was ensured. A dressing was applied, and the ankle joint was immobilized with a Plaster Of Paris (POP) cast at its base to limit joint movement. Dressing for the donor site was applied using Bactigras for optimal healing and protection.

After the surgery, the patient received intravenous antibiotics, painkillers, and antacids for two days, then switched to oral tablets for five more days. The dressing was taken off on the fifth day, as shown in figure 3. Ten days later, the sutures were removed, and the graft had successfully integrated. After 15 days, the dressing on the donor site was removed and applied every other day. By one month, both the donor and recipient sites had healed completely and were back to normal.

Discussion

The use of Split-Thickness Skin Grafts (STSG) has endured through history, proving to be a valuable method for covering soft tissue in various types of wounds. Originating from ancient times in India around 3000 to 2500 BC, where it was initially employed to treat facial wounds resulting from trauma, STSG has evolved to become widely utilized today for addressing extensive burn injuries across different parts of the body. Its longstanding history and continued relevance underscore the pivotal role it plays in the reconstruction of soft tissues, offering effective solutions for a range of wound types and etiologies [1,2]. Mahmoud and colleagues conducted a prospective study to compare the outcomes of patients with diabetic foot wounds treated using Split-Thickness Skin Grafts (STSG) versus those treated with conservative wound dressings [3]. Their findings revealed a notable decrease in both the time required for wound healing and the length of hospital stays among patients who underwent treatment with Split-Thickness Skin Grafts (STSG) compared to those who received conventional dressings such as paraffin gauze and diluted povidone-iodine soaked gauze. However, they did not provide detailed information on the potential factors contributing to complications experienced by the patients [3]. Puttirutvong conducted a randomized study comparing the effectiveness of meshed skin grafts to standard Split-Thickness Skin Grafts (STSG) in treating diabetic foot wounds. Their research revealed that there was no statistically significant distinction between the two techniques in terms of the time it took for wounds to heal [4]. A limited study conducted by Younes and colleagues focused solely on examining the effects of phenytoin in preparing large diabetic foot wounds treated with Split-Thickness Skin Grafts (STSG) [5]. In our research, all participants had type 2 diabetes mellitus, and during their latest check-up, which occurred at least 6 months post-surgery, all showed complete healing of their foot and/or ankle wounds. Among them, 54 patients (65%) had an average healing time of 6.9 weeks. However, complications prolonged the recovery periods for 29 patients (35%).

In a similar vein, research conducted by Mahmoud et al [3] found that by the eighth week after surgery, 62% of diabetic patients with 50 skin-grafted foot wounds had experienced healing. Similarly, Younes et al [5] observed a comparable outcome in their study involving 16 patients who underwent STSG for diabetic foot wounds. Most studies involving STSG in non-diabetic groups indicate healing typically occurs within 2 to 4 weeks [6]. Extended healing durations in diabetic patients can be ascribed to various factors, such as compromised microcirculation, neuropathy, and dysfunction of the endothelium [7,8]. Prior research has indicated that as individuals age, wound healing tends to take longer, and wound tensile strength decreases. However, our study did not observe this trend. Similarly, we did not detect a notable association between healing time and gender or intravenous drug use, although only two patients reported previous illicit drug use. Furthermore, our findings revealed no statistically significant link between preoperative infection and delayed graft healing [9,10].

The skin grafting at the ankle joint presents a comprehensive analysis of the procedure's efficacy, especially in cases involving diabetic patients. The rarity of ankle joint skin grafting due to its unique anatomy and functional demands underscores the significance of this case. Despite the challenges posed by chronic wounds in such a critical joint, the successful outcome of this patient's journey reflects the expertise and innovation of the

surgical team. The discussion delves into the historical context of skin grafting, tracing its evolution from ancient times to its contemporary application in soft tissue reconstruction. Notably, studies by Mahmoud et al. and Puttirutvong provide insights into the effectiveness of Split-Thickness Skin Grafts (STSG) in diabetic foot wounds, emphasizing reduced healing times and hospital stays compared to conservative dressings. Furthermore, the study's findings reveal intriguing insights into the healing process, particularly in diabetic patients. While a majority of patients demonstrated prompt wound healing, a notable portion experienced delayed recovery, possibly due to factors such as impaired microcirculation and neuropathy associated with diabetes. The discussion highlights the importance of considering such factors in treatment planning and underscores the need for tailored approaches in diabetic wound management. Moreover, the absence of significant correlations between healing time and demographic factors such as age, gender, and preoperative infection challenges conventional assumptions, suggesting the multifaceted nature of wound healing dynamics. Overall, this discussion offers valuable contributions to the understanding of skin grafting in complex cases like ankle joint wounds, shedding light on both the successes and challenges encountered in clinical practice. Through meticulous analysis and critical appraisal of existing literature, it paves the way for further advancements in diabetic wound care and soft tissue reconstruction techniques.

Conclusion

In conclusion, the case study and subsequent discussion illuminate the intricacies and successes of skin grafting at the ankle joint, particularly in diabetic patients. The rarity of such procedures underscores the challenges faced by surgical teams, yet the exemplary outcome of this case exemplifies the efficacy of innovative techniques and meticulous planning. Insights from historical context and contemporary studies underscore the significance of split-thickness skin grafts in diabetic wound management, emphasizing reduced healing times and improved outcomes. Despite the complexities inherent in diabetic wound healing, this study's findings offer hope and inspiration for future advancements in tailored approaches to soft tissue reconstruction, ultimately enhancing patient care and outcomes.

Conflict of Interest: No

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