PROSTHETIC FITTING OF ELDERLY NEW AMPUTEES WITH WOUND HEALING ISSUES

Anton Johannesson Ph.D., CPO. and Department of Orthopedics, Hässleholm-Kristianstad, SWEDEN

INTRODUCTION

When a major amputation is unavoidable, it is essential to select the lowest level that will allow both healing and optimal function. Delayed or failed healing at more distal level is known to increase morbidity and prolong hospitalization. Thus, by tradition an individually made prosthetic socket is not provided before the wound is completely healed, especially in elderly peripheral vascular diseased (PVD) patients. The choice of a more proximal amputation level can benefit wound healing, but lowers the odds of the patient becoming a prosthetic user (Johannesson et al. 2010). In trans-tibial amputation (TTA) our standardized treatment program consists of sagittal incision, rigid dressing, and compression therapy using silicone liner and direct manufacturing prosthetic technique. The general outcome of this method has been presented previously (Johannesson et al. 2010). A sidestep from our method has been how to deal with delayed wound healing. The aim was to include the latest knowledge about wound healing. One of these methods is vacuum-assisted closure for chronic non-healing wounds, a well-known method in wound treatment today and to combine it with early fitting and use of individually made prosthesis.

METHOD

The method includes: • ***Moisied wound treatment:*** Wound fluids may contain tissue growth factors that facilitate re-epithelialization. The goal is to keep the ulcer bed moist to retain tissue growth factors while allowing some evaporation and inflow of oxygen to keep surrounding skin dry, facilitate autolytic debridement, and establish a barrier to infection (Bergström et al. 2005) • ***Negative wound pressure therapy:*** The therapy involves the controlled application of sub-atmospheric pressure to the local wound environment using a sealed wound dressing. Traditionally this has been obtained by using a assistive vacuum pump (Lillis 2003), in our method by the use of the prosthetic socket and mobilization. The aim was to increase the blood circulation, transport and exchange of oxygen using a semi-hydrostatic prosthetic socket (TSB) i.e. Modular Socket System (MSS™, Ossur Inc., Reykjavik, Iceland) with sleeve suspension. Creating sub-atmospheric pressure within a prosthetic socket is possible by using an airtight suspension sleeve. The weight of the prosthesis creates a negative pressure within the socket in the swing phase. During full load, a positive pressure is produced. It is hypothesized that this enhances the circulation at the distal end of the residuum and promotes the healing process (Vanross et al. 2009.). This treatment was used because no other option gave a better alternative than reamputation or a long term restrictive activity. The regime was done in fully cooperation with the patients and closely monitored by the team members.

RESULTS

Two case studies with delayed wound healing after TTA will be present were this method have been used. In the first case (male, age 91 yr.), amputation due to PVD, that included poor tissue coverage resulting in a necrotic area distally around the suture line (5x3 inch) that opened up the wound. Reamputation was considered as the only alternative (pic. 1). Second case, (male, age 67yr.), a TTA due to compartment syndrome after bilateral knee replacement. The only option was a free flap surgery due to necrotic tissue and previous surgery (wound depth between 2 – 4 inch). In both cases the cavity of the wound was filled with highly absorbing bandages and covered with a thin plastic film. A silicone cushion liner was then rolled on. Prosthesis was thereafter produced using a pressure casting made socket with a distal valve, lightweight pylon and foot. An airtight suspension sleeve was used to provide a vacuum suspension. The multidisciplinary team closely monitored both cases between 1-5 times per week. In both cases healing was obtained (pic. 2) and the total result was encouraging for both the patient and the team.

DISCUSSION & CONCLUSION

These two case study´s shows favourable results demonstrating that a combination of moist wound therapy, vacuum suspension socket and early mobilization of the amputee can enhance the healing. This method can shorten the rehabilitation time and is an alternative to reamputation. Further research is warranted to explore the approach.

CLINICAL APPLICATIONS

In an effort to lower the amputation level and to reduce the risk for reamputation this method can be alternative.

REFERENCES

Johannesson A. et al. Am. J. Phys. Med. Rehabili. 89, 4, 293-303, 2010.

Bergstrom N, et al. J Am Geriatr Soc.53, 1721-1729, 2005.

Lillis, K. Healthcare Purchasing News 1, 27, 32. 2003,

Vanross ER, et al. Arch Phys Med Rehabil 90(4), 610-7, 2009.