

Harmony vs other socket systems

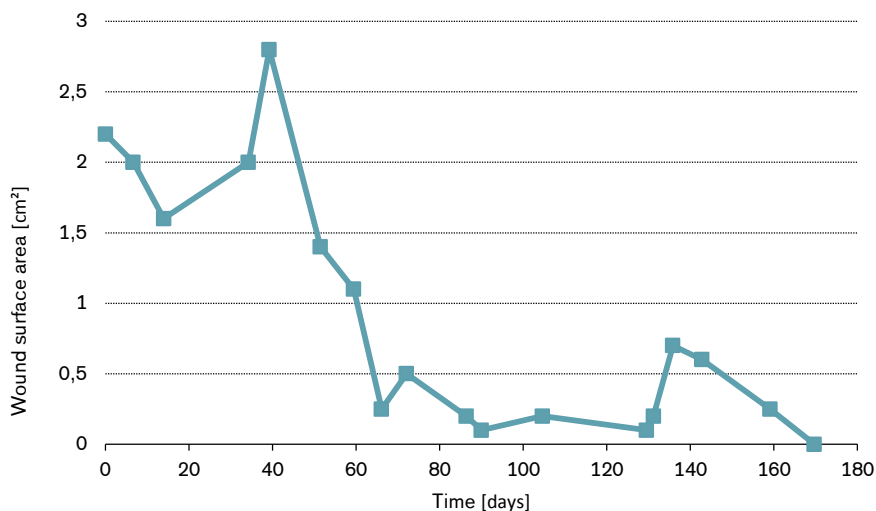
Wound Healing

Major Findings

With vacuum-assisted socket system (VASS) compared to other socket systems:

- **Even in the presence of unhealed wounds the prosthesis can be worn.**
- **The wounds show a strong trend to heal also when prosthesis is in use.**

Wound healing occurs while using VASS



Patient 72 years old, cause of amputation was nonhealing ulcer, diabetes mellitus type II, fitted with a vacuum-assisted socket system (VASS). (Hoskins et al., 2014)

Clinical Relevance

Prosthesis should provide adequate environment and thereby keeping the residual limb healthy and free of wounds. Early prosthesis fitting is crucial to obtain great patient autonomy and mobility (Traballesi et al., 2012). Delayed rehabilitation can lead to a deterioration of balance, muscle endurance, strength, flexibility and coordination. Moreover delayed prosthesis fitting is the main cause of increased costs for rehabilitation after amputation.

Summary

With the VASS healing occurs while the amputee is able to use the prosthesis for ambulation. In contrast, other modes of suspension normally require the residual limb to be out of the prosthesis for healing to take place. This difference is based on following. (I) With the VASS movement of the limb relative to the socket is reduced which leads to minimal physical stress as peak pressure and shear forces. (II) Increased blood flow (Street, 2002) has the potential to improve limb health since blood is the delivery system that provides the limb with oxygen, nutrients and immune cells, and removes wastes.

Hoskins et al. reported that wound closure occurred within all subjects in an average time of 177 days while the prosthesis is in use. A high variation in time was observed in the range of 40 to 390 days which is based on heterogeneity in health conditions, wound severity, and compliance in terms of wound care and prosthesis use (Hoskins et al., 2014). These results are in accordance to Brunelli et al. (2009): Wound healing occurred in all subjects while using VASS within 9 months.

References of summarized studies

Brunelli, S., Aversa, T., Delusso, S., & Trallesi, M. (2009). Vacuum assisted socket system in trans-tibial amputees: Clinical report. *Orthopädie-Technik Quarterly, English edition*, 11, 2–7.

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Kahle, J. T., Orriola J.J., Johnston W., & Highsmith, M. J. (2014). The effects of vacuum-assisted suspension on residual limb physiology, wound healing, and function: A systematic review. *Technology & Innovation*, 15(4), 333–341.

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