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ScienceDirect
British Journal of Oral and Maxillofacial Surgery 50 (2012) 88–89
BRITISH Journal of Oral and Maxillofacial Surgery
www.bjoms.com

Technical note

Vacuum-assisted dressing for promoting granulation over the dura: technical note

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Accepted 22 October 2010
Available online 9 December 2010

Keywords: Vacuum-assisted dressing; Squamous cell carcinoma; Healing; Granulation; Dura; Scalp; Calvaria

We report the use of a vacuum-assisted dressing to promote wound healing in a large defect in the scalp with exposed meninges, which was a result of multiple deeply invasive recurrences of cutaneous squamous cell carcinoma (SCC) after both local and free flap reconstruction of the scalp.

A 76-year-old man who had previously had active surgical intervention involving removal of a cutaneous SCC of the scalp, posterior craniotomy, selective neck dissection, and multiple reconstructions, was referred with a full thickness posterior scalp defect (4 cm × 4 cm) with exposed dura that had previously been repaired with fascia lata. Examination showed an extensive open wound in the parieto-occipital region with exposure of the titanium mesh and dura mater (Figs. 1–3).

Options for closure of the defect were severely limited because of previous local, regional, and free tissue transfer. We applied a vacuum-assisted dressing to the wound over a period of 9 weeks with the dressing changed every 72 h. A continuous initial therapeutic vacuum of 50 mm Hg was applied (later increased to 125 mm) using an appropriate proprietary pump. The patient was fitted with a portable device that allowed him to be mobile and not confined to hospital.

The dressing encouraged appreciable granulation tissue to form over the entire defect (Fig. 2). Once the vulnerable dural surface had been covered the titanium mesh was removed and the wound grafted with skin to provide a protective soft tissue seal over the dura and brain (Fig. 3).

Successful use of topical negative pressure has been widely reported in the management of chronic wounds. It was first described by Fleischmann in 1993 and was further developed by Argenta and Morykwas.[1] The vacuum dressing system acts by removing fluid and desiccated tissue from the wound, restricting bacterial growth, improving blood flow, and enabling granulation tissue to form. It also stimulates cell growth and draws wound edges closer.[2,3] The improvement in blood flow results in an increased supply of oxygen and nutrients, and the vacuum function of the dressing reduces oedema.[1] Removal of excess fluid also inhibits metalloproteinase production which can potentially retard the generation of granulation tissue.[1,4] The augmented formation of granulation tissue in response to these dressings is also partly related to increased cellular proliferation in response to tissue stress (Fig. 4).

We could find only one reported case of a calvarial defect over intact dura treated using vacuum-assisted dressings. It was the result of a giant eccrine adenocarcinoma of the scalp, and application of the dressing enabled the generation of granulation tissue over the entire bony defect.[5] To our knowledge, we report for the first time the successful use of a vacuum-assisted dressing to achieve healing over repaired dura, and suggest that these dressings should be employed in complex wounds as they promote healing, reduce the duration of hospital stay, and create a favourable surface for

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doi:10.1016/j.bjoms.2010.10.014

Fig. 1. Initial defect showing size of wound and exposed dura.

Fig. 2. Coverage of granulation tissue in response to vacuum-assisted treatment.

Fig. 3. Split thickness skin graft.

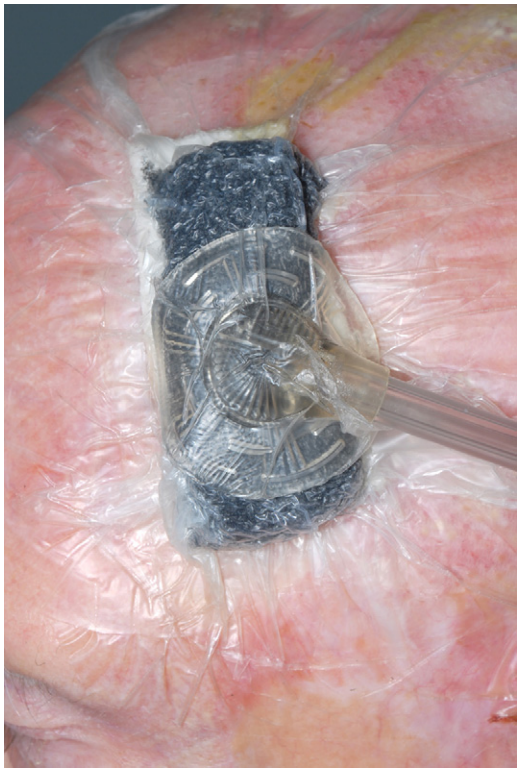

Fig. 4. Vacuum-assisted dressing in another patient with a scalp defect with exposed but intact dura. It comprised a non-adhesive dressing to cover the defect, white polyvinyl alcohol foam, black GranuFoam™ (KCI, Texas, USA), and drapes to achieve a seal.

subsequent skin grafting. We recommend their use in managing defects of the scalp and calvaria where other reconstructive options have been exhausted.

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