

# Use of NovoSorb Biodegradable Temporizing Matrix in the Management of Complex Scalp Defects

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**Summary:** Dermal substitutes have emerged as a potential option in complex wound management. PolyNovo NovoSorb Biodegradable Temporizing Matrix has shown promise in managing partial and full-thickness wounds. We discuss here the successful use of this product in the management of a scalp defect complicated by exposed bone, following wide local excision of a desmoplastic melanoma of the scalp. (*Plast Reconstr Surg Glob Open* 2023; 11:e5068; doi: 10.1097/GOX.0000000000005068; Published online 21 July 2023.)

**D**esmoplastic melanoma (DM) is a rare histological variant of spindle cell melanoma, first described by Conley et al in 1971.<sup>1</sup> It accounts for less than 4% of cutaneous melanoma, and is associated with high local recurrence rates of up to 40%–50%, but relatively low rates of nodal metastasis.<sup>2</sup> It has been linked with chronic exposure to UV, resulting in 51% of DM occurring in the head and neck, and 30% in the extremities. The majority of patients are men and in older age groups (male–female ratio: 2:1; average age at diagnosis: 66 years).<sup>2</sup>

DM may arise de novo or with other subtypes of melanoma. It generally presents as an amelanotic nodule or dermal plaque, which may resemble a scar and is therefore susceptible to delayed or misdiagnosis, even on light microscopy.<sup>2</sup> Due to the high local recurrence rate, ensuring adequate surgical margins is crucial. Management involves wide local excision (with margins of at least 2 cm) and adjuvant radiotherapy.<sup>3</sup> Significant defects may result from this approach, and careful reconstructive planning is required to achieve optimal functional and aesthetic outcomes. In the head and neck, these surgical margins may result in challenging reconstruction. Direct closure may not be possible, and skin grafts result in aesthetic defects or unstable skin, or fail to vascularize over exposed calvaria. Large local flaps or microsurgical reconstruction may be required, with increased physiological demands and potential need for skin grafting of the secondary defect.

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Over the past few decades, dermal substitutes have emerged as a potential solution to complex wound management. Initially developed to aid the management of burns, PolyNovo NovoSorb Biodegradable Temporizing Matrix (BTM) is one example of this. BTM is a dermal replacement scaffold derived from polyurethane open-cell foam.<sup>4</sup> The polyurethane foam is designed as a scaffold to allow for ingrowth of granulation tissue, which then degrades through hydrolysis, leaving behind a neodermis. The foam does not contain any substrates for bacterial metabolism, and it is suggested to reduce the risk of infection when compared with collagen-containing dermal matrices.<sup>4</sup> A silicone layer covers the foam to reduce desiccation, which is removed once the tissue ingrowth has proceeded adequately to allow for either skin grafting or secondary epithelialization.<sup>5</sup> We describe the use of this product in the management of a defect after excision of a DM of the scalp, which has not been described previously.

## CASE REPORT

A 76-year-old man who had recently undergone nodular transformation presented with a pigmented lesion to the scalp. The patient had a medical history of triple coronary artery bypass, type 2 diabetes mellitus, hypertension, and hypothyroidism. After assessment and discussion, he underwent an excision biopsy, resulting in a 2 × 3 cm defect on the center of the scalp with a deep margin of periosteum. Histology from this excision revealed a 30-mm diameter desmoplastic malignant melanoma, 7.4 mm Breslow depth, with involvement of the galea. A positron emission tomography–computed tomography demonstrated no features of metastatic disease, resulting in stage IIc disease. Sentinel lymph node biopsy was

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**Fig. 1.** Photograph demonstrating large defect created after wide local excision of the DM.

planned, but lymphoscintigraphy was nondiagnostic for node site and, therefore, not attempted.

The patient was listed for wide local excision with 2-cm margins, with reconstruction using a scalp transposition flap in anticipation of adjuvant radiotherapy. At preoperative review, further pigmented nodular skin change was identified near the excision scar, raising the possibility of early recurrence. After discussion with the patient, wide local excision including the periosteum was performed with delayed reconstruction after pathologic evaluation (Fig. 1).<sup>6</sup>

The patient was seen once weekly in our dressings clinic, where the wound was monitored and re-dressed in soft silicone nonadhesive dressings (Mepitel), followed by sterile gauze. A nonsterile flexible tape (Hypafix) was used to secure the wound dressing. The wound was monitored clinically and with microbiological swabs for signs of problematic colonization or infection; however, he did not require treatment.

After confirmation of clear margins, the patient was listed for reconstruction, and was attended at 5 weeks from the wide local excision. Due to the area of exposed calvaria, a scalp transposition flap with skin grafting of the secondary defect was again discussed, as was the additional option of BTM. After discussion of this product, its novel use, and its potential for reconstructive failure, the patient chose this option. At the time of surgery, there were large areas of exposed bone, but approximately 50% had thin granulation tissue. The wound was cleaned, and the exposed bone was burred to bleeding tissue, and the product was applied. It was secured with nonabsorbable sutures and dressed. The reconstructed wound was managed postoperatively, using the same protocol as that after wide local excision.

After reviewing the patient at 5 weeks postoperative, the outer silicone layer was removed, and the neo-dermis demonstrated satisfactory vascularity (Figs. 2 and 3). Epithelialization progressed rapidly, and split skin grafting was not required. (See Video [online], which shows at 10 weeks postreconstruction that epithelialization had



**Fig. 2.** Review at 5 weeks post reconstruction with the dermal substitute BTM in situ.



**Fig. 3.** Photograph showing the review at 5 weeks after reconstruction and post removal of the silicone layer, revealing the BTM neo-dermis.

progressed and SSG was no longer necessary.) He proceeded to postoperative radiotherapy, which he tolerated well.

## DISCUSSION

Scalp defects result from a wide range of etiologies, and may be complicated by exposed bone or fracture. Although various reconstruction options are often available, they should be individualized to a patient's ability to tolerate the anesthetic, surgery, donor deficit, risks, and postoperative management.

This was at a high risk of complications from microsurgical reconstruction, and a local transposition flap would have required skin grafting of the secondary defect with disruption of his hairline. Split skin grafting alone may have failed on exposed bone and would have been vulnerable to break down after radiotherapy. Using BTM minimized his anesthetic, surgical, and inpatient time and



**Fig. 4.** Review at the 6 month follow-up, post radiotherapy.

avoided a donor site. It also resulted in a very acceptable aesthetic result compared with those anticipated from other options (Fig. 4).

A wide range of dermal substitutes have been described, with no clear consensus for superiority regarding successful take and wound healing,<sup>7,8</sup> let alone other important outcomes that include patient acceptance, product cost and availability, surgical characteristics such as ease of use or need for staged reconstruction, and long-term aesthetics or function.

In the scenario of complex head and neck reconstruction, the use of products such as Integra has been established through case reports and series.<sup>9</sup> A recent small study comparing NovoSorb BTM and Integra found BTM had favorable outcomes in patients with head and neck wounds of mixed etiology.<sup>10</sup> We suggest that the intrinsic resistance of BTM polyurethane to infection compared with other products based predominantly on collagen may provide a benefit, especially when vascularization of the template is likely to be prolonged but advocate further comparative studies between the available options.

This case report demonstrates the successful use of BTM in a large scalp defect with exposed bone. We suggest

that this product represents a promising option for reconstruction of similar defects.

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#### DISCLOSURES

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