Stacking of a Dermal Regeneration Template for Reconstruction of a Soft-Tissue Defect After Tumor Excision From the Palm of the Hand: A Case Report

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Excision of tumors from the hand often leaves tissue defects with exposed tendons or neurovascular structures that require coverage. Various types of free and pedicled grafts have been described for use in these situations. We present a patient who had a tumor excision in the hand followed by wound coverage with a stacked dermal regeneration template. A 50-year-old man presented with a mass over the palm of the hand. He had an incisional biopsy procedure, the results of which suggested malignancy. He then had wide excision with planned temporary skin coverage with a dermal regeneration template. The dermal template incorporated nicely. With adequate skin coverage the palmar defect still was substantial in terms of depth. This was raised with layering or stacking of the template followed by a split-thickness skin graft. Excellent wound healing and coverage of the defect ultimately were achieved. Additionally the patient went on to obtain full range of motion. Stacking of a dermal regeneration template coupled with split-thickness skin grafting was used to fill a soft-tissue defect over the median and nerve and flexor tendons after wide tumor excision. (J Hand Surg 2005;30A:1322–1326. Copyright © 2005 by the American Society for Surgery of the Hand.)

Key words: Dermal template, excision, graft, Integra, stacking, tumor.

Integra (Integra LifeSciences, Plainsboro, NJ) was introduced initially as a bilaminate membrane that could be used to re-establish a neodermis in a full-thickness wound. A porous surface of cross-linked bovine tendon collagen and chondroitin-6-sulfate allows migration of fibroblasts, macrophages, lymphocytes, and capillaries onto the surface, regenerating the dermis.[1,2] The superficial surface consists of a thin polysiloxane layer that controls moisture escape from the wound bed.[3] This allows large, full-thickness wounds to be covered and later grafted with a thin split-thickness skin graft. Recently a monolayer form of Integra consisting only of the bovine collagen and chondroitin-6-sulfate was approved for use in stacking for filling deeper defects.

When treated with Integra the percentage of wound beds developing a neodermis and then accommodating the subsequent skin graft successfully has been reported to be as high as 90% to 100%.[4–6] The neodermis is developed over the

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Received for publication April 21, 2005; accepted in revised form August 3, 2005.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

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0363-5023/05/30A06-0034$30.00/0
doi:10.1016/j.jhsa.2005.08.001

Figure 1. Preoperative photograph of the lesion in the hand. Preliminary pathology indicated acral myxoinflammatory fibroblastic sarcoma. The final diagnosis was of a benign fibrous lesion.

surface of the entire wound but the number of myofibroblasts migrating into the neodermis is small; both factors result in less scar formation and less wound contracture. These characteristics of Integra have been used mainly in the treatment of severe burns—for which it was approved initially—with good results.[7–9] More recently published reports have documented the use of Integra for contracture release,[10] chronic leg ulcer and skin cancer excisions,[2,11] free-flap coverage,[12] degloving injuries,[13] and deep burns of the hand.[4] We report a method of stacking Integra followed by split-thickness skin grafting to fill a full-thickness defect on the palm of the hand.

Case Report

A 50-year-old, left-handed man presented to our clinic with a history of a painful, rapidly growing mass in the palm of the right hand. There was no history of trauma. On examination there was a hard mass measuring 4 × 4 × 3 cm that was ulcerating through the skin (Fig. 1). Radiographic evaluation showed no involvement of the underlying bone. Magnetic resonance imaging showed a heterogeneous mass measuring 3 × 3 × 3 cm that was abutting the median nerve and displacing the flexor tendons.

Incisional biopsy examination was suggestive of acral myxoinflammatory fibroblastic sarcoma. In planning the definitive resection the initial plan regarding wound coverage included a pedicled radial forearm flap. A preoperative angiogram, however, showed an incomplete palmar arch. Also, given that the mass appeared malignant a pedicled groin flap caused concern because the mass could be seeded to the groin if recurrence occurred. Therefore we decided to proceed with immediate coverage with a dermal template and definitive coverage could be performed after the final pathology report.

A wide local excision was performed with relatively narrow margins adjacent to the median nerve and flexor tendons; in an attempt to preserve motor and sensory function only the epineurium of the nerves was excised. The flexor tendons were preserved and an extended carpal tunnel decompression was performed. Excision of the tumor created a full-thickness defect in the proximal palm measuring 4 × 5 cm. The absence of overlying palmar fascia, subcutaneous fat, and skin left the median nerve and flexor tendons exposed at the base of the wound.

After hemostasis was achieved a piece of bilaminar Integra measuring 5 × 5 cm was laid onto the wound bed and sutured in place (Fig. 2). A moist bolster was placed over the Integra with a bulky dressing and the hand was splinted in the position of function. The patient was discharged to home the following day and finger motion was encouraged.

At the initial follow-up evaluation the Integra was taking well without hematoma or evidence of infection. At this time the patient complained of mild paresthesias in the index finger and radial aspect of the middle finger despite 5-mm, 2-point discrimination throughout. The final pathology report was consistent with a benign lesion, nodular fasciitis of the tendon sheath. Again treatment options were discussed with the patient. He was offered 2 options: a pedicled groin flap or stacking of Integra to fill in the defect before split-thickness skin grafting. The latter option was a result of discussions with colleagues and new information on the existence of the dermal template without silicone specifically manufactured for cases involving deeper defects.