Applying a Dermal Regenerative Template in Management of Congenital Melanocytic Nevi of the Hand

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Summary: Congenital melanocytic nevus of the hand in the pediatric population is an uncommon diagnosis. These lesions have malignant potential and can cause psychosocial effects from cosmetic deformity. Early surgical intervention is recommended in these cases. The literature suggests that full-thickness skin grafting is to be performed in the hand to maintain functionality and avoid contracture and scarring. This creates a large donor-site defect and increased risk of graft loss due to slow revascularization from graft thickness. In addition, for large defects, the full-thickness skin graft donor site would require a split-thickness graft. However, split-thickness skin grafting is avoided in the hand due to increased scarring and contracture and decreased range of motion despite decreased donor-site morbidity and better revascularization. We describe a novel reconstructive technique that uses a dermal regenerative template (Integra) with split-thickness grafting. Having performed in 2 pediatric patients, we demonstrate that aesthetic and functional outcomes are equivalent to full-thickness grafting while creating a superficial donor site and allowing for improved revascularization from decreased graft thickness. (Plast Reconstr Surg Glob Open 2015;3:e515; doi: 10.1097/GOX.0000000000000483; Published online 22 September 2015.)

Congenital melanocytic nevus (CMN), resulting from proliferation of benign melanocytes in the dermis and/or epidermis, can be a problematic diagnosis in the pediatric population. Not only there is risk of malignant degeneration but also the psycho-social effects of a visible deformity can be significant, as lesions can develop hair and dark pigmentation. They are classified based on size, and although the true incidence of malignant degeneration is unknown, it is generally agreed that the larger the nevus, the greater the risk of malignant transformation. Early surgical intervention is recommended for larger nevi or those producing significant cosmetic deformity with psychological effects and is the only method for complete removal of nevus cells.1 CMN of the hand poses a special challenge considering the risks of scarring, contracture, and subsequent functional limitation following excision and reconstruction. Although full-thickness skin grafts have been described as being superior to split-thickness skin grafts in the hand due to decreased risk of contracture and scarring and better functional outcomes,2 they result in increased

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donor-site morbidity and are slower to revascularize, leading to decreased graft survival rates. We describe a novel reconstructive technique using split-thickness skin grafting in conjunction with a dermal regenerative template (Integra, Integra LifeSciences Holdings Corporation, Plainsboro, N.J.) after excision of large CMN of the hand in 2 pediatric patients.

CASE 1
A 5-year and 6-month-old girl with CMN that was nearly circumferential of the left hand and wrist except for a less than 1-cm strip on the ulnar aspect (11×6 cm) (Fig. 1A) underwent 4 partial excisions before presenting to our clinic for evaluation. Because of the large size of the lesion, it was decided that complete excision with dermal regenerative template (Integra) placement and delayed split-thickness skin grafting 3 weeks later would be performed rather than multistage operations involving partial excision of the lesion followed by full-thickness skin grafting.

CASE 2
A 3-year and 8-month-old girl with extensive CMN of the left hand involving all dorsal web spaces, interdigital web spaces, and palmar and hypothenar Glover skin (13×9 cm) with corrugated appearance and hair formation underwent 4 partial excisions and 2 full-thickness skin grafts (from the left groin and left retroauricular region) before presenting to our clinic for evaluation. It was decided that complete excision with placement of a dermal regenerative template would be performed with subsequent split-thickness skin grafting 3 weeks later rather than resection in a staged fashion with full-thickness skin grafting, which would require several more operations compared to complete excision with split-thickness skin grafting.

METHODS
The patient is placed in the supine position. A sterile arm tourniquet with exsanguination was used. An incision is made around the lesion with a 1–2 mm border. Dissection is then performed with a Colorado Bovie (Stryker, Kalamazoo, Mich.) tip just beneath the dermis while preserving the dorsal veins. The specimen is sent to pathology. Integra is then applied and secured with surgical staples and 5-0 chromic suture (Fig. 2). Multiple incisions are made in the Integra Silastic membrane to allow for drainage. Xeroform with cotton balls soaked with normal saline is applied as a bolster, and a long-arm plaster splint is applied. The patient then undergoes dressing changes weekly until 3 weeks postoperatively, at which time the patient then undergoes split-thickness skin grafting. The split-thickness skin graft is taken from the thigh or buttck area at 14/1000 inches. The Silastic membrane is removed from the Integra and the split-thickness skin graft is placed over the defect. Similar dressing and splint protection are implemented. Serial dressing changes are performed until the wound is healed and a compression garment is applied for 1 year postoperatively in conjunction with hand therapy.

RESULTS
Both patients had successful complete resection of their CMN with complete healing of the
split-thickness skin grafts (Figs. 1B, C). They had full range of motion after 1 year postoperatively with acceptable aesthetic outcomes.

CONCLUSIONS

Traditionally, full-thickness skin grafts have been used in the hand due to their propensity for reduced scarring and contracture, ultimately resulting in functionality. However, this method requires donor-site primary closure and carries an increased risk of graft loss due to slow revascularization because of graft thickness. By using a dermal regenerative template (Integra) with split-thickness skin grafting, thus approximating the thickness of a full-thickness skin graft, a superficial donor site is created while decreasing scarring and contracture and facilitating full range of motion of the hand and graft survival from decreased graft thickness. This concept has been demonstrated in these 2 patients and represents a viable approach for addressing excision and reconstruction of CMN of the hand in the pediatric population. The use of Integra for nonburn wound coverage is not novel, but its successful application in giant CMN of the hand has not been described.

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