

Just how thin are ultra-thin split-thickness skin grafts?

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Additional Author(s):

Keith Sweitzer
Derek Bell MD

Abstract Presenting Author:

James Butterfield MD

Abstract Text:

Introduction:

Burn surgery teachings have long held that thicker grafts including full-thickness or thick STSG (0.025 inch) have better functional and cosmetic outcomes than standard (0.012 – 0.020 inch) and thin (0.008 – 0.011 inch) STSG, due to concern for contraction and poor color matching. This is thought to be due to the higher ratio of dermis to epidermis in thicker grafts which resist secondary contracture. As the thickness of the STSG decreases, the amount of dermis in the graft decreases. Reports in the literature estimate epidermal thickness to be between 5 and 49 micrometers in thickness (about 0.0006 – 0.0015 inch). Recently, Chacon, et al, in the largest single-surgeon experience with thin and ultra-thin STSG (≤ 0.007 inch), demonstrated that ultra-thin STSG are durable options with reduced hypertrophic scar formation and excellent graft take. Additionally, they showed that thinner grafts allow for faster re-epithelialization of the donor site, which would allow for re-harvesting STSG from the same site if needed for large burn injuries. The purpose of this study is to better understand which cells are present within an ultra-thin STSG to better understand the healing and scar formation processes via formal pathologic evaluation.

Methods:

The study includes sampling from excess ultra-thin STSG on five patients undergoing STSG to reconstruct burn injuries. STSG were harvested via air-powered dermatome at a depth of 0.004 inch (4/1000 inch). Sample thickness were recorded, including average thickness per sample and standard deviation. These samples were then preserved in formalin, formally processed by surgical pathology, and examined by a dermatopathologist to determine cellular content, including harvested epidermal and dermal sub-layers and cell-thickness counts for each layer.

Results:

The overall mean graft thickness was 142.70 micrometers with a SD of 46.07 OR 5.6/1000" with a SD of 1.8/1000". Each graft contains the epidermis and a small portion of reticular dermis.

Conclusions:

Our ultra-thin split-thickness skin grafts cut with a dermatome set to 4/1000 " were found to contain mostly epidermis with varying degrees of papillary dermis. The portion of hair follicle which contains stem cells is not present in our grafts. There is no reticular dermis present in our grafts. Although the dermatome was set to 4/1000" the mean thickness of our grafts was 5.6/1000" with a standard deviation of 1.8/1000".

Tracks:

Clinical