

Split Thickness Skin Grafts and Wounds

Joshua L. Moore, DPM FACFAS
Clinical Assistant Professor – Department of Surgery
Assistant Dean of Educational Affairs
Temple University School of Podiatric Medicine



Objectives

- ◆ Understand the basic concepts/benefits of split thickness skin grafts (STSG).
- ◆ Understand proper patient selection in STSG.
- ◆ Understand pre and postoperative management of STSG.
- ◆ Understand complications of STSG.

Split Thickness Skin Grafts

- ◆ 68 year old, uncontrolled diabetic male presents to clinic with chronic ulcerations to bilateral lower extremities. The patient has been treated with numerous wound care regimens and dermal grafts with little success over a period of years. His most concerning wound is his left posterior leg and Achilles insertion region.



Split Thickness Skin Grafts

- ◆ Foot and leg ulcers are the leading cause of hospital admissions in patients with diabetes mellitus.
- ◆ STSG's are a widely accepted method for soft tissue coverage of open wounds.
- ◆ Initially reserved for burns and plastic reconstructions, have shown efficacy in diabetic chronic ulcers.
- ◆ Burn literature shows up to 96.7% graft take in optimal conditions.¹

Split Thickness Skin Grafts

- ◆ Includes epidermis and parts of dermis
- ◆ 3 thicknesses; variable based upon amount of dermis taken:
 - ◆ Thin: .008 -.012 inches
 - ◆ Medium/Intermediate: .013 -.016 inches
 - ◆ Thick: .017 - .02 inches

STSG vs. FTSG Pros and Cons

Advantages

- ◆ Better chance of survival with vascular compromise
- ◆ More likely to fully incorporate into recipient bed
- ◆ Can cover larger areas
- ◆ Easier to obtain

Disadvantages

- ◆ Presence of granulating and painful donor site
- ◆ Greater graft contraction
- ◆ Special equipment required
- ◆ Poor cosmesis of incorporated graft (tire patch appearance, hyperpigmented)

Split Thickness Skin Grafts

- ◆ In the lower extremity we can harvest our own from the calf or foot.
- ◆ Benefits of harvesting from the ipsilateral lower limb:
 - ◆ Enclosure within the same dressing as the graft recipient site
 - ◆ Ease of exposure during surgery
 - ◆ Less pain when compared to thigh or buttock
 - ◆ Can be performed under local anesthesia

Split Thickness Skin Grafts

- ◆ For both chronic and acute wounds, STSG offer a rapid and effective way to provide closure and healing.
- ◆ Diabetic patients **without** comorbidities have shown no significant difference in healing times compared to non-diabetic patients for STSG.²
- ◆ When used as the primary closure on optimized diabetic foot ulcerations, split-thickness skin grafts are 78% successful at closing 90% of the wound by eight weeks.³
- ◆ Mean healing time is 8 weeks in all wounds.³⁻⁶

Patient Selection

- ◆ Medically optimized
 - ◆ Albumin levels/nutritional status
 - ◆ HbA1c
 - ◆ Effects of hyperglycemia inconclusive.⁶
- ◆ Vascular optimization
- ◆ Infection control
- ◆ Wound viability
- ◆ Ability to comply
- ◆ Have exhausted conservative measures

Patient Selection

- ◆ Wound bed **MUST** be clean and granular
 - ◆ No exposed bone
 - ◆ No exposed tendon
 - ◆ No infection
 - ◆ No remaining eschar/necrotic tissue
- ◆ Must have adequate blood supply
- ◆ May require synthetic grafting and VAC initially



Post Operative Care

- ◆ **Absolute non weight bearing**
- ◆ Compressive dressing
 - ◆ Bolster dressing
 - ◆ Negative pressure wound therapy
- ◆ First dressing change 3 -14 days post application
- ◆ Keep wound bed moist
- ◆ Regular dressing changes after 2 weeks



STSG Healing

- ◆ Plasmatic phase (phase of serum imbibition):
 - ◆ First 24 hours
 - ◆ Ischemic phase
 - ◆ Graft anchored by fibrin glue anchors
 - ◆ Passive absorption of plasmatic nutrients into empty vascular channels.
 - ◆ Graft becomes edematous and accumulates 40% weight creating a moist, nutrient rich environment that maintains patency until revascularization occurs.

STSG Healing

- ◆ Phase of revascularization (inosculation):
 - ◆ 48 hours to 7 days
 - ◆ Granulation tissue replaces fibrin glue
 - ◆ Revascularization proceeds between graft and host wound bed
 - ◆ Vascular proliferation and sprouting of budding vessels with full circulation restored to skin

STSG Healing

- ◆ Phase of reorganization/reinnervation:
- ◆ May last 1-2 years
- ◆ Graft fully adhered to recipient bed
- ◆ Functions like native skin
- ◆ Fibroblasts and new vasculature anchor graft to recipient site
- ◆ Reinnervation begins at approximately 2 months



Considerations/Complications

- ◆ Donor site morbidity
- ◆ Seroma, hematoma, infection
- ◆ Failure of graft
- ◆ New skin strength
- ◆ Shearing force between the graft and recipient site
- ◆ Improper preparation of recipient site
- ◆ Compared to patients without diabetes mellitus, diabetic patients experience a 5.15 times higher risk of postoperative complications after STSG.⁵
- ◆ Healing time in diabetics 2-4 weeks longer than in healthy population.⁶
- ◆ Overall complication rates range from 2.8% to 27%.³⁻⁶

Summary

- ◆ STSG is a viable alternative to wounds of the foot and ankle
- ◆ Patient selection and compliance is key
- ◆ Non weight bearing and appropriate post operative dressing changes and follow up is required
- ◆ Proper preparation and care post STSG is essential
- ◆ Know your limitations

References

- ◆ 1. K. S. Petkar, P. Dhanraj, P. M. Kingsly et al., A prospective randomized controlled trial comparing negative pressure dressing and conventional dressing methods on split-thickness skin grafts in burned patients. *Burns*. 37; 6: 925–929, 2011.
- ◆ 2. Ramanujam CL, Han D, Fowler S, Kilpadi K, Zgonis T. Impact of diabetes and comorbidities on split-thickness skin grafts for foot wounds. *J Am Podiatr Med Assoc*. 103:223–32, 2013.
- ◆ 3. McCartan B, Dinh T. The use of split-thickness skin grafts on diabetic foot ulcerations: a literature review. *Plast Surg Int*. 2012, 2012.
- ◆ 4. Anderson J, Wallin K, Spencer L. Split thickness skin grafts for the treatment of non-healing foot and leg ulcers in patients with diabetes: a retrospective review. *Diabetic Foot Ankle*. 3, 2012.
- ◆ 5. Donegan R, Schmidt B, Blume P. An overview of factors maximizing successful split-thickness skin grafting in diabetic wounds. *Diabetic Foot Ankle*. 5, 2014.
- ◆ 6. Ramanujam CL, Stapleton JJ, Kilpadi KL. Split-thickness skin grafts for closure of diabetic foot and ankle wounds: a retrospective review of 83 patients. *Foot Ankle Spec*. 3:231, 2010.
- ◆ Dockery, G. Crawford, M. *Lower Extremity Soft Tissue & Cutaneous Plastic Surgery*. Saunders Elsevier. 2006.
- ◆ Zgonis, T. *Surgical reconstruction of the Diabetic Foot And Ankle*. Lippincott Williams & Wilkins. 2009.