FUNDAMENTALS OF SKIN
GRAFTING- 2014

Superficial Anatomy and Cutaneous Surgery Course
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No conflicts of interest in this talk
Agenda

- Discuss different types of skin grafts
- Discuss physiologic processes in skin graft take
- Advantages, disadvantages, indications
- Surgical technique including bandaging and perioperative management
- Regional considerations of the body (e.g. lids)
- Instrumentation for split thickness skin grafting
- Management of perioperative problems
- Managing the suboptimal result

TYPES OF SKIN GRAFTS

- **AUTOGRAPH**: A piece of skin taken from one location of one species and transplanted to a different location on that same species. (ftsg, stsg, composite graft)
- **ALLOGRAFT**: Skin from one species to a different member of the same species (cadaver graft)
- **XENOGRAFT**: Skin from one species placed on a different species (pigskin graft)
DEFINITIONS

- **Full thickness skin graft (FTSG)**: entire epidermis and dermis
- **Split thickness skin graft (STSG)**: entire thickness of epidermis and a variable thickness of dermis
- It is not uncommon to sculpt (thin) the thickness of a full thickness graft

PHYSIOLOGY OF SKIN GRAFT TAKE

- Phase of serum imbibition (24-48hr)
- Phase of inosculation
- Phase of capillary ingrowth

PHASE OF SERUM (PLASMIC) IMBIBITION

- Graft takes up wound exudate
- Graft becomes edematous, gains weight
- Fluid moves only one way
- Graft pH becomes acidic within first hour
- Release of vasoactive substances
- Shift from aerobic to anaerobic metabolism
- Graft becomes fixed to wound bed by fibrin glue
PHASE OF GRAFT REVASCULARIZATION

- **Inosculation**: Host endothelial buds hook up to existing arterioles and venules
- Ingrowth of host vessels into persisting endothelial channels
- Penetration of host vessels into graft dermis from host bed and margin
- Blood flow at 48 hours

GRAFT REVASCULARIZATION-II

- Degree of vascularization depends upon vascularity of donor site, secondarily graft thickness

GRAFT CONTRACTION

- **Primary contraction**: Immediate shrinkage of graft once removed; recoil of elastic fibers
- **Secondary contraction**: Once transferred to recipient site; stsg; ftsg
LYMPHATIC FLOW
- Lymphatic flow returns by the 5-6 post op day
- Utilizes existing lymphatic channels

REINNERVATION OF GRAFTS
- Sensory reinnervation is slow
- Begins @ 2-3 months; may take years to complete
- Occurs first at margins, then moves inward

FULL THICKNESS SKIN GRAFT
INDICATIONS
LOCAL FACTORS
- Defect size- local tissue not available
- Defect location & tissue mobility
- Tissue quality- radiated tissue, severe medical illness, heavy smoker
SKIN GRAFT INDICATIONS-II

NON LOCAL FACTORS
- Aggressive tumor biology
- Uncertain margin control
- Risk of other methods is high (uncertain vascularity in area)
- “Safe repair”
- May result in a pleasing cosmetic result

FULL THICKNESS SKIN GRAFT

ADVANTAGES
- Less tendency to contract
- Less tendency to develop a smooth sheen and resist cosmetics
- Less tendency to pigment post op
- Better chance to have texture and thickness match
- Durability
- Appearance improves with time
- No special instrumentation required

DISADVANTAGES
- Adequate recipient bed-clean (+) excellent vascular bed required
- Meticulous technique-edge approximation and hemostasis
- Donor area requires closure (linear, flap)
- Potential complications at two sites
- Texture, color, and surface differences between graft and adjacent tissue
FULL THICKNESS SKIN GRAFTS
DONOR SITES
- Retro auricular
- Pre auricular
- Upper lid
- Neck
- Upper inner arm
- Clavicular
- Groin
- Nasolabial crease

MATCHING DONOR SKIN TO RECIPIENT SITE
- Total size including depth; use gentian violet and template
- Consider skin thickness
- Sebaceous and actinic quality

FULL THICKNESS SKIN GRAFT
SURGICAL TECHNIQUE
1. Donor site selection
2. Appropriate marking and sizing, tailor defect size
3. Harvest skin graft (safe keeping)
4. Repair donor defect
5. Defat graft (keep moist)
6. Prepare recipient bed (hemostasis, delayed graft: freshen edges)
7. Placement of graft
8. Metaculous approximation of edges: tacking sutures at edge, basting sutures, running at periphery
9. Dressing
10. Pt. Education: diet, activity, any local care, f/u
SKIN GRAFT
SURGICAL TECHNIQUE-II

11- Follow up visit: bolster / dressing removal
12- Discussion of graft appearance and demonstration of local care
SILK HAS EXCELLENT KNOT STABILITY
CLEANING GRAFT EDGES
FTSG Upper Eyelid From Upper Lid Donor

Access & Visualization

TRACTION SUTURES

TRACTION SUTURES
BURROWS GRAFTS
BASTING SUTURES
DRESSING OVER GRAFT

Goal: to prevent external mechanical forces from disturbing “physiologic take” of graft to recipient bed

Bolster dressing – tie over – vs- non tie over dressing protects graft

PERIOPERATIVE MANAGEMENT

- Written instructions
- Telephone numbers for questions/problems
- Acceptable diet
- Acceptable activity, bathing
- Rx: Antibiotics, pain medications
- Follow up depends on distance traveled
- Stress their actions determine survival of graft and outcome
- Bolster off at about 7 days
- Review graft appearance: color, contour, expectations- mirror in patient’s hand

PERIOPERATIVE MANAGEMENT-II

- Follow up- depends on graft appearance
- Do not abandon patient if outcome appears unfavorable- rather opposite
SPLIT THICKNESS GRAFTS

CLASSIFICATION OF SPLIT GRAFTS

- Thin ...................... 0.050–0.012 inch
- Intermediate ........... 0.012–0.018 inch
- Thick .................... 0.018–0.028 inch
STSG DONOR SITES

- Thigh
- Buttock
- Inner arm
- Abdomen
- Be mindful in young female pt. (swim suit)

SPLIT THICKNESS GRAFT

INDICATIONS

LOCAL FACTORS

- Large size
- Compromised recipient bed-radiated tissue, questionable vascular supply

NON LOCAL FACTORS

- Coverage of wound before formal reconstruction with flaps (delayed, tissue expansion)
- Observation of wound after removal of tumor with aggressive/ recurrent disease
- “Biologic Band-Aid”
SPLIT THICKNESS GRAFTS

ADVANTAGES

- High rate of success
- Simple to apply; less meticulous technique required
- Rapid coverage of larger defects
- Ample donor sites
- May use with marginal recipient bed

DISADVANTAGES

- Durability
- Appearance - color and texture match
- Special instrumentation required for larger defects
- Graft contraction
- Appearance worse over time

SURGICAL TECHNIQUE

1. Donor site selection
2. Appropriate sizing - depth + dimensions
3. Prepare donor site; mineral oil
4. Stabilization of donor site; harvest; safe placement of graft until ready
5. Secure graft
6. Fenestration of graft - vs. - meshed graft
7. Dressings for graft and donor site
8. Written instructions
INSTRUMENTATION

A. Freehand harvest
   1. Blue blade
   2. Weck knife
   3. Hamby knife
B. Electric dermatome
   1. Power Padgett dermatome
   2. Brown dermatome
   3. Davol Simons
C. Power Dermatome
   1. Zimmer dermatome
POST OP DAY 21; 3 PIECES STITCHED

RECURRENT BCC S/P RT

RECURRENT BCC S/P RT
MELANOMA WITH LARGE AMELANOTIC COMPONENT READY FOR GRAFTING: 16x14 cm

FRESHENING BASE & EDGES
TUMESCENT ANESTHESIA FOR LARGER AREAS
HELPFUL: 0.1-0.25% LIDOCAINE DEPENDING ON SIZE

PIECES DRAPED OVER DEFECT

DONOR SITES WITH GRAFTS HARVESTED
GRAFTS SECURED AT PERIPHERY AND OVERLAPPING

TRIM AWAY EXCESS

GRAFTS SECURED TOGETHER WITH BITES INTO WOUND TO SECURE AND #11 BLADE TO "PIE CRUST" GRAFT
BASTING SUTURES RUNNING LOCK WITH TACKING 2-0 SILKS FOR TIE OVER BOLSTER DRESSING

BOLSTER CONSTRUCTED OUT OF KERLIX FLUFF COVERED WITH 4x4 GAUZES AND COVER ROLL TAPE ARM PLACED IN SLING UNTIL P/U

BOLSTER REMOVAL
BOLSTER REMOVAL

POST OP WEEK 1

FOLLOW UP
**SPLIT THICKNESS GRAFTING**

Pre-op | Post-op week 12

**AMELANOTIC MELANOMA; S/P MOHS WITH PERM. SECTIONS- 14X16 CM; 8 MONTHS POST OP**

**AMELANOTIC MELANOMA PT--DONOR SITS OF STSG WITH AREAS OF HYPERTHROPHY; 8 MONTHS POST OP**
Hypertrophic Scarring of Donor Site Improved Following Multiple Laser Treatments

2008 2011

Hypertrophic Scarring of Donor Site Improved Following Multiple Laser Treatments

STSG 3 Years Out

7-08-11
STSG 3 Years Out

PINCH GRAFTS

[Images and text related to medical procedures]
COMPLICATIONS AND MANAGEMENT

1. Bleeding
   - Must see – true bleed – vs – ointment mix
   - Inspect graft; if active bleeding, take down and effect hemostasis
   - Rebandage; if > 24-48 hours, graft may not be viable – consider additional graft
   - Prevention – meticulous technique, thrombin, delayed graft, nicks in graft, review pre op check list

2. Infection – rare but can occur

COMPLICATIONS AND MANAGEMENT-II

3. Incomplete take – contour irregularity
4. Free edge contraction
5. Hypertrophy

HYPERTROPHY OF GRAFT
HYPERTROPHY OF GRAFT
MELANOMA WLE AND STSG; MRSA WITH AREA OF NECROSIS

14 X 12 CM
PIECES STITCHED
EXUBERANT GRANULATION TISSUE @ NECROSIS SITES

SMOKING'S EFFECT ON RANDOM PATTERN FLAP
NECROSIS OF GRAFT

- Do not aggressively debride graft
- Do frequent dressing changes
- Do see pt. frequently
- Reevaluate once demarcation of necrosis complete to go over options

CAUSES OF GRAFT FAILURE

- Poor planning
- Poor technique
- Inadequate hemostasis, necrotic debris in recipient bed, inadequate vascular bed
- Infection
- Patient indifference to instructions
8 Month F/U
THANK YOU!