12th Annual Otolaryngology Literature Update
Facial Plastic & Reconstructive Surgery

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Judith M. Skoner, M.D. joined the MUSC Department of Otolaryngology-Head and Neck Surgery in September 2005. She received her medical degree from the University of South Carolina School of Medicine and completed residency at the Medical University of South Carolina. Following residency, she completed fellowship training in facial plastic and reconstructive /microvascular surgery with Dr. Mark Wax, at Oregon Health & Science University in Portland.

As Associate Professor within the MUSC Facial Plastics division, Dr. Skoner continues her focused expertise in microvascular surgery and complex reconstruction of the head & neck. She also has particular interest in post-traumatic facial reconstruction and the functional/aesthetic reconstruction of other complex defects and deformities. In addition, she serves as the division chief of Otolaryngology-HNS at the Ralph H. Johnson VA Hospital in Charleston.

Dr. Skoner is board-certified by both the American Board of Otolaryngology and the American Board of Facial Plastic and Reconstructive Surgery, and she is an active member of the American Academy of Otolaryngology-Head and Neck Surgery.

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REVIEW

Use of xenografts and allografts in scalp reconstruction

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Seerat K. Poonia[a] *and Brianna N. Harris*[b]

Purpose of review
Scalp reconstruction requires a full array of reconstructive options given the complex anatomy and protection of vital structures. Not all patients qualify for advanced reconstructive options and therefore rely on short, effective procedures with minimal morbidity. This review aims to focus on xenografts and allografts to achieve an adequate reconstruction while minimizing morbidity.

Recent findings
Although bovine xenografts have been used for many decades, there have been recent advances in porcine xenografts to aid in scalp defects. Similarly, new allogenic materials have emerged as additional tools in the armamentarium to promote wound healing.

Summary
Both xenografts and allografts offer viable options for complex scalp reconstruction.

Keywords
allograft, cranioplasty, dermal matrix, scalp reconstruction, xenograft

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XENOGRAFTS:

Collagen xenografts are popular→ bovine or porcine --promote healing by absorbing fluids in wound and supplying structural support for cell regeneration

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XENOGRAFTS:

Integra

– bilaminate synthetic construct of outer silicone layer and inner collagen-glycosaminoglycan matrix (bovine collagen): >90% success rate

-- ability to produce a neo-dermis even directly on bone

--limits scar contracture compared to skin graft alone

-- particularly beneficial in elderly pts with many comorbidities bc lower anesthetic risk and less complicated postop care

-highly cost effective in study comparing free flap vs Integra: similar healing outcomes(!!)

- DISADVANTAGE: often 2-stage approach: prolongs healing time, increased pt burden

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XENOGRAFTS:

Matriderm

– Porous dermal matrix of collagen from bovine dermis and elastic from bovine nuchal ligament

-- used in SINGLE–STAGE full-thickness reconstruction with 96.7% success rate

but NONE were directly on bone

- 2 case studies used this PLUS STSG to cover exposed dura after ftt failure, with overlying VAC

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XENOGRAFTS:

Puracol

– 100% bovine derived collagen matrix

--post-Mohs reports using this even in wound with >50% bone exposure

--bid petrolatum oinment dressing changes; some required reapplication of material

--authors concluded it expedited healing and granulation

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XENOGRAFTS:

Mucograft

– Porcine collagen matrix

--Pilot study showed wound closure in 4-5 wks for smaller defects, 8-24 wks in large complex wounds

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XENOGRAFTS:

Pelnac

– Atelocollagen porcine tendon and silicone reinforcement in **complex wound txs, relatively new**

--Study of 12 pts, all 2 stage: median 21.3 days for matrix, then all with successful FTSG

--**included smoker, DM, XRT, chronic wound pts**

--Another study with exposed bone all healed within 13 wks as single stage

--Another study found mean healing time 39 days and also found pts very satisfied with their appearance

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XENOGRAFTS:

Collagen xenografts are popular→ bovine or porcine

--promote healing by absorbing fluids in wound and supplying structural support for cell regeneration

--reliable method for scalp 'closure' in pts with comorbidities who may not tolerate long anesthetic times

--Disadvantages: overall duration of healing; daily wound care; frequent f/u; may be thin, thus more susceptible to injury

**even though they are all collagen matrices, each induce different cellular inflammatory responses -- but no comparative studies are out yet →

so no conclusion about what is the 'best' matrix**

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ALLOGRAFTS:

--Popular dermal alternative: acellular dermal matrices (ADM) and dehydrated human amnion/chorion (dHACM)

ADMs – allografts from human cells, screened for viruses and removed of cells so no immune or graft rejection response

dHACM- allograft from human amniotic membranes; exhibit low immunogenicity and accelerate wound healing

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ALLOGRAFTS:

Alloderm

- Most widely used ADM; from cadaver skin: elastin+collagen, promoting structure viability by reduction tension and increasing elasticity of the new skin. Contributes to wound healing and reduces scar contracture

-Study concluded more favorable results using ADM with STSG, with higher appearance satisfaction than STSG alone

- Another concluded even in hostile environments ADM can help healing

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ALLOGRAFTS:

Epifix

- dHACM allograft used to accelerate healing in chronic wounds

-can be placed directly on bone to encourage granulation

-contains cytokines and growth factors to promote healing, and 'bone chiseling' was not required, still healed

- in other studies, dHACM found superior to 'standard methods' in chronic wounds – mostly in diabetic foot ulcers

-promising! Further studies needed for HN

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CONCLUSION

Although local rotational flaps and microvascular free tissue transfer are the preferred methods for some large scalp wound, it requires prolonged operative time, donor site morbidity, specialized equipment and microsurgical technique [21]. The available data support the use of xenografts and allografts in the healing of complicated postsurgical scalp wounds. Larger prospective studies are needed, however, to provide better data on which graft should be used, and to help develop a treatment algorithm.

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Thank You!