



## Skin and Soft Tissue Substitutes

LOB(s): <input checked="" type="checkbox"/> Commercial  <input checked="" type="checkbox"/> Medicare	State(s): <input checked="" type="checkbox"/> Idaho <input checked="" type="checkbox"/> Montana <input checked="" type="checkbox"/> Oregon <input checked="" type="checkbox"/> Washington <input type="checkbox"/> Other:
<input checked="" type="checkbox"/> Medicaid	<input checked="" type="checkbox"/> Oregon <input type="checkbox"/> Washington

### Enterprise Policy

PacificSource is committed to assessing and applying current regulatory standards, widely-used treatment guidelines, and evidenced-based clinical literature when developing clinical criteria for coverage determination. Each policy contains a list of sources (references) that serves as the summary of evidence used in the development and adoption of the criteria. The evidence was considered to ensure the criteria provide clinical benefits that promote patient safety and/or access to appropriate care. Each clinical policy is reviewed, updated as needed, and readopted, at least annually, to reflect changes in regulation, new evidence, and advancements in healthcare.

Clinical Guidelines are written when necessary to provide guidance to providers and members in order to outline and clarify coverage criteria in accordance with the terms of the Member's policy. This Clinical Guideline only applies to PacificSource Health Plans PacificSource Community Health Plans, and PacificSource Community Solutions, in Idaho, Montana, Oregon, and Washington. Because of the changing nature of medicine, this list is subject to revision and update without notice. This document is designed for informational purposes only and is not an authorization or contract. Coverage determinations are made on a case-by-case basis and subject to the terms, conditions, limitations, and exclusions of the Member's policy. Member policies differ in benefits and to the extent a conflict exists between the Clinical Guideline and the Member's policy, the Member's policy language shall control. Clinical Guidelines do not constitute medical advice nor guarantee coverage.

### Background

Skin and soft tissue substitutes are biologic, synthetic, or biosynthetic materials that may be used temporarily or permanently, eventually replacing damaged skin. Skin substitutes may be used to treat burns, chronic ulcers, or wounds. They may provide temporary coverage of wounds to facilitate healing, help reduce incidence of contracture or infection, either eliminate the need for grafting or as a bridge until the wound is ready for grafting.

Skin consists of two main layers, the dermis, and the epidermis. The epidermis is the outer, thinner layer of skin consisting of layers of stratified squamous epithelium. The epidermis has minimal blood vessels and nerve endings. The dermis is a dense connective tissue layer which lies beneath the epidermis. It is comprised of collagenous fibers, blood vessels, lymph channels, nerves, sebaceous glands, sweat glands and hair follicles.

Wounds may be described as partial-thickness or full-thickness.

**Partial thickness** wounds have damage to the epidermis and a portion of the dermis. Partial-thickness wounds may heal spontaneously if kept clean and protected; however, contractures formed by scar tissue may result.

**Full-thickness** wounds have damage that extends through both the dermis and the epidermis. Full-thickness wounds usually require excision followed by split-thickness grafts of varying thickness. Split-

thickness grafts contain only small portions of dermis which is why skin substitutes may be elected for the treatment of larger surface area burns.

**Deep partial thickness burns** – These burns extend into the deeper dermis and are characteristically different from superficial partial-thickness burns. Deep burns damage hair follicles and glandular tissue. They are painful to pressure only, almost always blister (easily unroofed), are wet or waxy dry, and have variable mottled colorization from patchy cheesy white to red.

**Skin and soft tissue substitutes** may also be used for repair, reconstruction, and reinforce; tendons, cardiac applications, traumatic injuries, and other surgical procedures.

- DuraSeal is considered integral to dural repair during spinal surgery and is not separately reimbursed.
- Tisseel is considered integral to the surgery, when used, and is not separately reimbursed.
- TissueMend is considered integral to the surgery, when used, and is not separately reimbursed for the repair or reinforcement of soft tissues repaired by sutures or suture anchors during tendon repair surgery, including reinforcement of the rotator cuff, patellar, Achilles, biceps, quadriceps, or other tendons.

## Criteria

---

### Commercial

#### Prior authorization is required

##### I. Skin Substitutes for Breast Reconstruction Surgery

PacificSource considers the following products to be medically necessary when used in an approved breast reconstruction surgery:

- A. AlloDerm
- B. DermACELL

##### II. Skin Substitutes for Full Thickness or Deep Partial Thickness Burns

PacificSource considers **Integra Bilayer Matrix Wound Dressing, Integra Dermal Regeneration Template, and Integra Matrix** to be medically necessary for the post excisional treatment of full-thickness or deep partial-thickness burns when **EITHER** of the following criteria is met:

- A. There is a limited amount of the patient's own skin to use for autografts
- B. The member is too ill for autografting

##### III. Skin Substitutes for Diabetic Plantar Surface Foot Ulcers

PacificSource considers the use of **Dermagraft** to be medically necessary for treatment of diabetic plantar surface foot ulcers when **ALL** of the following criteria is met:

- A. The plantar surface ulcer has been present more than 3 weeks
- B. The ulcer has failed to respond to standard therapy (e.g., moist-wound therapy with alginates, foams, hydrocolloids, or hydrogels)
- C. There is no tendon, muscle, capsule, or bone exposed in ulcer

##### IV. Skin Substitutes for Venous Stasis Leg Ulcers and Diabetic Foot Ulcers:

PacificSource considers the use of **Apligraf** or the **sheet form of EpiFix** medically necessary for the treatment of venous stasis leg ulcers when **ALL** of the following criteria is met:

- A. The venous stasis ulcer has been present for more than one month
- B. The ulcer is not infected
- C. The ulcer has failed to respond to standard treatment prior to Apligraf or EpiFix application (e.g., compression dressings, Unna boot)

PacificSource considers the use of **Apligraf** or the **sheet form of EpiFix** medically necessary for the treatment of diabetic foot ulcers when **ALL** of the following criteria is met:

- A. The diabetic foot ulcer is full thickness
- B. The ulcer has been present more than 3 weeks
- C. The ulcer has failed to respond to standard therapy (e.g., moist-wound therapy with alginates, foams, hydrocolloids, or hydrogels)
- D. There is no tendon, muscle, capsule, or bone exposed in the ulcer bed

## Medicaid

PacificSource Community Solutions (PCS) follows OARs 410-141-3820 to 3830, 410-151-0000 to 0003, & and 410-120-1200 for coverage of Skin and Soft Tissue Substitutes and Guideline Note 163 of the Oregon Health Plan (OHP) Prioritized List of Health Services for coverage of Skin and Soft Tissue Substitutes.

PacificSource Community Solutions (PCS) considers implantation of acellular dermal matrix for soft tissue reinforcement (15777) to be medically necessary when performed as part of an approved breast reconstruction surgery. For all other indications, PCS follows Guideline Note 172 of the Oregon Health Plan (OHP) Prioritized List of Health Services which considers this service to have an increased risk of adverse events and unclear benefits versus other effective therapies. Additionally, for members under the age of 21, PacificSource Community Solutions (PCS) follows OARs 410-151-0000 through 0003 for coverage of services.

## Medicare

PacificSource Medicare follows CMS guidelines and criteria. In the absence of CMS guidelines and criteria, PacificSource Medicare will follow internal policy for determination of coverage and medical necessity.

## Experimental/ Investigational/Unproven

---

PacificSource considers the use of AlloDerm and DermACELL to be to be experimental, investigational, or unproven for all other indications.

PacificSource considers the use of Integra Bilayer Matrix Wound Dressing, Integra Dermal Regeneration Template, and Integra Matrix to be to be experimental, investigational, or unproven for all other indications.

PacificSource considers the use of Dermagraft to be to be experimental, investigational, or unproven for all other indications.

PacificSource considers the use of Apligraf and EpiFix to be to be experimental, investigational, or unproven for all other indications.

PacificSource considers **ALL OTHER** skin substitute products to be experimental, investigational, or unproven until they are approved for specific indication and added to this policy for coverage.

## Coding Information

---

The following list of codes are for informational purposes only and may not be all-inclusive. Deleted codes and codes which are not effective at the time the service is rendered may not be eligible for reimbursement.

**Skin Substitute Grafts:** The type of skin substitute graft(s) (Q code) should be requested in conjunction with the application 15271- 15278.

- 15271 Application of skin substitute graft to trunk, arms, legs, total wound surface area up to 100 sq. cm; first 25 sq. cm or less wound surface area—
- 15272 each additional 25 sq. cm wound surface area, or part thereof (List separately in addition to code for primary procedure)
- 15273 Application of skin substitute graft to trunk, arms, legs, total wound surface area greater than or equal to 100 sq. cm; first 100 sq. cm wound surface area, or 1% of body area of infants and children
- 15274 each additional 100 sq. cm wound surface area, or part thereof, or each additional 1% of body area of infants and children, or part thereof (List separately in addition to code for primary procedure)
- 15275 Application of skin substitute graft to face, scalp, eyelids, mouth, neck, ears, orbits, genitalia, hands, feet, and/or multiple digits, total wound surface area up to 100 sq. cm; first 25 sq. cm or less wound surface area
- 15276 each additional 25 sq. cm wound surface area, or part thereof (List separately in addition to code for primary procedure)
- 15277 Application of skin substitute graft to face, scalp, eyelids, mouth, neck, ears, orbits, genitalia, hands, feet, and/or multiple digits, total wound surface area greater than or equal to 100 sq. cm; first 100 sq. cm wound surface area, or 1% of body area of infants and children
- 15278 each additional 100 sq. cm wound surface area, or part thereof, or each additional 1% of body area of infants and children, or part thereof
- 15777 Implantation of biologic implant (e.g., acellular dermal matrix) for soft tissue reinforcement (e.g., breast, trunk) (List separately in addition to code for primary procedure)
- 46707 Repair of anorectal fistula with plug (e.g.: porcine small intestine submucosa).

HCPCS	Product
Q4104	Integra Bilayer Matrix Wound
Q4105	Integra Dermal Regeneration Template (IDRT)

Q4105	Integra Omnigraft Dermal Regeneration Matrix
Q4106	Dermagraft
Q4108	Integra Matrix Wound
Q4114	Integra Flowable Wound Matrix, injectable, 1 cc
Q4116	Alloderm
Q4122	DermACELL, per square centimeter

CPT® codes, descriptions and materials are copyrighted by the American Medical Association (AMA).

HCPCS® codes, descriptions and materials are copyrighted by Centers for Medicare and Medicaid Services (CMS).

## Related Policies

---

New and Emerging Technologies – Coverage Status

Bone and Tendon Graft Substitutes

Gender Affirming Surgery and Related Procedures

Reduction Mammoplasty

## References

---

### AlloDerm

Australia and New Zealand Horizon Scanning Network (ANZHSN). (February 2007). Alloderm for deep superficial and full-thickness burns. Horizon Scanning Prioritizing Summary.

Aycock, J., Fichera, A., Colwell, J. C., & Song, D. H. (2007). Parastomal hernia repair with acellular dermal matrix. *Journal of wound, ostomy, and continence nursing : official publication of The Wound, Ostomy and Continence Nurses Society*, 34(5), 521–523.

Beale, E. W., Hoxworth, R. E., Livingston, E. H., & Trussler, A. P. (2012). The role of biologic mesh in abdominal wall reconstruction: a systematic review of the current literature. *American journal of surgery*, 204(4), 510–517.

Bindingavele, V., Gaon, M., Ota, K. S., Kulber, D. A., & Lee, D. J. (2007). Use of acellular cadaveric dermis and tissue expansion in postmastectomy breast reconstruction. *Journal of plastic, reconstructive & aesthetic surgery : JPRAS*, 60(11), 1214–1218.

Bluebond-Langner, R., Keifa, E. S., Mithani, S., Bochicchio, G. V., Scalea, T., & Rodriguez, E. D. (2008). Recurrent abdominal laxity following interpositional human acellular dermal matrix. *Annals of plastic surgery*, 60(1), 76–80.

Bochicchio, G. V., De Castro, G. P., Bochicchio, K. M., Weeks, J., Rodriguez, E., & Scalea, T. M. (2013). Comparison study of acellular dermal matrices in complicated hernia surgery. *Journal of the American College of Surgeons*, 217(4), 606–613.

Breuing, K. H., & Colwell, A. S. (2007). Inferolateral AlloDerm hammock for implant coverage in breast reconstruction. *Annals of plastic surgery*, 59(3), 250–255.

- Brooke, S., Mesa, J., Uluer, M., Michelotti, B., Moyer, K., Neves, R. I., Mackay, D., & Potochny, J. (2012). Complications in tissue expander breast reconstruction: a comparison of AlloDerm, DermaMatrix, and FlexHD acellular inferior pole dermal slings. *Annals of plastic surgery*, 69(4), 347–349.
- Buñewicz, B., & Rosen, B. (2004). Acellular cadaveric dermis (AlloDerm): a new alternative for abdominal hernia repair. *Annals of plastic surgery*, 52(2), 188–194.
- Butler, C. E., Langstein, H. N., & Kronowitz, S. J. (2005). Pelvic, abdominal, and chest wall reconstruction with AlloDerm in patients at increased risk for mesh-related complications. *Plastic and reconstructive surgery*, 116(5), 1263–1277.
- Butterfield J. L. (2013). 440 Consecutive immediate, implant-based, single-surgeon breast reconstructions in 281 patients: a comparison of early outcomes and costs between SurgiMend fetal bovine and AlloDerm human cadaveric acellular dermal matrices. *Plastic and reconstructive surgery*, 131(5), 940–951.
- Champagne, B., J. (2023). Operative management of anorectal fistulas. UpToDate.
- Deneve, J. L., Turaga, K. K., Marzban, S. S., Puleo, C. A., Sarnaik, A. A., Gonzalez, R. J., Sondak, V. K., & Zager, J. S. (2013). Single-institution outcome experience using AlloDerm® as temporary coverage or definitive reconstruction for cutaneous and soft tissue malignancy defects. *The American surgeon*, 79(5), 476–482.
- Diaz, J. J., Jr, Guy, J., Berkes, M. B., Guillaumondegui, O., & Miller, R. S. (2006). Acellular dermal allograft for ventral hernia repair in the compromised surgical field. *The American surgeon*, 72(12), 1181–1188.
- Efsandiari S., Dendukuri, N., McGregor, M. (2009). Clinical efficacy and cost of Allogenic Acellular Dermal Matrix (AADM) in implant-based breast reconstruction of post mastectomy cancer patients. Report No. 40.
- Ellis, C. V., & Kulber, D. A. (2012). Acellular dermal matrices in hand reconstruction. *Plastic and reconstructive surgery*, 130(5 Suppl 2), 256S–269S.
- Espinosa-de-los-Monteros, A., de la Torre, J. I., Marrero, I., Andrades, P., Davis, M. R., & Váscquez, L. O. (2007). Utilization of human cadaveric acellular dermis for abdominal hernia reconstruction. *Annals of plastic surgery*, 58(3), 264–267.
- Gamboa-Bobadilla G. M. (2006). Implant breast reconstruction using acellular dermal matrix. *Annals of plastic surgery*, 56(1), 22–25.
- Garramone, C. E., & Lam, B. (2007). Use of AlloDerm in primary nipple reconstruction to improve long-term nipple projection. *Plastic and reconstructive surgery*, 119(6), 1663–1668.
- Germani, R. M., Vivero, R., Herzallah, I. R., & Casiano, R. R. (2007). Endoscopic reconstruction of large anterior skull base defects using acellular dermal allograft. *American journal of rhinology*, 21(5), 615–618.
- Glasberg, S. B., & D'Amico, R. A. (2006). Use of regenerative human acellular tissue (AlloDerm) to reconstruct the abdominal wall following pedicle TRAM flap breast reconstruction surgery. *Plastic and reconstructive surgery*, 118(1), 8–15.
- Gordley, K., Cole, P., Hicks, J., & Hollier, L. (2009). A comparative, long term assessment of soft tissue substitutes: AlloDerm, Enduragen, and Dermamatrix. *Journal of plastic, reconstructive & aesthetic surgery : JPRAS*, 62(6), 849–850.



- Gore D. C. (2005). Utility of acellular allograft dermis in the care of elderly burn patients. *The Journal of surgical research*, 125(1), 37–41.
- Gupta, A., Zahriya, K., Mullens, P. L., Salmassi, S., & Keshishian, A. (2006). Ventral herniorrhaphy: experience with two different biosynthetic mesh materials, Surgisis and Alloderm. *Hernia : the journal of hernias and abdominal wall surgery*, 10(5), 419–425.
- Guy, J. S., Miller, R., Morris, J. A., Jr, Diaz, J., & May, A. (2003). Early one-stage closure in patients with abdominal compartment syndrome: fascial replacement with human acellular dermis and bipedicle flaps. *The American surgeon*, 69(12), 1025–1029.
- Harirchian, S., & Baredes, S. (2013). Use of AlloDerm in primary reconstruction after resection of squamous cell carcinoma of the lip and oral commissure. *American journal of otolaryngology*, 34(5), 611–613.
- Harth, K. C., Krpata, D. M., Chawla, A., Blatnik, J. A., Halaweish, I., & Rosen, M. J. (2013). Biologic mesh use practice patterns in abdominal wall reconstruction: a lack of consensus among surgeons. *Hernia : the journal of hernias and abdominal wall surgery*, 17(1), 13–20.
- Hiles, M., Record Ritchie, R. D., & Altizer, A. M. (2009). Are biologic grafts effective for hernia repair: a systematic review of the literature. *Surgical innovation*, 16(1), 26–37.
- Holton, L. H., 3rd, Kim, D., Silverman, R. P., Rodriguez, E. D., Singh, N., & Goldberg, N. H. (2005). Human acellular dermal matrix for repair of abdominal wall defects: review of clinical experience and experimental data. *Journal of long-term effects of medical implants*, 15(5), 547–558.
- Janis, J. E., O'Neill, A. C., Ahmad, J., Zhong, T., & Hofer, S. O. P. (2012). Acellular dermal matrices in abdominal wall reconstruction: a systematic review of the current evidence. *Plastic and reconstructive surgery*, 130(5 Suppl 2), 183S–193S.
- Jansen, L. A., De Caigny, P., Guay, N. A., Lineaweaver, W. C., & Shokrollahi, K. (2013). The evidence base for the acellular dermal matrix AlloDerm: a systematic review. *Annals of plastic surgery*, 70(5), 587–594.
- Jin, J., Rosen, M. J., Blatnik, J., McGee, M. F., Williams, C. P., Marks, J., & Ponsky, J. (2007). Use of acellular dermal matrix for complicated ventral hernia repair: does technique affect outcomes. *Journal of the American College of Surgeons*, 205(5), 654–660.
- Kim, H., Bruen, K., & Vargo, D. (2006). Acellular dermal matrix in the management of high-risk abdominal wall defects. *American journal of surgery*, 192(6), 705–709.
- Kissane NA, Itani KM. A decade of ventral incisional hernia repairs with biologic acellular dermal matrix: What have we learned? *Plast Reconstr Surg*. 2012;130(5 Suppl 2):194S-202S.
- Kolker, A. R., Brown, D. J., Redstone, J. S., Scarpinato, V. M., & Wallack, M. K. (2005). Multilayer reconstruction of abdominal wall defects with acellular dermal allograft (AlloDerm) and component separation. *Annals of plastic surgery*, 55(1), 36–42.
- Lattari, V., Jones, L. M., Varcelotti, J. R., Latenser, B. A., Sherman, H. F., & Barrette, R. R. (1997). The use of a permanent dermal allograft in full-thickness burns of the hand and foot: a report of three cases. *The Journal of burn care & rehabilitation*, 18(2), 147–155.
- Lee, J. M., Seo, Y. J., Shim, D. B., Lee, H. J., & Kim, S. H. (2018). Surgical outcomes of tympanoplasty using a sterile acellular dermal allograft: a prospective randomised controlled study. *Acta otorhinolaryngologica Italica: organo ufficiale della Societa italiana di otorinolaringologia e chirurgia cervico-facciale*, 38(6), 554–562.

- Li, C., Yang, X., Pan, J., Shi, Z., & Li, L. (2013). Graft for prevention of Frey syndrome after parotidectomy: a systematic review and meta-analysis of randomized controlled trials. *Journal of oral and maxillofacial surgery : official journal of the American Association of Oral and Maxillofacial Surgeons*, 71(2), 419–427.
- Liu, D. Z., Mathes, D. W., Neligan, P. C., Said, H. K., & Louie, O. (2014). Comparison of outcomes using AlloDerm versus FlexHD for implant-based breast reconstruction. *Annals of plastic surgery*, 72(5), 503–507.
- Lorenz, R. R., Dean, R. L., Hurley, D. B., Chuang, J., & Citardi, M. J. (2003). Endoscopic reconstruction of anterior and middle cranial fossa defects using acellular dermal allograft. *The Laryngoscope*, 113(3), 496–501.
- Lydiat, W. M., Quivey, J. M. Salivary gland tumors: Treatment of locoregional disease. UpToDate.
- Lynch, M. P., Chung, M. T., & Rinker, B. D. (2013). Dermal autografts as a substitute for acellular dermal matrices (ADM) in tissue expander breast reconstruction: a prospective comparative study. *Journal of plastic, reconstructive & aesthetic surgery : JPRAS*, 66(11), 1534–1542.
- McCarthy, C. M., Lee, C. N., Halvorson, E. G., Riedel, E., Pusic, A. L., Mehrara, B. J., & Disa, J. J. (2012). The use of acellular dermal matrices in two-stage expander/implant reconstruction: a multicenter, blinded, randomized controlled trial. *Plastic and reconstructive surgery*, 130(5 Suppl 2), 57S–66S.
- Memorial Sloan Kettering Cancer Center (MSKCC). (February 18, 2009). Tissue expander/implant reconstruction: A single-blinded, randomized, controlled trial. *ClinicalTrials.gov*. Identifier NCT00639106.
- Mendenhall, S. D., Anderson, L. A., Ying, J., Boucher, K. M., Liu, T., Neumayer, L. A., & Agarwal, J. P. (2015). The BREASTrial: stage I. Outcomes from the time of tissue expander and acellular dermal matrix placement to definitive reconstruction. *Plastic and reconstructive surgery*, 135(1), 29e–42e.
- Patel, K. M., & Bhanot, P. (2012). Complications of acellular dermal matrices in abdominal wall reconstruction. *Plastic and reconstructive surgery*, 130(5 Suppl 2), 216S–224S.
- Patel, M. R., Stadler, M. E., Snyderman, C. H., Carrau, R. L., Kassam, A. B., Germanwala, A. V., Gardner, P., & Zanation, A. M. (2010). How to choose? Endoscopic skull base reconstructive options and limitations. *Skull base : official journal of North American Skull Base Society ... [et al.]*, 20(6), 397–404.
- Patton, J. H., Jr, Berry, S., & Kralovich, K. A. (2007). Use of human acellular dermal matrix in complex and contaminated abdominal wall reconstructions. *American journal of surgery*, 193(3), 360–363.
- Preminger, B. A., McCarthy, C. M., Hu, Q. Y., Mehrara, B. J., & Disa, J. J. (2008). The influence of AlloDerm on expander dynamics and complications in the setting of immediate tissue expander/implant reconstruction: a matched-cohort study. *Annals of plastic surgery*, 60(5), 510–513.
- Ricci, J. A., Treiser, M. D., Tao, R., Jiang, W., Guldbrandsen, G., Halvorson, E., Hergueter, C. A., & Chun, Y. S. (2016). Predictors of Complications and Comparison of Outcomes Using SurgiMend Fetal Bovine and AlloDerm Human Cadaveric Acellular Dermal Matrices in Implant-Based Breast Reconstruction. *Plastic and reconstructive surgery*, 138(4), 583e–591e.
- Salzberg C. A. (2006). Nonexpansive immediate breast reconstruction using human acellular tissue matrix graft (AlloDerm). *Annals of plastic surgery*, 57(1), 1–5.



- Scott, B. G., Welsh, F. J., Pham, H. Q., Carrick, M. M., Liscum, K. R., Granchi, T. S., Wall, M. J., Jr, Mattox, K. L., & Hirshberg, A. (2006). Early aggressive closure of the open abdomen. *The Journal of trauma*, 60(1), 17–22.
- Shridharani, S. M., & Tufaro, A. P. (2012). A systematic review of acellular dermal matrices in head and neck reconstruction. *Plastic and reconstructive surgery*, 130(5 Suppl 2), 35S–43S.
- Slater, N. J., van der Kolk, M., Hendriks, T., van Goor, H., & Bleichrodt, R. P. (2013). Biologic grafts for ventral hernia repair: a systematic review. *American journal of surgery*, 205(2), 220–230.
- Sobti, N., & Liao, E. C. (2016). Surgeon-Controlled Study and Meta-Analysis Comparing FlexHD and AlloDerm in Immediate Breast Reconstruction Outcomes. *Plastic and reconstructive surgery*, 138(5), 959–967.
- Spear, S. L., Parikh, P. M., Reisin, E., & Menon, N. G. (2008). Acellular dermis-assisted breast reconstruction. *Aesthetic plastic surgery*, 32(3), 418–425.
- Tsai, C. C., Lin, S. D., Lai, C. S., & Lin, T. M. (1999). The use of composite acellular allodermis-ultrathin autograft on joint area in major burn patients--one year follow-up. *The Kaohsiung journal of medical sciences*, 15(11), 651–658.
- Vertrees, A., Greer, L., Pickett, C., Nelson, J., Wakefield, M., Stojadinovic, A., & Shriver, C. (2008). Modern management of complex open abdominal wounds of war: a 5-year experience. *Journal of the American College of Surgeons*, 207(6), 801–809.
- Walters, J., Cazzell, S., Pham, H., Vayser, D., & Reyzelman, A. (2016). Healing Rates in a Multicenter Assessment of a Sterile, Room Temperature, Acellular Dermal Matrix Versus Conventional Care Wound Management and an Active Comparator in the Treatment of Full-Thickness Diabetic Foot Ulcers. *Eplasty*, 16, e10.
- Weber, P. C., Lambert, P. R., Cunningham, C. D., 3rd, Richardson, M. S., & Genao, R. B. (2002). Use of Alloderm in the neurotologic setting. *American journal of otolaryngology*, 23(3), 148–152.
- Yonehiro, L., Burleson, G., & Sauer, V. (2013). Use of a new acellular dermal matrix for treatment of nonhealing wounds in the lower extremities of patients with diabetes. *Wounds : a compendium of clinical research and practice*, 25(12), 340–344.
- Zelen, C. M., Orgill, D. P., Serena, T., Galiano, R., Carter, M. J., DiDomenico, L. A., Keller, J., Kaufman, J., & Li, W. W. (2017). A prospective, randomised, controlled, multicentre clinical trial examining healing rates, safety, and cost to closure of an acellular reticular allogenic human dermis versus standard of care in the treatment of chronic diabetic foot ulcers. *International wound journal*, 14(2), 307–315.
- Zeng, X. T., Tang, X. J., Wang, X. J., Li, M. Z., Guo, Y., Huang, W., Niu, Y. M., & Leng, W. D. (2012). AlloDerm implants for prevention of Frey syndrome after parotidectomy: a systematic review and meta-analysis. *Molecular medicine reports*, 5(4), 974–980.
- Zhong, T., Janis, J. E., Ahmad, J., & Hofer, S. O. (2011). Outcomes after abdominal wall reconstruction using acellular dermal matrix: a systematic review. *Journal of plastic, reconstructive & aesthetic surgery : JPRAS*, 64(12), 1562–1571.
- Zienowicz, R. J., & Karacaoglu, E. (2007). Implant-based breast reconstruction with allograft. *Plastic and reconstructive surgery*, 120(2), 373–381.

## **Alloderm / Strattice**

Booth, J. H., Garvey, P. B., Baumann, D. P., Selber, J. C., Nguyen, A. T., Clemens, M. W., Liu, J., & Butler, C. E. (2013). Primary fascial closure with mesh reinforcement is superior to bridged mesh repair for abdominal wall reconstruction. *Journal of the American College of Surgeons*, 217(6), 999–1009.

Garvey, P. B., Giordano, S. A., Baumann, D. P., Liu, J., & Butler, C. E. (2017). Long-Term Outcomes after Abdominal Wall Reconstruction with Acellular Dermal Matrix. *Journal of the American College of Surgeons*, 224(3), 341–350.

Giordano, S., Garvey, P. B., Baumann, D. P., Liu, J., & Butler, C. E. (2017). Primary fascial closure with biologic mesh reinforcement results in lesser complication and recurrence rates than bridged biologic mesh repair for abdominal wall reconstruction: A propensity score analysis. *Surgery*, 161(2), 499–508.

Merikli, A. F., Garvey, P. B., Giordano, S., Liu, J., Baumann, D. P., & Butler, C. E. (2017). Abdominal Wall Reconstruction with Concomitant Ostomy-Associated Hernia Repair: Outcomes and Propensity Score Analysis. *Journal of the American College of Surgeons*, 224(3), 351–361.e2.

Romain, B., Story, F., Meyer, N., Delhorme, J. B., Brigand, C., & Rohr, S. (2016). Comparative study between biologic porcine dermal meshes: risk factors of postoperative morbidity and recurrence. *Journal of wound care*, 25(6), 320–325.

Sbitany, H., Kwon, E., Chern, H., Finlayson, E., Varma, M. G., & Hansen, S. L. (2015). Outcomes Analysis of Biologic Mesh Use for Abdominal Wall Reconstruction in Clean-Contaminated and Contaminated Ventral Hernia Repair. *Annals of plastic surgery*, 75(2), 201–204.

## **Apligraf**

Agence d'Evaluation des technologies et des Modes d'Intervention en Sante (AETMIS). (2000). The treatment of venous leg ulcers and optimal use of Apligraf (TM). CETS 2000-5.

Alvarez, O. M., Fahey, C. B., Auletta, M. J., & Fernández-Obregón, A. (1998). A novel treatment for venous leg ulcers. *The Journal of foot and ankle surgery : official publication of the American College of Foot and Ankle Surgeons*, 37(4), 319–324.

Australia and New Zealand Horizon Scanning Network (ANZHSN). (February 2007). Apligraf for burn injuries. Horizon Scanning Prioritising Summary. Adelaide, SA: Royal Australasian College of Surgeons, Australian Safety and Efficacy Registry of New Interventional Procedures - Surgical (ASERNIP-S).

BlueCross BlueShield Association (BCBSA), Technology Evaluation Center (TEC). Graftskin for the treatment of skin ulcers. (2001). TEC Assessment Program, 1;16(12).

Brem, H., Balledux, J., Bloom, T., Kerstein, M. D., & Hollier, L. (2000). Healing of diabetic foot ulcers and pressure ulcers with human skin equivalent: a new paradigm in wound healing. *Archives of surgery (Chicago, Ill. : 1960)*, 135(6), 627–634.

Buchberger, B., Follmann, M., Freyer, D., Huppertz, H., Ehm, A., & Wasem, J. (2011). The evidence for the use of growth factors and active skin substitutes for the treatment of non-infected diabetic foot ulcers (DFU): a health technology assessment (HTA). *Experimental and clinical endocrinology & diabetes : official journal, German Society of Endocrinology [and] German Diabetes Association*, 119(8), 472–479.

Carlson, M., Faria, K., Shamis, Y., Leman, J., Ronfard, V., & Garlick, J. (2011). Epidermal stem cells are preserved during commercial-scale manufacture of a bi-layered, living cellular construct (Apligraf®). *Tissue engineering. Part A*, 17(3-4), 487–493.

Coulomb, B., Friteau, L., Baruch, J., Guilbaud, J., Chretien-Marquet, B., Glicenstein, J., Lebreton-Decoster, C., Bell, E., & Dubertret, L. (1998). Advantage of the presence of living dermal fibroblasts within in vitro reconstructed skin for grafting in humans. *Plastic and reconstructive surgery*, 101(7), 1891–1903.

De, S. K., Reis, E. D., & Kerstein, M. D. (2002). Wound treatment with human skin equivalent. *Journal of the American Podiatric Medical Association*, 92(1), 19–23.

DeCarbo WT. Special segment: soft tissue matrices--Apligraf bilayered skin substitute to augment healing of chronic wounds in diabetic patients. *Foot Ankle Spec*. 2009;2(6):299-302.

DiDomenico L, Emch KJ, Landsman AR, et al. A prospective comparison of diabetic foot ulcers treated with either cryopreserved skin allograft or bioengineered skin substitute. *Wounds*. 2011;23(7):184-189.

Dolynchuk K, Hull P, Guenther L, et al. The role of Apligraf in the treatment of venous leg ulcers. *Ostomy Wound Manage*. 1999;45(1):34-43.

Eaglstein WH, Falanga V. Tissue engineering and the development of Apligraf, a human skin equivalent. *Cutis*. 1998;62(1 Suppl):1-8.

Eaglstein WH, Falanga V. Tissue engineering and the development of Apligraf, a human skin equivalent. *Clin Ther*. 1997;19(5):894-905.

Eaglstein WH, Falanga V. Tissue engineering for skin: An update. *J Am Acad Dermatol*. 1998;39(6):1007-1010.

Eaglstein WH, Iriondo M, Laszlo K. A composite skin substitute (graftskin) for surgical wounds. A clinical experience. *Dermatol Surg*. 1995;21(10):839-843.

Edmonds M, Bates M, Doxford M, et al. New treatments in ulcer healing and wound infection. *Diabetes Metab Res Rev*. 2000;16 Suppl 1:S51-S54.

Edmonds M; European and Australian Apligraf Diabetic Foot Ulcer Study Group. Apligraf in the treatment of neuropathic diabetic foot ulcers. *Int J Low Extrem Wounds*. 2009;8(1):11-18.

Fahey C. Experience with a new human skin equivalent for healing venous leg ulcers. *J Vasc Nurs*1998;16(1):11-15.

Falanga V, Margolis D, Alvarez O, et al. Rapid healing of venous ulcers and lack of clinical rejection with an allogeneic cultured human skin equivalent. Human skin equivalent investigators group. *Arch Dermatol*. 1998;134(3):293-300.

Ho C, Tran K, Hux M, et al. Artificial skin grafts in chronic wound care: A meta-analysis of clinical efficacy and a review of cost-effectiveness. Technology Report No 52. Ottawa, ON: Canadian Coordinating Office for Health Technology Assessment (CCOHTA); 2005.

Hu S, Kirsner RS, Falanga V, et al. Evaluation of Apligraf(R) persistence and basement membrane restoration in donor site wounds: A pilot study. *Wound Repair Regen*. 2006;14(4):427-433.

Jansen DA, Asgari MM, Atillasoy ES, Milstone LM. Clinical and in vitro responses of bilayered skin construct (graftskin) to meshing. *Arch Dermatol*. 2002;138(6):843-844.

Kirsner RS, Eaglstein WH, Kerdel FA. Split-thickness skin grafting for lower extremity ulcerations. *Dermatol Surg*. 1997;23(2):85-93.

Kirsner RS, Falanga V, Eaglstein WH. The development of bioengineered skin. *Trends Biotechnol*. 1998;16(6):246-249.

Kirsner RS, Fastenau J, Falabella A, et al. Clinical and economic outcomes with graftskin for hard-to-heal venous leg ulcers: A single-center experience. *Dermatol Surg*. 2002;28(1):81-82.

Langer A, Rogowski W. Systematic review of economic evaluations of human cell-derived wound care products for the treatment of venous leg and diabetic foot ulcers. *BMC Health Serv Res*. 2009;9:115.

Mundy L, Parrella A. Apligraf (R): For the treatment of diabetic foot and venous leg ulcers. Horizon Scanning Prioritising Summary - Volume 7. Adelaide, SA: Adelaide Health Technology Assessment (AHTA) on behalf of National Horizon Scanning Unit (HealthPACT and MSAC); 2004.

Novartis Pharmaceuticals Corporation. Apligraf (grafter). Product Labeling. East Hanover, NJ; Novartis; June 2002.

Paquette D, Falanga V. Leg ulcers. *Clin Geriatr Med*. 2002;18(1):77-88, vi.

Rice JB, Desai U, Ristovska L, et al. Economic outcomes among Medicare patients receiving bioengineered cellular technologies for treatment of diabetic foot ulcers. *J Med Econ*. 2015;18(8):586-595.

Sams HH, Chen J, King LE. Graftskin treatment of difficult to heal diabetic foot ulcers: One center's experience. *Dermatol Surg*. 2002;28(8):698-703.

Shealy FG Jr, DeLoach ED. Experience with the use of apligraf to heal complicated surgical and nonsurgical wounds in a private practice setting. *Adv Skin Wound Care*. 2006;19(6):310-322.

Sorensen JC. Living skin equivalents and their application in wound healing. *Clin Podiatr Med Surg*. 1998;15(1):129-137.

Steinberg JS, Edmonds M, Hurley DP Jr, King WN. Confirmatory data from EU study supports Apligraf for the treatment of neuropathic diabetic foot ulcers. *J Am Podiatr Med Assoc*. 2010;100(1):73-77.

Swedish Council on Technology Assessment in Health Care (SBU). Transplantation of cultured skin (Apligraf) in treating venous leg ulcers - early assessment briefs (Alert). Stockholm, Sweden: SBU; 2003.

Veves A, Falanga V, Armstrong DG, et al. Graftskin, a human skin equivalent, is effective in the management of noninfected neuropathic diabetic foot ulcers: A prospective randomized multicenter clinical trial. *Diabetes Care*. 2001;24(2):290-295.

Waymack P, Duff RG, Sabolinski M. The effect of a tissue engineered bilayered living skin analog, over meshed split-thickness autografts on the healing of excised burn wounds. The Apligraf Burn Study Group. *Burns*. 2000;26(7):609-619.

Zaulyanov L, Kirsner RS. A review of a bi-layered living cell treatment (Apligraf) in the treatment of venous leg ulcers and diabetic foot ulcers. *Clin Interv Aging*. 2007;2(1):93-98.

## **DermACELL**

Bullocks JM. DermACELL: A novel and biocompatible acellular dermal matrix in tissue expander and implant-based breast reconstruction. *Eur J Plast Surg*. 2014;37(10):529-538.

Capito AE, Tholpady SS, Agrawal H, et al. Evaluation of host tissue integration, revascularization, and cellular infiltration within various dermal substrates. *Ann Plast Surg*. 2012;68(5):495-500.

Cazzell S. A randomized controlled trial comparing a human acellular dermal matrix versus conventional care for the treatment of venous leg ulcers. *Wounds*. 2019;31(3):68-74.

Cazzell S, Vayser D, Pham H, et al. A randomized clinical trial of a human acellular dermal matrix demonstrated superior healing rates for chronic diabetic foot ulcers over conventional care and an active acellular dermal matrix comparator. *Wound Repair Regen.* 2017;25(3):483-497.

Chen SG, Tzeng YS, Wang CH. Treatment of severe burn with DermACELL(®), an acellular dermal matrix. *Int J Burns Trauma.* 2012;2(2):105-109.

Cheng A, Saint-Cyr M. Comparison of different ADM materials in breast surgery. *Clin Plast Surg.* 2012;39(2):167-175.

Robb GL, Gurtner GC. Letter to the editor. Healing rates in a multicenter assessment of a sterile, room temperature, acellular dermal matrix versus conventional care wound management and an active comparator in the treatment of full-thickness diabetic foot ulcers. *Eplasty.* 2016;16:229.

Roussalis JL. Novel use of an acellular dermal matrix allograft to treat a chronic scalp wound with bone exposure: A case study. *Int J Burns Trauma.* 2014;4(2):49-52.

Shitrit SB, Ramon Y, Bertasi G. Use of a novel acellular dermal matrix allograft to treat complex trauma wound: A case study. *Int J Burns Trauma.* 2014;4(2):62-65.

Vashi C. Clinical outcomes for breast cancer patients undergoing mastectomy and reconstruction with use of DermACELL, a sterile, room temperature acellular dermal matrix. *Plast Surg Int.* 2014;2014:704323.

Walters J, Cazzell S, Pham H, et al. Healing rates in a multicenter assessment of a sterile, room temperature, acellular dermal matrix versus conventional care wound management and an active comparator in the treatment of full-thickness diabetic foot ulcers. *Eplasty.* 2016;16:e10.

## **Dermagraft**

Advanced Tissue Sciences, Inc. Dermagraft interactive wound dressing. Summary of Safety and Effectiveness Data. Premarket Approval Application No. P000036. Rockville, MD: U.S. Food and Drug Administration; September 28, 2001.

Bowering CK. Dermagraft in the treatment of diabetic foot ulcers. *J Cutan Med Surg.* 1998;3 Suppl 1:S1-29-32.

Browne AC, Vearncombe M, Sibbald RG. High bacterial load in asymptomatic diabetic patients with neurotrophic ulcers retards wound healing after application of Dermagraft. *Ostomy Wound Manage.* 2001;47(10):44-49.

Buchberger B, Follmann M, Freyer D, et al. The evidence for the use of growth factors and active skin substitutes for the treatment of non-infected diabetic foot ulcers (DFU): A health technology assessment (HTA). *Exp Clin Endocrinol Diabetes.* 2011;119(8):472-479.

Eaglstein WH. Dermagraft treatment of diabetic ulcers. *J Dermatol.* 1998;25(12):803-804.

Edmonds ME, Foster AV, McColgan M. 'Dermagraft': A new treatment for diabetic foot ulcers. *Diabet Med* 1997;14:1010-1011.

Frykberg RG, Marston WA, Cardinal M. The incidence of lower-extremity amputation and bone resection in diabetic foot ulcer patients treated with a human fibroblast-derived dermal substitute. *Adv Skin Wound Care.* 2015;28(1):17-20.

Gentzkow GD, Iwasaki SD, Hershon KS, et al. Use of dermagraft, a cultured human dermis, to treat diabetic foot ulcers. *Diabetes Care.* 1996;19(4):350-354.



Hanft JR, Surprenant MS. Healing of chronic foot ulcers in diabetic patients treated with a human fibroblast-derived dermis. *J Foot Ankle Surg.* 2002;41(5):291-299.

Hansbrough JF, Mozingo DW, Kealey GP, et al. Clinical trials of a biosynthetic temporary skin replacement, Dermagraft-Transitional Covering, compared with cryopreserved human cadaver skin for temporary coverage of excised burn wounds. *J Burn Care Rehabil.* 1997;18(1 Pt 1):43-51.

Harding K, Sumner M, Cardinal M. A prospective, multicentre, randomised controlled study of human fibroblast-derived dermal substitute (Dermagraft) in patients with venous leg ulcers. *Int Wound J.* 2013;10(2):132-137.

Jiang WG, Harding KG. Enhancement of wound tissue expansion and angiogenesis by matrix-embedded fibroblast (dermagraft), a role of hepatocyte growth factor/scatter factor. *Int J Mol Med.* 1998;2(2):203-210.

Kashefsky H, Marston W. Total contact casting combined with human fibroblast-derived dermal tissue in 15 DFU patients. *J Wound Care.* 2012;21(5):236, 238, 240, 242-243.

Krishnamoorthy L, Harding K, Griffiths D, et al. The clinical and histological effects of Dermagraft in the healing of chronic venous leg ulcers. *Phlebology.* 2003;18(1):12-22.

Landsman A, Roukis TS, DeFronzo DJ, et al. Living cells or collagen matrix: Which is more beneficial in the treatment of diabetic foot ulcers? *Wounds.* 2008;20(5):111-116.

Langer A, Rogowski W. Systematic review of economic evaluations of human cell-derived wound care products for the treatment of venous leg and diabetic foot ulcers. *BMC Health Serv Res.* 2009;9:115.

Marston WA, Hanft J, Norwood P, et al. The efficacy and safety of Dermagraft in improving the healing of chronic diabetic foot ulcers: Results of a prospective randomized trial. *Diabetes Care.* 2003;26(6):1701-1705.

Marston WA. Dermagraft, a bioengineered human dermal equivalent for the treatment of chronic nonhealing diabetic foot ulcer. *Expert Rev Med Devices.* 2004;1(1):21-31.

Mundy L, Merlin T, Parrella A. Dermagraft (R): Dermal substitute wound cover for patients with dystrophic epidermolysis bullosa. Horizon Scanning Prioritising Summary - Volume 6. Adelaide, SA: Adelaide Health Technology Assessment (AHTA) on behalf of National Horizon Scanning Unit (HealthPACT and MSAC); 2004.

Naughton G, Mansbridge J, Gentzkow G. A metabolically active human dermal replacement for the treatment of diabetic foot ulcers. *Artif Organs.* 1997;21(11):1203-1210.

Newton DJ, Khan F, Belch JJ, et al. Blood flow changes in diabetic foot ulcers treated with dermal replacement therapy. *J Foot Ankle Surg.* 2002;41(4):233-237.

Purdue GF, Hunt JL, Still JM Jr, et al. A multicenter clinical trial of a biosynthetic skin replacement, Dermagraft-TC, compared with cryopreserved human cadaver skin for temporary coverage of excised burn wounds. *J Burn Care Rehabil.* 1997;18(1 Pt 1):52-57.

Truong AT, Kowal-Vern A, Latenser BA, et al. Comparison of dermal substitutes in wound healing utilizing a nude mouse model. *J Burns Wounds.* 2005;4:e4.

U.S. Food and Drug Administration (FDA). Dermagraft, Human Fibroblast-Derived Dermal Substitute. Treatment of wounds related to dystrophic epidermolysis bullosa. Summary of Safety and Probable Benefit. Humanitarian Device Exemption No. H020004. Rockville, MD: FDA; July 7, 2003.



Warriner RA 3rd, Cardinal M; TIDE Investigators. Human fibroblast-derived dermal substitute: Results from a treatment investigational device exemption (TIDE) study in diabetic foot ulcers. *Adv Skin Wound Care*. 2011;24(7):306-311.

### **Dermamatrix**

Athavale SM, Phillips S, Mangus B, et al. Complications of alloderm and dermamatrix for parotidectomy reconstruction. *Head Neck*. 2012;34(1):88-93.

Bowers CA, Brimley C, Cole C, et al. AlloDerm for duraplasty in Chiari malformation: Superior outcomes. *Acta Neurochir (Wien)*. 2015;157(3):507-511.

### **EpiFix**

Berhane CC, Brantley K, Williams S, et al. An evaluation of dehydrated human amnion/chorion membrane allografts for pressure ulcer treatment: A case series. *J Wound Care*. 2019;28(Sup5):S4-S10.

Bianchi C, Cazzell S, Vayser D, et al; EpiFix VLU Study Group. A multicentre randomised controlled trial evaluating the efficacy of dehydrated human amnion/chorion membrane (EpiFix®) allograft for the treatment of venous leg ulcers. *Int Wound J*. 2018;15(1):114-122.

Forbes J, Fetterolf DE. Dehydrated amniotic membrane allografts for the treatment of chronic wounds: A case series. *J Wound Care*. 2012;21(6):290, 292, 294-296.

National Institute for Health and Care Excellence (NICE). EpiFix for chronic wounds. Medtech Innovation Briefing [MIB139]. London, UK: NICE; January 2018.

Serena TE, Carter MJ, Le LT, et al.; EpiFix VLU Study Group. A multicenter, randomized, controlled clinical trial evaluating the use of dehydrated human amnion/chorion membrane allografts and multilayer compression therapy vs. multilayer compression therapy alone in the treatment of venous leg ulcers. *Wound Repair Regen*. 2014;22(6):688-693.

Sheikh ES, Sheikh ES, Fetterolf DE. Use of dehydrated human amniotic membrane allografts to promote healing in patients with refractory non healing wounds. *Int Wound J*. 2014;11(6):711-717.

Tettelbach W, Cazzell S, Reyzelman AM, et al. A confirmatory study on the efficacy of dehydrated human amnion/chorion membrane dHACM allograft in the management of diabetic foot ulcers: A prospective, multicentre, randomised, controlled study of 110 patients from 14 wound clinics. *Int Wound J*. 2019a;16(1):19-29.

Torabi R, Strong AL, Hogan ME, et al. Bone and tendon coverage via dehydrated human amniotic/chorionic membrane and split-thickness skin grafting. *J Reconstr Microsurg Open*. 2016;1:59-62.

Zelen CM, Gould L, Serena TE, et al. A prospective, randomised, controlled, multi-centre comparative effectiveness study of healing using dehydrated human amnion/chorion membrane allograft, bioengineered skin substitute or standard of care for treatment of chronic lower extremity diabetic ulcers. *Int Wound J*. 2015;12(6):724-732.

Zelen CM, Poka A, Andrews J. Prospective, randomized, blinded, comparative study of injectable micronized dehydrated amniotic/chorionic membrane allograft for plantar fasciitis--a feasibility study. *Foot Ankle Int*. 2013;34(10):1332-1339.

Zelen CM, Serena TE, Denozieri G, Fetterolf DE. A prospective randomised comparative parallel study of amniotic membrane wound graft in the management of diabetic foot ulcers. *Int Wound J*. 2013;10(5):502-507.

Zelen CM, Serena TE, Fetterolf DE. Dehydrated human amnion/chorion membrane allografts in patients with chronic diabetic foot ulcers: A long-term follow-up study. *Wound Medicine*. 2014(4):1-4.

Zelen CM, Serena TE, Gould L, et al. Treatment of chronic diabetic lower extremity ulcers with advanced therapies: A prospective, randomised, controlled, multi-centre comparative study examining clinical efficacy and cost. *Int Wound J*. 2016;13(2):272-282.

Zelen CM, Serena TE, Snyder RJ. A prospective, randomised comparative study of weekly versus biweekly application of dehydrated human amnion/chorion membrane allograft in the management of diabetic foot ulcers. *Int Wound J*. 2014;11(2):122-128.

Zelen CM, Snyder RJ, Serena TE, et al. The use of human amnion/chorion membrane in the clinical setting for lower extremity repair: A review. *Clin Podiatr Med Surg*. 2015;32(1):135-146.

Zelen CM. Advances in forefoot surgery. *Clin Podiatr Med Surg*. 2013;30(3):xiii-xiv.

Zelen CM. An evaluation of dehydrated human amniotic membrane allografts in patients with DFUs. *J Wound Care*. 2013;22(7):347-348, 350-351.

### **Integra (Collagen-Glycosaminoglycan Copolymer)**

Australia and New Zealand Horizon Scanning Network (ANZHSN). Dermal regeneration template (Integra) for deep hand burns. Horizon Scanning Prioritising Summary. Adelaide, SA: Royal Australasian College of Surgeons, Australian Safety and Efficacy Registry of New Interventional Procedures - Surgical (ASERNIP-S); April 2004.

Dantzer E, Braye FM. Reconstructive surgery using an artificial dermis (Integra): Results with 39 grafts. *Br J Plast Surg*. 2001;54(8):659-664.

Driver VR, Lavery LA, Reyzelman AM, et al. A clinical trial of Integra Template for diabetic foot ulcer treatment. *Wound Repair Regen*. 2015;23(6):891-900.

Fette A. Integra artificial skin in use for full-thickness burn surgery: Benefits or harms on patient outcome. *Technol Health Care*. 2005;13(6):463-468.

Heimbach DM, Warden GD, Luterman A, et al. Multicenter postapproval clinical trial of Integra dermal regeneration template for burn treatment. *J Burn Care Rehabil*. 2003;24(1):42-48.

Heitland A, Piatkowski A, Noah EM, Pallua N. Update on the use of collagen/glycosaminoglycate skin substitute-six years of experiences with artificial skin in 15 German burn centers. *Burns*. 2004;30(5):471-475.

Integra LifeSciences Corp. Integra Bilayer Wound Matrix [website]. Plainsboro, NJ: Integra LifeSciences; 2008.

Integra LifeSciences Corp. Integra Flowable Wound Matrix [website]. Plainsboro, NJ: Integra LifeSciences; 2008.

Integra LifeSciences Corp. Integra Matrix Wound Dressing [website]. Plainsboro, NJ: Integra LifeSciences; 2008.

Lagus H, Sarlomo-Rikala M, Böhling T, Vuola J. Prospective study on burns treated with Integra®, a cellulose sponge and split thickness skin graft: Comparative clinical and histological study--randomized controlled trial. *Burns*. 2013;39(8):1577-1587.

Lee LF, Porch JV, Spenler W, Garner WL. Integra in lower extremity reconstruction after burn injury. *Plast Reconstr Surg*. 2008;121(4):1256-1262.

Ryan CM, Schoenfeld DA, Malloy M, et al. Use of Integra artificial skin is associated with decreased length of stay for severely injured adult burn survivors. *J Burn Care Rehabil*. 2002;23(5):311-317.

Stern R, McPherson M, Longaker MT. Histologic study of artificial skin used in the treatment of full-thickness thermal injury. *J Burn Care Rehabil*. 1990;11(1):7-13.

U.S. Food and Drug Administration (FDA). Integra Flowable Wound Matrix. 510(k) Summary. K072113. Integra LifeSciences Corp, Plainsboro, NJ. Rockville, MD: FDA; October 10, 2007.

U.S. Food and Drug Administration (FDA). Integra Meshed Bilayer Wound Matrix. 510(k) Summary. K081635. Integra LifeSciences Corp, Plainsboro, NJ. Rockville, MD: FDA; December 4, 2008.

U.S. Food and Drug Administration (FDA). Bilayer Matrix Wound Dressing. 510(k) Summary. K021792. Integra LifeSciences Corp, Plainsboro, NJ. Rockville, MD: FDA; August 14, 2002.

Yao M, Attalla K, Ren Y, et al. Ease of use, safety, and efficacy of integra bilayer wound matrix in the treatment of diabetic foot ulcers in an outpatient clinical setting: A prospective pilot study. *J Am Podiatr Med Assoc*. 2013;103(4):274-280.

Beech A, Farrier J. Use of the Integra skin regeneration system in an intraoral mandibular defect in osteoradionecrosis. *Int J Oral Maxillofac Surg*. 2016;45(9):1159-1161.

Srivastava A, Maniakas A, Myers J, et al. Reconstruction of intraoral oncologic surgical defects with Integra bilayer wound matrix. *Clin Case Rep*. 2020;9(1):213-219.

TEI Biosciences. SurgiMend. Collagen matrix for soft tissue reconstruction [website]. Boston, MA: Integra TEI Biosciences; 2008. Available at: <http://www.teibio.com/SurgiMend.aspx>. Accessed June 30, 2008.

## **TenoGlide**

Integra LifeSciences Corp. TenoGlide tendon protector sheet [website]. Plainsboro, NJ: Integra Life Sciences; 2008. Available at: <http://www.integra-ls.com/products/?product=274>. Accessed June 30, 2008.

U.S. Food and Drug Administration (FDA). Tendon wrap tendon protector. 510(k) Summary. K053655. Integra LifeSciences Corp, Plainsboro, NJ. Rockville, MD: FDA; February 3, 2006.

## **Appendix**

---

### **Policy Number:**

**Effective:** 10/1/2020

**Next review:** 1/1/2026

**Policy type:** Enterprise

**Author(s):**

**Depts.:** Health Services

**Applicable regulation(s):** OAR 410-141-3820 through 3830, 410-151-0000 through 0003.

**Commercial OPs:** 2/2025

