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Subject: Bio-Engineered Skin and Soft Tissue Substitutes; Amniotic Membrane and Amniotic Fluid

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Position Statement	Billing/Coding	Reimbursement	Program Exceptions	Definitions	Related Guidelines
Other	References	Updates			

DESCRIPTION:

Bio-engineered skin and soft tissue substitutes may be derived from human tissue (autologous or allogeneic), non-human tissue (xenographic), synthetic materials, or a composite of these materials. Bioengineered skin and soft tissue substitutes are being evaluated for a variety of conditions, including breast reconstruction and healing lower-extremity ulcers and severe burns. Acellular dermal matrix (ADM) products are also being evaluated for soft tissue repair. Bioengineered skin and soft tissue substitutes may be either acellular or cellular. Acellular products (eg, dermis with cellular material removed) contain a matrix or scaffold composed of materials such as collagen, hyaluronic acid, and fibronectin. Acellular dermal matrix (ADM) products can differ in a number of ways, including as species source (human, bovine, porcine), tissue source (eg dermis, pericardium, intestinal mucosa), additives (eg antibiotics, surfactants), hydration (wet, freeze-dried), and required preparation (multiple rinses, rehydration). Cellular products contain living cells such as fibroblasts and keratinocytes within a matrix. The cells contained within the matrix may be autologous, allogeneic, or derived from other species (eg, bovine, porcine). Skin substitutes may also be composed of dermal cells, epidermal cells, or a combination of dermal and epidermal cells, and may provide growth factors to stimulate healing. Bioengineered skin substitutes can be used as either temporary or permanent wound coverings.

Several commercially available forms of human amniotic membrane (HAM) and amniotic fluid can be administered by patches, topical application, or injection. Amniotic membrane and amniotic fluid are being evaluated for the treatment of various conditions, including chronic full thickness diabetic lower extremity ulcers, venous ulcers, knee osteoarthritis, plantar fasciitis, and ophthalmic conditions. Human amniotic membrane (HAM) consists of 2 conjoined layers, the amnion, and chorion, and forms the innermost lining of the amniotic sac or placenta. When prepared for use as an allograft, the membrane

is harvested immediately after birth, cleaned, sterilized, and either cryopreserved or dehydrated. Many products available using amnion, chorion, amniotic fluid, and umbilical cord are being studied for the treatment of a variety of conditions, including chronic full-thickness diabetic lower-extremity ulcers, venous ulcers, knee osteoarthritis, plantar fasciitis, and ophthalmic conditions. The products are formulated either as patches, which can be applied as wound covers, or as suspensions or particulates, or connective tissue extractions, which can be injected or applied topically. Injection of amniotic fluid or amniotic fluid-derived cells is currently being evaluated for the treatment of osteoarthritis and plantar fasciitis.

Summary and Analysis of Evidence: Skin and Soft Tissue Substitutes- Patients who are undergoing breast reconstruction who receive allogeneic acellular dermal matrix (ADM) products, the evidence includes randomized controlled trials (RCTs) and systematic reviews. A systematic review found no difference in overall complication rates with ADM allograft compared with standard procedures for breast reconstruction. Reconstructions with ADM have been reported to have higher seroma, infection, and necrosis rates than reconstructions without ADM. However, capsular contracture and malposition of implants may be reduced. In cases where there is limited tissue coverage, the available evidence may inform patient decision making about reconstruction options. The evidence is sufficient to determine that the technology results in an improvement in the net health outcome. Patients undergoing tendon repair who receive GraftJacket, the evidence includes an RCT. The RCT identified found improved outcomes with the GraftJacket ADM allograft for rotator cuff repair. Although these results were positive, additional studies with a larger number of patients is needed to evaluate the consistency of the effect. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome. Diabetic lower-extremity ulcers for patients who receive AlloPatch, Apligraf, Dermagraft, Integra, mVASC, or TheraSkin, the evidence includes RCTs. RCTs reporting complete wound healing outcomes with at least 12 weeks of follow-up have demonstrated the efficacy of AlloPatch (reticular ADM), Apligraf and Dermagraft (living cell therapy), Integra (biosynthetic), mVASC, and TheraSkin over the standard of care (SOC). The evidence is sufficient to determine that the technology results in an improvement in the net health outcome. Patients with diabetic lower-extremity ulcers who receive ADM products other than AlloPatch, Apligraf, Dermagraft, or Integra, mVASC, or TheraSkin, the evidence includes RCTs. Results from a multicenter RCT showed some benefit of DermACELL that was primarily for the subgroup of patients who only required a single application of the ADM. Studies are needed to further define the population who might benefit from this treatment. Additional study with a larger number of subjects is needed to evaluate the effect of GraftJacket, DermACELL, Cytal, PriMatrix, and Oasis Wound Matrix, compared with current SOC or other advanced wound therapies. An RCT of Omega3 Wound (Kerecis) has been published and 2 larger RCTs are registered and reported as completed but have not been published. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome. Patients who have lower-extremity ulcers due to venous insufficiency who receive Apligraf or Oasis Wound Matrix, the evidence includes RCTs. RCTs have demonstrated the efficacy of Apligraf living cell therapy and xenogeneic Oasis Wound Matrix over the SOC. The evidence is sufficient to determine that the technology results in an improvement in the net health outcome. Lower-extremity ulcers due to venous insufficiency treated with bioengineered skin substitutes other than Apligraf or Oasis Wound Matrix, the evidence includes RCTs. In a moderately large RCT, Dermagraft was not shown to be more effective than controls for the primary or secondary endpoints in the entire population and was only slightly more effective than controls (an 8% to 15% increase in healing) in subgroups of patients with ulcer durations of 12 months or less or size of 10 cm or

less. Additional studies with a larger number of subjects is needed to evaluate the effect of the xenogeneic PriMatrix skin substitute versus the current SOC. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome. Patients who have dystrophic epidermolysis bullosa who receive OrCel, the evidence includes a case series. OrCel was approved under a humanitarian drug exemption for use in patients with dystrophic epidermolysis bullosa undergoing hand reconstruction surgery, to close and heal wounds created by the surgery, including those at donor sites. Outcomes have been reported in a small series (eg, 5 patients). The evidence is insufficient to determine that the technology results in an improvement in the net health outcome. Deep dermal burns treated with bioengineered skin substitutes (ie, Epicel, Integra Dermal Regeneration Template), the evidence includes RCTs. Overall, few skin substitutes have been approved, and the evidence is limited for each product. Epicel (living cell therapy) has received FDA approval under a humanitarian device exemption for the treatment of deep dermal or full-thickness burns comprising a total body surface area of 30% or more. Comparative studies have demonstrated improved outcomes for biosynthetic skin substitute Integra Dermal Regeneration Template for the treatment of burns. The evidence is sufficient to determine that the technology results in an improvement in the net health outcome. Amniotic Membrane and Amniotic Fluid- Patients with non-healing diabetic lower-extremity ulcers who receive a patch formulation of HAM or placental membrane (ie, Affinity, AmnioBand Membrane, AmnioExcel, Biovance, EpiCord, EpiFix, Grafix), the evidence includes randomized controlled trials (RCTs). The RCTs evaluating amniotic and placental membrane products for the treatment of non-healing (<20% healing with ≥ 2 weeks of standard care) diabetic lower-extremity ulcers have compared HAM with standard care or with an established advanced wound care product. These trials used wound closure as the primary outcome measure, and some used power analysis, blinded assessment of wound healing, and intention-to-treat analysis. For the HAM products that have been sufficiently evaluated (ie, Affinity, AmnioBand Membrane, Biovance, EpiCord, EpiFix, Grafix), results have shown improved outcomes compared with standard care, and outcomes that are at least as good as an established advanced wound care product. Improved health outcomes in the RCTs are supported by multicenter registries. The evidence is sufficient to determine that the technology results in an improvement in the net health outcome. Lower-extremity ulcers due to venous insufficiency treated with a patch formulation of HAM, the evidence includes 3 RCTs. The published evidence on HAM for the treatment of venous leg ulcers includes 2 multicenter RCTs with EpiFix and 1 multicenter RCT with Amnioband. One RCT reported a larger percent wound closure at 4 weeks, but the percentage of patients with complete wound closure at 4 weeks did not differ between EpiFix and the standard of care. A second RCT evaluated complete wound closure at 12 weeks after weekly application of EpiFix or standard dressings with compression, but interpretation is limited by methodologic concerns. A third RCT demonstrated significantly greater blinded assessor-confirmed rates of complete wound closure at 12 weeks after weekly or twice-weekly application of AmnioBand Membrane with compression bandaging compared with compression bandaging alone. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome. Patientw with knee osteoarthritis who receive an injection of suspension or particulate formulation of HAM or amniotic fluid, the evidence includes a feasibility study. The pilot study assessed the feasibility of a larger RCT evaluating HAM injection. Additional trials, which will have a larger sample size and longer follow-up, are needed to permit conclusions on the effect of this treatment. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome. Patients with plantar fasciitis who receive an injection of amniotic membrane, the includes preliminary studies and a larger (N=145) patient-blinded comparison of

micronized injectable-HAM and placebo control. Injection of micronized amniotic membrane resulted in greater improvements in the visual analog score for pain and the Foot Functional Index compared to placebo controls. The primary limitation of the study is that this is an interim report with 12-month results pending. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

POSITION STATEMENT:

Note: This guideline does not address the use of meshes or patches of non-biologic origin used for standard repair procedures such as hernia repairs.

Bio-Engineered Skin and Soft Tissue Substitutes

Breast reconstructive surgery using allogeneic acellular dermal matrix products* (i.e. AlloDerm[®], AlloMend[®], Cortiva[®] (AlloMax[™]), DermACELL[™], DermaMatrix[™], FlexHD[®], FlexHD[®] Pliable[™], GraftJacket[®]) **meets the definition of medical necessity** for **ONE** of the following indications:

- when there is insufficient tissue expander or implant coverage by the pectoralis major muscle and additional coverage is required, **OR**
- when there is viable but compromised or thin post-mastectomy skin flaps that are at risk of dehiscence or necrosis, **OR**
- the inframammary fold and lateral mammary folds have been undermined during mastectomy and re-establishment of these landmarks is needed.

Treatment of chronic, non-infected, full-thickness diabetic lower extremity ulcers using the following tissue-engineered skin substitutes **meets the definition of medical necessity**:

- AlloPatch^{®*}
- Apligraf^{f®**}
- Dermagraft^{®**}
- Integra[®] Omnigraft Dermal Regeneration Matrix (also known as Omnigraft)
- Integra[™] Flowable Wound Matrix
- Primatrix[®]
- Primatrix[®] Dermal Repair Scaffold
- mVASC[®]
- TheraSkin[®].

Treatment of chronic, noninfected, partial- or full-thickness lower extremity skin ulcers due to venous insufficiency, which have not adequately responded following a one-month period of conventional ulcer therapy, using the following tissue-engineered skin substitutes **meets the definition of medical necessity**:

- Apligraf^{f®**}
- Oasis[™] Wound Matrix^{***}.

Treatment of dystrophic epidermolysis bullosa using the following tissue-engineered skin substitutes **meets the definition of medical necessity:**

- OrCel™ (for the treatment of mitten-hand deformity when standard wound therapy has failed and when provided in accordance with the Humanitarian Device Exemption (HDE) specifications of the FDA)****.

Treatment of second- and third-degree burns using the following tissue-engineered skin substitutes **meets the definition of medical necessity:**

- Epicel® (for the treatment of deep dermal or full-thickness burns comprising a total body surface area of greater than or equal to 30% when provided in accordance with the HDE specifications of the FDA)****
- Integra® Dermal Regeneration Template™**
- Primatrix® Dermal Repair Scaffold.

* Banked Human Tissue.

** FDA premarket approval.

*** FDA 510(k) clearance.

**** FDA-approved under an HDE.

All other uses of the bio-engineered skin and soft tissue substitutes listed above **do not meet the definition of medical necessity.**

Amniotic Membrane and Amniotic Fluid

Treatment of nonhealing diabetic lower-extremity ulcers using the following human amniotic membrane products **meets the definition of medical necessity:**

- Affinity®
- AmnioBand® Membrane
- AmnioExcel®
- Biovance®
- Epicord®
- Epifix®
- Grafix™.

All other indications not listed above are considered **experimental or investigational**, including but not limited to treatment of lower extremity ulcers due to venous insufficiency and repair following Mohs micrographic surgery. The evidence is insufficient to determine the effects of the technology on health outcomes.

The following is considered **experimental or investigational** for all indications, including but not limited to treatment of osteoarthritis and plantar fasciitis:

- Injection of micronized or particulated human amniotic membrane
- Injection of human amniotic fluid.

The evidence is insufficient to determine the effects of the technology on health outcomes.

All other bio-engineered skin substitutes, soft tissue substitutes, amniotic membranes and amniotic fluids are considered **experimental or Investigational**, including, but not limited to:

- Acell® UBM Hydrated/Lyophilized Wound Dressing
- ActiveBarrier® 45, 200, 2000
- Allogen
- AlloSkin™
- AlloSkin™ AC
- AlloSkin™ RT
- Allowrap™
- Alphaplex™ with MariGen Omega3™
- Altrazeal™ Transforming Powder Dressing
- AmnioAMP-MP
- Amnioarmor™
- Amnion bio or Axomembrane
- AmnioClear™
- Amniocore™
- Amniocyte
- Amnio-maxx or Manio-maxx lite
- AmnioFix®
- AmnioFix® Injectable
- AmnioGen™ 45
- AmnioGen™ 200
- AmnioGen™ A
- AmnioGen™ C
- AmnioGraft®
- AmnioMatrix®
- AmnioPro® 45
- AmnioPro® 200
- AmnioPro® Flow
- Amniorepair or AltiPly
- Amniotext and Amniotext Patch
- AmnioVisc™

- Amniowound
- AmnioWrap2™
- Amniply
- Aongen™ Collagen Matrix
- Apis®
- Architect® ECM, PX, FX
- Artacent® Cord, Wound
- ArthroFlex™ (FlexGraft)
- Articent ac flowable, patch
- Artacent® Wound
- Ascent
- Atlas Wound Matrix
- Avagen Wound Dressing
- Avaulta Plus™
- Axolotl ambient or Axolotl Cryo
- Biobrane®/Biobrane-L
- Bio-ConneKt® Wound Matrix
- BioDDryFlex®
- BioDfence™
- BioDfence Dryflex™/BioDfactor™
- BioDMatrix™
- BioNextPATCH
- BioRenew® 45
- BioRenew® 200
- BioRenew® Flow
- BioSkin® 45
- BioSkin® 200
- BioSkin® Flow
- BioWound, BioWound Plus™, BioWound Xplus™
- carePATCH
- CellerateRX® (CRXa)
- Cellesta/Cellesta duo, Cord, flowable
- Clarix®
- Clarix® Flo
- Cogenex amniotic membrane

- CollaCare®
- CollaCare® Dental
- Collagen Sponge
- Collagen Wound Dressing (Oasis Research)
- CollaGUARD®
- CollaMend™
- CollaSorb™
- CollaWound™
- Coll-e-derm
- Collexa®
- Collieva®
- Conexa™
- Corecyte
- Coreleader Colla-Pad
- Coretext or Protect
- CorMatrix®
- Corplex, Corplex P
- CRXa™
- Cryo-cord
- Cygnus
- Cygnus Max
- Cymetra® (Micronized AlloDerm™)
- Cytal™ (previously MatriStem®)
- DeNovoSkin™
- Dermacyte
- Dermadapt™ Wound Dressing
- Derma-gide
- DermaPure™
- DermaSpan™
- Derm-maxx
- DressSkin
- Dermavest™
- DUPRA SDRM
- Durepair Regeneration Matrix®
- Endoform Dermal Template™
- Epifix injectable

- *ENDUR*Agen™
- Excellagen®
- ExpressGraft™
- E-Zderm®
- FlexiGraft®
- Floweramnioflo, Floweramniopatch
- FlowerDerm™
- Fluid flow or Fluid GF
- GammaGraft
- Geistlich Derma-Gide™
- Genesis
- GraftJacket® Xpress, injectable
- Guardian/AmniBand®
- HA Absorbent Wound Dressing
- Helicoll™
- Hyalomatrix®
- Hyalomatrix® PA
- hMatrix®
- HydraTek®
- InnovaMatrix®
- Integra™ Bilayer Wound Matrix
- Integra® Matrix Wound Dressing (previously Avagen)
- InteguPly®
- Interfyl™
- Jaloskin®
- Kermatrix®
- Kerecis™ Omega3
- Keroxx™
- MatriDerm®
- Matrion
- MatriStem
- Matrix Collagen Wound Dressing
- Matrix HD™
- MediHoney®
- Mediskin®

- MemoDerm™
- Microderm® Biologic Wound Matrix
- Microlyte matrix®
- MicroMatrix®
- MyOwn skin
- NeoForm™
- Neopatch or Therion
- Neox®100
- Neox®Flo
- Neox® Cord
- Neox® Wound
- Novachor
- Novafix®, Novafix DL
- NovoSorb® Biodegradable Temporizing Matrix (BMT)
- NuCel®
- NuShield™
- Oasis® Burn Matrix
- Oasis® Ultra Tri-Layer Matrix
- Ologen™ Collagen Matrix
- Omega3 Wound (originally Merigen wound dressing)
- Omeza®Collagen Matrix
- OrthoFlo™
- OviTex®
- PalinGen® Flow
- PalinGen® Membrane
- PalinGen® SprotFlow
- Pelvicol®/PelviSoft®
- Permacol™
- PermeaDerm® B
- PermeaDerm® C
- PermeaDerm® Glove
- Phoenix™ Wound Matrix
- Plurivest™
- Polycyte
- Procenta

- Progenamatrix
- ProMatrX™ ACF
- Puracol® and Puracol® Plus Collagen Wound Dressings
- PuraPly™ Wound Matrix (previously FortaDerm™)
- PuraPly™ AM (Antimicrobial Wound Matrix)
- Puros® Dermis
- RECELL® System
- RegenePro™
- ReNu™
- Repliform®
- Repriza™
- Restorigin Injectable
- Restrata®
- Revita
- Revitalon™
- SIS Wound Dressing II
- SkinTE™
- Sport Flow™
- SS Matrix™
- Stimulen™ Collagen
- StrataGraft®
- Strattice™ (xenograft)
- Suprathel®
- Surgenex, Surfactor, and Nudyn
- Surgicord
- SurgiGRAFT™
- SurgiMend®
- Symphony™
- Talymed®
- TenoGlide™
- TenSIX™ Acellular Dermal Matrix
- TheraForm™ Standard/Sheet
- TheraGenesis®
- TissueMend
- TransCyte™

- TruSkin™
- Unite™ Biomatrix
- Veritas® Collagen Matrix
- WoundEx®, 45, 200
- WoundEx® Flow
- Woundfix, Woundfix Plus, Woundfix Xplus
- Xcellerate
- Xcellistem®
- XCM Biologic® Tissue Matrix
- XenMatrix™ AB
- Xwrap.

The evidence is insufficient to determine the effects of the technology on health outcomes.

Collagen-Based Dressing Or Wound Filler (A6010, A6011, A6021-A6024)

Collagen-based dressing or wound filler **meets the definition of medical necessity** for full thickness wounds (e.g., stage 3 or 4 ulcers), wounds with light to moderate exudate, or wounds that have stalled or have not progressed toward a healing goal.

Collagen-based dressing or wound filler **does not meet the definition of medical necessity** for wounds with heavy exudate, third-degree burns, or when an active vasculitis is present.

BILLING/CODING INFORMATION:

CPT Coding:

15011	Harvest of skin for skin cell suspension autograft; first 25 sq cm or less (Investigational)
15012	Harvest of skin for skin cell suspension autograft; each additional 25 sq cm or part thereof (List separately in addition to code for primary procedure) (Investigational)
15013	Preparation of skin cell suspension autograft, requiring enzymatic processing, manual mechanical disaggregation of skin cells, and filtration; first 25 sq cm or less of harvested skin (Investigational)
15014	Preparation of skin cell suspension autograft, requiring enzymatic processing, manual mechanical disaggregation of skin cells, and filtration; each additional 25 sq cm of harvested skin or part thereof (List separately in addition to code for primary procedure) (Investigational)
15015	Application of skin cell suspension autograft to wound and donor sites, including application of primary dressing, trunk, arms, legs; first 480 sq cm or less (Investigational)

15016	Application of skin cell suspension autograft to wound and donor sites, including application of primary dressing, trunk, arms, legs; each additional 480 sq cm or part thereof (List separately in addition to code for primary procedure) (Investigational)
15017	Application of skin cell suspension autograft to wound and donor sites, including application of primary dressing, face, scalp, eyelids, mouth, neck, ears, orbits, genitalia, hands, feet, and/or multiple digits; first 480 sq cm or less (Investigational)
15018	Application of skin cell suspension autograft to wound and donor sites, including application of primary dressing, face, scalp, eyelids, mouth, neck, ears, orbits, genitalia, hands, feet, and/or multiple digits; each additional 480 sq cm or part thereof (List separately in addition to code for primary procedure) (Investigational)

HCPCS Coding:

A2001	Innovamatrix ac, per square centimeter (Investigational)
A2002	Mirragen advanced wound matrix, per square centimeter (Investigational)
A2004	Xcellistem, 1 mg (Investigational)
A2005	Microlyte matrix, per square centimeter (Investigational)
A2006	Novosorb synpath dermal matrix, per square centimeter (Investigational)
A2007	Restrata, per square centimeter (Investigational)
A2008	Theragenesis, per square centimeter (Investigational)
A2009	Symphony, per square centimeter (Investigational)
A2010	Apis, per square centimeter (Investigational)
A2011	Supra sdrm, per square centimeter (Investigational)
A2012	Suprathel, per square centimeter (Investigational)
A2013	Innovamatrix fs, per square centimeter (Investigational)
A2014	Omeza collagen matrix, per 100 mg (Investigational)
A2015	Phoenix wound matrix, per square centimeter (Investigational)
A2016	Permeaderm b, per square centimeter (Investigational)
A2017	Permeaderm glove, each (Investigational)
A2018	Permeaderm c, per square centimeter (Investigational)
A2019	Kerecis omega3 marigen shield, per square centimeter (Investigational)
A2020	Ac5 advanced wound system (ac5) (Investigational)
A2021	Neomatrix, per square centimeter (Investigational)
A2022	Innovaburn or innovamatrix xl, per square centimeter (Investigational)
A2023	Innovamatrix pd, 1 mg (Investigational)
A2024	Resolve matrix or xenopatch, per square centimeter (Investigational)
A2025	Miro3d, per cubic centimeter (Investigational)
A2026	Restrata MiniMatrix, 5 mg (Investigational)
A2027	Matriderm, per square centimeter (Investigational)
A2028	Micromatrix flex, per mg (Investigational)
A2029	Mirotract wound matrix sheet, per cubic centimeter (Investigational)

A2030	Miro3d fibers, per milligram (Investigational)
A2031	Mirodry wound matrix, per square centimeter (Investigational)
A2032	Myriad matrix, per square centimeter (Investigational)
A2033	Myriad morcells, 4 milligrams (Investigational)
A2034	Foundation drs solo, per square centimeter (Investigational)
A2035	Corplex p or theracor p or allacor p, per milligram (Investigational)
A4100	Skin substitute, fda cleared as a device, not otherwise specified
C1832	Autograft suspension, including cell processing and application, and all system components (Investigational)
C8002	Preparation of skin cell suspension autograft, automated, including all enzymatic processing and device components (do not report with manual suspension preparation) (Investigational)
C9354	Acellular pericardial tissue matrix of nonhuman origin (Veritas), per sq cm (Investigational)
C9356	Tendon, porous matrix of cross-linked collagen and glycosaminoglycan matrix (TenoGlide Tendon Protector Sheet), per sq cm (Investigational)
C9358	Dermal substitute, native, nondenatured collagen, fetal bovine origin (SurgiMend Collagen Matrix), per 0.5 sq cm (Investigational)
C9360	Dermal substitute, native, nondenatured collagen, neonatal bovine origin (SurgiMend Collagen Matrix), per 0.5 sq cm (Investigational)
C9363	Skin substitute (Integra Meshed Bilayer Wound Matrix), per square cm (Investigational)
C9364	Porcine implant, Permacol, per sq cm (Investigational)
Q4100	Skin substitute, not otherwise classified
Q4101	Apligraf, per square centimeter
Q4102	Oasis Wound Matrix, per square centimeter
Q4103	Oasis Burn Matrix, per square centimeter (Investigational)
Q4104	Integra Bilayer Matrix Wound Dressing (BMWD), per square centimeter (Investigational)
Q4105	Integra dermal regeneration template (drt) or integra omnigraft dermal regeneration matrix, per square centimeter
Q4106	Dermagraft, per square centimeter
Q4107	Graftjacket, per square centimeter
Q4108	Integra Matrix , per square centimeter (Investigational)
Q4110	PriMatrix, per square centimeter
Q4111	Gammagraft, per square centimeter (Investigational)
Q4112	Cymetra, injectable, 1 cc (Investigational)
Q4113	Allograft, Graftjacket Xpress, injectable, 1 cc (Investigational)
Q4114	Integra Flowable Wound Matrix, injectable, 1 cc
Q4115	Alloskin, per square centimeter (Investigational)
Q4116	Alloderm, per square centimeter
Q4117	Hyalomatrix, per square centimeter (Investigational)
Q4118	Matristem Micromatrix, 1 MG (Investigational)
Q4121	Theraskin, per square centimeter

Q4122	DermACELL, DermACELL AWM or DermACELL AWM Porous, per sq cm
Q4123	AlloskinRT, per square centimeter (Investigational)
Q4124	Oasis Ultra Tri-layer wound matrix, per square centimeter (Investigational)
Q4125	Arthroflex, per square centimeter (Investigational)
Q4126	Memoderm, Dermospan, Tranzgraft or Integuply, per square centimeter (Investigational)
Q4127	Talymed, per square centimeter (Investigational)
Q4128	Flex hd, or allopatch hd, per square centimeter
Q4130	Strattice™, per square centimeter (Investigational)
Q4132	Grafix core and grafixpl core, per square centimeter
Q4133	Grafix prime, grafixpl prime, stravix and stravixpl, per square centimeter
Q4134	hMmatrix, per square centimeter (Investigational)
Q4135	Mediskin, per square centimeter (Investigational)
Q4136	EZ-Derm, per square centimeter (Investigational)
Q4137	Amnioexcel, amnioexcel plus or biodexcel, per square centimeter
Q4138	BioDfence Dryflex per square centimeter (Investigational)
Q4139	AmnioMatrix or BioDMatrix, injectable, 1 cc (Investigational)
Q4140	BioDfense, per square centimeter (Investigational)
Q4141	Alloskin AC, per square centimeter (Investigational)
Q4142	XCM Biologic Tissue Matrix, per square centimeter (Investigational)
Q4143	Repriza, per square centimeter (Investigational)
Q4145	Epifix, injectable, 1 mg (Investigational)
Q4146	TenSIX, per square centimeter (Investigational)
Q4147	Architect, Architect PX, or Architect FX, extracellular matrix, per square centimeter (Investigational)
Q4148	Neox cord 1k, neox cord rt, or clarix cord 1k, per square centimeter (Investigational)
Q4149	Excellagen, 0.1 cc (Investigational)
Q4150	Allowrap DS or dry, per square centimeter (Investigational)
Q4151	Amnioband or guardian, per square centimeter
Q4152	Dermapure, per square centimeter (Investigational)
Q4153	Dermavest and plurivest, per square centimeter (Investigational)
Q4154	Biovance, per square centimeter
Q4155	Neoxflo or clarixflo, 1 mg (Investigational)
Q4156	Neox 100 or clarix 100, per square centimeter (Investigational)
Q4157	Revitalon, per square centimeter (Investigational)
Q4158	Kerecis omega3, per square centimeter (Investigational)
Q4159	Affinity, per square centimeter
Q4160	Nushield, per square centimeter (Investigational)
Q4161	Bio-connekt wound matrix, per square centimeter (Investigational)
Q4162	Woundex flow, bioskin flow, 0.5 cc (Investigational)
Q4163	Woundex, bioskin, per square centimeter (Investigational)
Q4164	Helicoll, per square centimeter (Investigational)

Q4165	Keramatrix or kerasorb, per square centimeter (Investigational)
Q4166	Cytal, per square centimeter (Investigational)
Q4167	Truskin, per square centimeter (Investigational)
Q4168	Amnioband, 1 mg (Investigational)
Q4169	Artacent wound, per square centimeter (Investigational)
Q4170	Cygnus, per square centimeter (Investigational)
Q4171	Interfyl, 1 mg (Investigational)
Q4173	Palingen or palingen xplus, per square centimeter (Investigational)
Q4174	Palingen or promatrix, 0.36 mg per 0.25 cc (Investigational)
Q4175	Miroderm, per square centimeter (Investigational)
Q4176	Neopatch or Therion, per square centimeter (Investigational)
Q4177	Floweramnioflo, 0.1 cc (Investigational)
Q4178	Floweramniopatch, per square centimeter (Investigational)
Q4179	Flowerderm, per square centimeter (Investigational)
Q4180	Revita, per square centimeter (Investigational)
Q4181	Amnio wound, per square centimeter (Investigational)
Q4182	Transcyte, per square centimeter (Investigational)
Q4183	Surgigraft, per square centimeter (Investigational)
Q4184	Cellesta or cellesta duo, per square centimeter (Investigational)
Q4185	Cellesta flowable amnion (25 mg per cc); per 0.5 cc (Investigational)
Q4186	Epifix, per square centimeter
Q4187	Epicord, per square centimeter
Q4188	Amnioarmor, per square centimeter (Investigational)
Q4189	Artacent ac, 1 mg (Investigational)
Q4190	Artacent ac, per square centimeter (Investigational)
Q4191	Restorigin, per square centimeter (Investigational)
Q4192	Restorigin, 1 cc (Investigational)
Q4193	Coll-e-derm, per square centimeter (Investigational)
Q4194	Novachor, per square centimeter (Investigational)
Q4195	Puraply, per square centimeter (Investigational)
Q4196	Puraply am, per square centimeter (Investigational)
Q4197	Puraply xt, per square centimeter (Investigational)
Q4198	Genesis amniotic membrane, per square centimeter (Investigational)
Q4199	Cygnus matrix, per square centimeter (Investigational)
Q4200	Skin te, per square centimeter (Investigational)
Q4201	Matrion, per square centimeter (Investigational)
Q4202	Keroxx (2.5g/cc), 1cc (Investigational)
Q4203	Derma-gide, per square centimeter (Investigational)
Q4204	Xwrap, per square centimeter (Investigational)
Q4205	Membrane graft or membrane wrap, per square centimeter (Investigational)
Q4206	Fluid flow or fluid GF, 1 cc (Investigational)
Q4208	Novafix, per square centimeter (Investigational)
Q4209	Surgraft, per square centimeter (Investigational)

Q4211	Amnion bio or Axobiomembrane, per square centimeter (Investigational)
Q4212	Allogen, per cc (Investigational)
Q4213	Ascent, 0.5 mg (Investigational)
Q4214	Cellesta cord, per square centimeter (Investigational)
Q4215	Axolotl ambient or axolotl cryo, 0.1 mg (Investigational)
Q4216	Artacent cord, per square centimeter (Investigational)
Q4217	Woundfix, BioWound, Woundfix Plus, BioWound Plus, Woundfix Xplus or BioWound Xplus, per square centimeter (Investigational)
Q4218	Surgicord, per square centimeter (Investigational)
Q4219	Surgigraft-dual, per square centimeter (Investigational)
Q4220	BellaCell HD or Surederm, per square centimeter (Investigational)
Q4221	Amniowrap2, per square centimeter (Investigational)
Q4222	Progenamatrix, per square centimeter (Investigational)
Q4226	MyOwn skin, includes harvesting and preparation procedures, per square centimeter (Investigational)
Q4224	Human health factor 10 amniotic patch (hhf10-p), per square centimeter (Investigational)
Q4225	Amniobind or dermabind tl, per square centimeter (Investigational)
Q4227	Amniocore, per square centimeter (Investigational)
Q4229	Cogenex amniotic membrane, per square centimeter (Investigational)
Q4230	Cogenex flowable amnion, per 0.5 cc (Investigational)
Q4232	Corplex, per square centimeter (Investigational)
Q4233	Surfactor or nudyn, per 0.5 cc (Investigational)
Q4234	Xcellerate, per square centimeter (Investigational)
Q4235	Amniorepair or altiPLY, per square centimeter (Investigational)
Q4236	Carepatch, per square centimeter (Investigational)
Q4237	Cryo-cord, per square centimeter (Investigational)
Q4238	Derm-maxx, per square centimeter (Investigational)
Q4239	Amnio-maxx or amnio-maxx lite, per square centimeter (Investigational)
Q4240	Corecyte, for topical use only, per 0.5 cc (Investigational)
Q4241	Polycyte, for topical use only, per 0.5 cc (Investigational)
Q4242	Amniocyte plus, per 0.5 cc (Investigational)
Q4245	Amniotext, per cc (Investigational)
Q4246	Coretext or protext, per cc (Investigational)
Q4247	Amniotext patch, per square centimeter (Investigational)
Q4248	Dermacyte amniotic membrane allograft, per square centimeter (Investigational)
Q4249	AmniPLY, for topical use only, per square centimeter (Investigational)
Q4250	Amnioamp-mp, per square centimeter (Investigational)
Q4251	Vim, per square centimeter (Investigational)
Q4252	Vendaje, per square centimeter (Investigational)
Q4253	Zenith amniotic membrane, per square centimeter (Investigational)
Q4254	Novafix dl, per square centimeter (Investigational)

Q4255	Reguard, for topical use only, per square centimeter (Investigational)
Q4256	Mlg-complete, per square centimeter (Investigational)
Q4257	Relese, per square centimeter (Investigational)
Q4258	Enverse, per square centimeter (Investigational)
Q4259	Celera dual layer or celera dual membrane, per square centimeter (Investigational)
Q4260	Signature apatch, per square centimeter (Investigational)
Q4261	Tag, per square centimeter (Investigational)
Q4262	Dual layer impax membrane, per square centimeter (Investigational)
Q4263	Surgraft tl, per square centimeter (Investigational)
Q4264	Cocoon membrane, per square centimeter (Investigational)
Q4265	Neostim tl, per square centimeter (Investigational)
Q4266	Neostim membrane, per square centimeter (Investigational)
Q4267	Neostim dl, per square centimeter (Investigational)
Q4268	Surgraft ft, per square centimeter (Investigational)
Q4269	Surgraft xt, per square centimeter (Investigational)
Q4270	Complete sl, per square centimeter (Investigational)
Q4271	Complete ft, per square centimeter (Investigational)
Q4272	Esano a, per square centimeter (Investigational)
Q4273	Esano aaa, per square centimeter (Investigational)
Q4274	Esano ac, per square centimeter (Investigational)
Q4275	Esano aca, per square centimeter (Investigational)
Q4276	Orion, per square centimeter (Investigational)
Q4278	Epieffect, per square centimeter (Investigational)
Q4279	Vendaje ac, per square centimeter (Investigational)
Q4280	Xcell amnio matrix, per square centimeter (Investigational)
Q4281	Barrera sl or barrera dl, per square centimeter (Investigational)
Q4282	Cygnus dual, per square centimeter (Investigational)
Q4283	Biovance tri-layer or biovance 3l, per square centimeter
Q4284	Dermabind sl, per square centimeter (Investigational)
Q4285	Nudyn dl or nudyn dl mesh, per square centimeter (Investigational)
Q4286	Nudyn sl or nudyn slw, per square centimeter (Investigational)
Q4287	Dermabind dl, per square centimeter (Investigational)
Q4288	Dermabind ch, per square centimeter (Investigational)
Q4289	Revoshield + amniotic barrier, per square centimeter (Investigational)
Q4290	Membrane wrap-hydro, per square centimeter (Investigational)
Q4291	Lamellas xt, per square centimeter (Investigational)
Q4292	Lamellas, per square centimeter (Investigational)
Q4293	Acesso dl, per square centimeter (Investigational)
Q4294	Amnio quad-core, per square centimeter (Investigational)
Q4295	Amnio tri-core amniotic, per square centimeter (Investigational)
Q4296	Rebound matrix, per square centimeter (Investigational)
Q4297	Emerge matrix, per square centimeter (Investigational)

Q4298	Amnicore pro, per square centimeter (Investigational)
Q4299	Amnicore pro+, per square centimeter (Investigational)
Q4300	Acesso tl, per square centimeter (Investigational)
Q4301	Activate matrix, per square centimeter (Investigational)
Q4302	Complete aca, per square centimeter (Investigational)
Q4303	Complete aa, per square centimeter (Investigational)
Q4304	Grafix plus, per square centimeter
Q4305	American amnion ac tri-layer, per square centimeter (Investigational)
Q4306	American amnion ac, per square centimeter (Investigational)
Q4307	American amnion, per square centimeter (Investigational)
Q4308	Sanopellis, per square centimeter (Investigational)
Q4309	Via matrix, per square centimeter (Investigational)
Q4310	Procenta, per 100 mg (Investigational)
Q4311	Acesso, per square centimeter (Investigational)
Q4312	Acesso ac, per square centimeter (Investigational)
Q4313	Dermabind fm, per square centimeter (Investigational)
Q4314	Reeva ft, per square centimeter (Investigational)
Q4315	Regenelink amniotic membrane allograft, per square centimeter (Investigational)
Q4316	Amchoplast, per square centimeter (Investigational)
Q4317	Vitograft, per square centimeter (Investigational)
Q4318	E-graft, per square centimeter (Investigational)
Q4319	Sanograft, per square centimeter (Investigational)
Q4320	Pellograft, per square centimeter (Investigational)
Q4321	Renograft, per square centimeter (Investigational)
Q4322	Caregraft, per square centimeter (Investigational)
Q4323	Alloply, per square centimeter (Investigational)
Q4324	Amniotx, per square centimeter (Investigational)
Q4325	Acapatch, per square centimeter (Investigational)
Q4326	Woundplus, per square centimeter (Investigational)
Q4327	Duoamnion, per square centimeter (Investigational)
Q4328	Most, per square centimeter (Investigational)
Q4329	Singlay, per square centimeter (Investigational)
Q4330	Total, per square centimeter (Investigational)
Q4331	Axolotl graft, per square centimeter (Investigational)
Q4332	Axolotl dualgraft, per square centimeter (Investigational)
Q4333	Ardeograft, per square centimeter (Investigational)
Q4336	Artacent c, per square centimeter (Investigational)
Q4337	Artacent trident, per square centimeter (Investigational)
Q4338	Artacent velos, per square centimeter (Investigational)
Q4339	Artacent vericlen, per square centimeter (Investigational)
Q4340	Simpligraft, per square centimeter (Investigational)
Q4341	Simplimax, per square centimeter (Investigational)

Q4342	Theramend, per square centimeter (Investigational)
Q4343	Dermacyte ac matrix amniotic membrane allograft, per square centimeter (Investigational)
Q4344	Tri-membrane wrap, per square centimeter (Investigational)
Q4345	Matrix hd allograft dermis, per square centimeter (Investigational)
Q4346	Shelter dm matrix, per square centimeter (Investigational)
Q4347	Rampart dl matrix, per square centimeter (Investigational)
Q4348	Sentry sl matrix, per square centimeter (Investigational)
Q4349	Mantle dl matrix, per square centimeter (Investigational)
Q4350	Palisade dm matrix, per square centimeter (Investigational)
Q4351	Enclose tl matrix, per square centimeter (Investigational)
Q4352	Overlay sl matrix, per square centimeter (Investigational)
Q4353	Xceed tl matrix, per square centimeter (Investigational)
Q4354	Palingen dual-layer membrane, per square centimeter (Investigational)
Q4355	Abiomend xplus membrane and abiomend xplus hydromembrane, per square centimeter (Investigational)
Q4356	Abiomend membrane and abiomend hydromembrane, per square centimeter (Investigational)
Q4357	Xwrap plus, per square centimeter (Investigational)
Q4358	Xwrap dual, per square centimeter (Investigational)
Q4359	Choriply, per square centimeter (Investigational)
Q4360	Amchoplast fd, per square centimeter (Investigational)
Q4361	Epixpress, per square centimeter (Investigational)
Q4362	Cygnus disk, per square centimeter (Investigational)
Q4363	Amnio burgeon membrane and hydromembrane, per square centimeter (Investigational)
Q4364	Amnio burgeon xplus membrane and xplus hydromembrane, per square centimeter (Investigational)
Q4365	Amnio burgeon dual-layer membrane, per square centimeter (Investigational)
Q4366	Dual layer amnio burgeon x-membrane, per square centimeter (Investigational)
Q4367	Amniocore sl, per square centimeter (Investigational)

ICD-10 Diagnosis Codes That Support Medical Necessity:

C50.011 – C50.019 C50.111 – C50.119 C50.211 – C50.219 C50.311 – C50.319 C50.411 – C50.519 C50.611 – C50.619 C50.811 – C50.819 C50.911 – C50.919	Malignant neoplasm of breast
D05.00 – D05.92	Carcinoma in situ of breast
E08.621	Diabetes mellitus due to underlying condition with foot ulcer
E08.622	Diabetes mellitus due to underlying condition with other skin ulcer
E09.621	Drug or chemical induced diabetes mellitus with foot ulcer

E09.622	Drug or chemical induced diabetes mellitus with other skin ulcer
E10.621	Type 1 diabetes mellitus with foot ulcer
E10.622	Type 1 diabetes mellitus with other skin ulcer
E11.621	Type 2 diabetes mellitus with foot ulcer
E11.622	Type 2 diabetes mellitus with other skin ulcer
E13.621	Other specified diabetes mellitus with foot ulcer
E13.622	Other specified diabetes mellitus with other skin ulcer
I83.001 – I83.029	Varicose veins of lower extremities with ulcer
I83.201 – I83.229	Varicose veins of lower extremities with both ulcer and inflammation
Q81.2	Epidermolysis bullosa dystrophica
T20.20xA – T20.39xS T20.60xA – T20.79xS	Burn and corrosion of head, face and neck
T21.20xA – T21.39xS T21.60xA – T21.79xS	Burn and corrosion of trunk
T22.20xA – T22.399S T22.60xA – T22.799S	Burn and corrosion of shoulder and upper limb except wrist and hand
T23.201A – T23.399S T23.601A – T23.799S	Burn and corrosion of wrist and hand
T24.201A – T24.399S T24.601A – T24.799S	Burn and corrosion of lower limb, except ankle and foot
T25.211A – T25.399S T25.611A – T25.799S	Burn and corrosion of ankle and foot
T30.0 – T32.99	Burns classified according to extent of body surface involvement
T34.011A – T34.99XS	Frostbite with tissue necrosis

Application Codes: (See reimbursement section below)

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	Application of skin substitute graft to trunk, arms, legs, total wound surface area up to 100 sq cm; 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	Application of skin substitute graft to trunk, arms, legs, total wound surface area greater than or equal to 100 sq cm; 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	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; 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	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; 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)
C5271	Application of low cost 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
C5272	Application of low cost skin substitute graft to trunk, arms, legs, total wound surface area up to 100 sq cm; each additional 25 sq cm wound surface area, or part thereof (list separately in addition to code for primary procedure)
C5273	Application of low cost 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
C5274	Application of low cost skin substitute graft to trunk, arms, legs, total wound surface area greater than or equal to 100 sq cm; 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)
C5275	Application of low cost 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
C5276	Application of low cost 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; each additional 25 sq cm wound surface area, or part thereof (list separately in addition to code for primary procedure)
C5277	Application of low cost 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
C5278	Application of low cost 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; 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)

Collagen Dressing or Wound Filler: (See reimbursement section below)

A6010	Collagen based wound filler, dry form, sterile, per g of collagen
A6011	Collagen based wound filler, gel/paste, per g of collagen
A6021	Collagen dressing, sterile, size 16 sq in or less, each
A6022	Collagen dressing, sterile, size more than 16 sq in but less than or equal to 48 sq in, each
A6023	Collagen dressing, sterile, size more than 48 sq in, each
A6024	Collagen dressing wound filler, sterile, per 6 in

REIMBURSEMENT INFORMATION:

Apligraf® is limited to five (5) applications per ulcer. The safety and the effectiveness of Apligraf have not been established for patients receiving greater than 5 applications.

Dermagraft® is limited to eight (8) applications per treatment site over a twelve (12) week period. Dermagraft has not been studied in patients receiving greater than 8 device applications.

OrCel™ is limited to a single, one-time application per donor site. No more than eight (8) pieces should be used per donor site. The safety and effectiveness of OrCel has not been evaluated in burn patients with split thickness donor sites larger than 288cm (8 pieces of OrCel).

Safety and effectiveness of **re-treatment** of a single wound using Apligraf®, Dermagraft® or OrCel™ has not been established and is considered **experimental or Investigational**.

Application codes (15271-15278, C5271-C5278) must be submitted with product codes.

Collagen-based dressings or wound fillers (A6010, A6011, A6021-A6024) can stay in place up to 7 days. Dressings are limited to 26 units per treatment site per 6-month period.

PROGRAM EXCEPTIONS:

Federal Employee Program (FEP): Follow FEP guidelines.

State Account Organization (SAO): Follow SAO guidelines.

Medicare Advantage products:

The following National Coverage Determination (NCD) was reviewed on the last guideline reviewed date: Porcine skin and Gradient Pressure Dressing (270.5) located at cms.gov.

The following were reviewed on the last guideline reviewed date: Local Coverage Determination (LCD) Application of Skin Substitute Grafts for Treatment of DFU and VLU of Lower Extremities (L36377); LCD Surgical Dressings (L33831); and Local Coverage Article Billing and Coding: Application of Skin Substitute Grafts for Treatment of DFU and VLU of Lower Extremities A57680 located at fcso.com.

If this Medical Coverage Guideline contains a step therapy requirement, in compliance with Florida law 627.42393, members or providers may request a step therapy protocol exemption to this requirement if based on medical necessity. The process for requesting a protocol exemption can be found at [Coverage Protocol Exemption Request](#).

DEFINITIONS:

Nonhealing- less than a 20% decrease in wound area with standard wound care for at least 2 weeks.

RELATED GUIDELINES:

[Amniotic Membrane and Limbal Stem Cell Transplantation for the Treatment of Ocular Conditions, 02-65000-19](#)

OTHER:

None.

REFERENCES:

1. Agency for Healthcare Research and Quality (AHRQ), Negative Pressure Wound Therapy Devices, Technology Assessment Report, 2009. Accessed at ahrq.gov 08/02/12.
2. Agency for Healthcare Research and Quality (AHRQ), Skin Substitutes for Treating Chronic Wounds, 12/18/12.
3. Alkhatieb M, Mortada H, et al. Management of a Difficult-to-Treat Diabetic Foot Wound Complicated by Osteomyelitis: A Case Study. *Case Rep Surg*. 2020 Jun 15;2020:3971581.
4. American Diabetes Association, Diabetes Care- Graftskin, A Human Skin Equivalent, Is Effective in the Management of Noninfected Neuropathic Diabetic Foot Ulcers, 2001.
5. American Society of Plastic Surgeons. Evidence-Based Clinical Practice Guideline: Breast Reconstruction with Expanders and Implants. 2013; accessed at plasticsurgery.org 01/21/14.
6. American Society of Plastic Surgeons (ASPS). Evidence-based Clinical Practice Guideline: Chronic Wounds of the Lower Extremity. 2007. Accessed at plasticsurgery.org 05/14/13.
7. Assadian O, Arnoldo B, et al. A prospective, randomised study of a novel transforming methacrylate dressing compared with a silver-containing sodium carboxymethylcellulose dressing on partial-thickness skin graft donor sites in burn patients. *Int Wound J*. 2015 Jun;12(3):351-6. PMID:23919667.
8. Athavale SM, Phillips S, Mangus B et al. Complications of alloderm and dermamatrix for parotidectomy reconstruction. *Head Neck* 2011.
9. Azar FK, Crawford TC, et al. Ventral hernia repair in patients with abdominal loss of domain: an observational study of one institution's experience. *Hernia*. 2017 Apr;21(2):245-252.
10. Badois N, Bauer P, et al. Acellular fish skin matrix on thin-skin graft donor sites: a preliminary study. *J Wound Care*. 2019 Sep 2;28(9):624-628.
11. Baldursson BT, Kjartansson H, et al, Healing rate and autoimmune safety of full-thickness wounds treated with fish skin acellular dermal matrix versus porcine small-intestine submucosa: a noninferiority study. *Int J Low Extrem Wounds*. 2015 Mar;14(1):37-43.
12. Ball JF, Sheena Y, et al. A direct comparison of porcine (Strattice™) and bovine (Surgimend™) acellular dermal matrices in implant-based immediate breast reconstruction. *J Plast Reconstr Aesthet Surg*. 2017 Aug;70(8):1076-1082.
13. Barbul A, Gurtner GC, et al. Matched-cohort Study Comparing Bioactive Human Split-Thickness Skin Allograft Plus Standard of Care to Standard of Care Alone in the Treatment of Diabetic Ulcers: A Retrospective Analysis Across 470 Institutions. *Wound Repair Regen*, 28 (1), 81-89 Jan 2020.

14. Bastidas N, Ashjian PJ, Sharma S, Acellular Dermal Matrix for Temporary Coverage of Exposed Critical Neurovascular Structures in Extremity Wounds, *Annals of Plastic Surgery*, April 2009, Vol 62, Issue 4, pp 410-413.
15. Bianchi C, Cazzell S, et al. 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 Feb;15(1):114-122.
16. Blue Cross Blue Shield Association Evidence Positioning System®; 7.01.149 Amniotic Membrane and Amniotic Fluid, 03/24.
17. Blue Cross Blue Shield Association Evidence Positioning System®; 7.01.113 BioEngineered Skin and Soft Tissue Substitutes, 02/24.
18. Blue Cross and Blue Shield Technology Evaluation Center. Graftskin for the treatment of skin ulcers. *TEC Assessments 2001*; Volume 16, Tab 12.
19. Brantley JN, Verla TD, Use of Placental Membranes for the Treatment of Chronic Diabetic Foot Ulcers. *Adv Wound Care (New Rochelle)*. 2015 Sep 1;4(9):545-559.
20. Budny AM, Ley A, Cryopreserved Allograft as an Alternative Option for Closure of Diabetic Foot Ulcers, *Podiatry Management*, 2013; 131-136.
21. Butterfield JL. 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. *Plast Reconstr Surg*. May 2013;131(5):940-951.
22. Cazzell SM, et al, The Management of Diabetic Foot Ulcers with Porcine Small Intestine Submucosa Tri-Layer Matrix: A Randomized Controlled Trial. *Adv Wound Care (New Rochelle)*. 2015 Dec 1;4(12):711-718.
23. Cazzell S, Moyer PM, et al. A Prospective, Multicenter, Single-Arm Clinical Trial for Treatment of Complex Diabetic Foot Ulcers With Deep Exposure Using Acellular Dermal Matrix. *Adv Skin Wound Care*, 32 (9), 409-415 Sep 2019. PMID: 31361269.
24. Cazzell S, Vayser D, 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 May;25(3):483-497.
25. Centers for Medicare and Medicaid Services (CMS). National Coverage Determination (NCD) for Porcine skin and Gradient Pressure Dressing (270.5), accessed at [cms.gov](https://www.cms.gov).
26. DeNoto G 3rd. Bridged repair of large ventral hernia defects using an ovine reinforced biologic: A case series. *Ann Med Surg (Lond)*. 2022 Mar 2;75:103446.
27. DeNoto G 3rd, Ceppa EP, et al. 24-Month results of the BRAVO study: A prospective, multi-center study evaluating the clinical outcomes of a ventral hernia cohort treated with OviTex® 1S permanent reinforced tissue matrix. *Ann Med Surg (Lond)*. 2022 Sep 27;83:104745. PMID: 36389188.
28. DiDomenico L, Emch KJ, et al, A Prospective Comparison of Diabetic Foot Ulcers Treated With Either a Cryopreserved Skin Allograft or a Bioengineered Skin Substitute *WOUNDS* 2011;23(7):184–189.
29. DiDomenico LA, Orgill DP, et al, Aseptically Processed Placental Membrane Improves Healing of Diabetic Foot Ulcerations: Prospective, Randomized Clinical Trial. *Plast Reconstr Surg Glob Open*. 2016 Oct 12;4(10):e1095.
30. Dobke M, Peterson DR, et al. Microvascular tissue as a platform technology to modify the local microenvironment and influence the healing cascade. *Regen Med*. 2020 Feb;15(2):1313-1328. PMID: 32228366.
31. Driver VR, Lavery LA, et al, A clinical trial of Integra Template for diabetic foot ulcer treatment. *Wound Repair Regen*. 2015 Nov-Dec;23(6):891-900.

32. Duan-Arnold Y, Gyurdieva A, et al; Soluble Factors Released by Endogenous Viable Cells Enhance the Antioxidant and Chemoattractive Activities of Cryopreserved Amniotic Membrane. *Advances in Wound Care*. May 2015, 4(6): 329-338.
33. Duan-Arnold Y, Uveges TE, et al; Angiogenic Potential of Cryopreserved Amniotic Membrane Is Enhanced Through Retention of All Tissue Components in Their Native State. *Advances in Wound Care*. August 2015, 4(9): 513-522.
34. Eichler C, Efremova J, et al. A Head to Head Comparison Between SurgiMend® - Fetal Bovine Acellular Dermal Matrix and Tutomesh® - A Bovine Pericardium Collagen Membrane in Breast Reconstruction in 45 Cases. *In Vivo*. 2017 Jul-Aug;31(4):677-682.
35. Fetterolf D, Savage R, Dehydrated Human Amniotic Tissue Improves Healing Time, Cost of Care. *Today's Wound Clinic*, Jan/Feb 2013.
36. First Coast Service Options, Inc. (FCSO). Local Coverage Article: Billing and Coding: Application of Skin Substitute Grafts for Treatment of DFU and VLU of Lower Extremities A57680; accessed at fcso.com.
37. First Coast Service Options, Inc. (FCSO), Local Coverage Determination (LCD): Application of Skin Substitute Grafts for Treatment of DFU and VLU of Lower Extremities (L36377); accessed at fcso.com.
38. First Coast Service Options, Inc. (FCSO). Local Coverage Determination (LCD): Surgical Dressings (L33831); accessed at fcso.com.
39. Fitzgerald RH, Bharara, et al. Use of a Nanoflex powder dressing for wound management following debridement for necrotising fasciitis in the diabetic foot. *Int Wound J*. 2009 Apr;6(2):133-9. PMID:19432662.
40. Fleshman JW, Beck DE, et al. A prospective, multicenter, randomized, controlled study of non-cross-linked porcine acellular dermal matrix fascial sublay for parastomal reinforcement in patients undergoing surgery for permanent abdominal wall ostomies. *Dis Colon Rectum*. May 2014;57(5):623-631.
41. Frykberg RG, Banks J; Challenges in the Treatment of Chronic Wounds. *Advances in Wound Care*. August 2015, 4(9): 560-582.
42. Frykberg RG, Gibbons, GW, et al, A prospective, randomized, multicenter, open-label, single-arm clinical trial for treatment of chronic complex diabetic foot wounds with exposed tendon and/or bone: positive clinical outcomes of viable cryopreserved human placental membrane; *Int Wound J*. 2016 Aug 3. Doi: 10.1111/iwj.12649.
43. Frykberg RG, Zgonis T, Armstrong DG et al. Diabetic foot disorders. A clinical practice guideline (2006 revision). *J Foot Ankle Surg* 2006; 45 (5 Suppl):S1-66. Accessed at acfas.org 05/14/13.
44. Gaster RS, Berger AJ, Monica SD, et al, Histologic Analysis of Fetal Bovine Derived Acellular Dermal Matrix in Tissue Expander Breast Reconstruction, *Annals of Plastic Surgery*, Vol.70, Number 4, April 2013.
45. Gibson GW, Grafix®, a Cryopreserved Placental Membrane, for the Treatment of Chronic/Stalled Wounds. *Adv Wound Care (New Rochelle)*. 2015 Sep 1;4(9):534-544.
46. Glat P, Gould L, et al. Minimizing bias in a diabetic foot ulcer clinical evaluation: analysis of the HIFLO Trial. *Wounds*. 2023 Feb;35(3):36-40. doi: 10.25270/wnds/22062.
47. Goetz M, Jurczyk M, et al. Semiresorbable biologic hybrid meshes for ventral abdominal hernia repair in potentially contaminated settings: lower risk of recurrence. *Updates Surg*. 2022 Dec;74(6):1995-2001. PMID: 36223064.
48. Gould LJ, Orgill DP, et al. Improved healing of chronic diabetic foot wounds in a prospective randomised controlled multi-centre clinical trial with a microvascular tissue allograft. *Int Wound J*. 2022 May;19(4):811-825. doi: 10.1111/iwj.13679.

49. Gurtner GC, Garcia AD, et al. A Retrospective Matched-Cohort Study of 3994 Lower Extremity Wounds of Multiple Etiologies Across 644 Institutions Comparing a Bioactive Human Skin Allograft, TheraSkin, Plus Standard of Care, to Standard of Care Alone. *Int Wound J*, 17 (1), 55-64 Feb 2020. PMID: 31729833.
50. Hankin CS, Knispel J, Lopes M, et al, Clinical and Cost Efficacy of Advanced Wound Care Matrices for Venous Ulcers, *J Manag Care Pharm*. 2012;18(5):375-84.
51. Hayes Medical Technology Directory. Skin Substitutes for Wound Healing (SKIN0301.19) 02/01/04, update 02/09/07.
52. Hopf HW, Ueno C, Aslam R et al. Guidelines for the treatment of arterial insufficiency ulcers. *Wound Repair Regen* 2006; 14(6):693-710. 2007/01/04, accessed at plasticsurgery.org 05/14/13.
53. Hsu GS, Utilizing Dehydrated Human Amnion/Chorion Membrane Allograft in Transcanal Tympanoplasty, 4:161. Doi: 10.4172/2161-119X.1000161.
54. Karr JC, Retrospective Comparison of Diabetic Foot Ulcer and Venous Stasis Ulcer Healing Outcome Between a Dermal Repair Scaffold (PriMatrix) and a Bilayered Living Cell Therapy (Apligraf), *Adv Skin Wound Care*. 2011 Mar;24(3):119-25.
55. Kavros SJ, Dutra T, et al. The use of PriMatrix, a fetal bovine acellular dermal matrix, in healing chronic diabetic foot ulcers: a prospective multicenter study. *Adv Skin Wound Care*. Aug 2014;27(8):356-362.
56. Keifer OP, Page EK, et al, A Complication Analysis of 2 Acellular Dermal Matrices in Prosthetic-based Breast Reconstruction. *Plast Reconstr Surg Glob Open*. 2016 Jul; 4(7): e800.
57. Kerecis LLC. Kerecis Evidence Dossier Fish Skin Grafts for Tissue Regeneration, 12/21.
58. Kerecis LLC. Kerecis Clinical Studies Binder; 2021.
59. Kerecis LLC. Kerecis™ Omega3 Wound- Evidence for Use, KR17-003.6; 2019.
60. Kirsner RS, Warriner R, Michela M et al. Advanced biological therapies for diabetic foot ulcers. *Arch Dermatol* 2010; 146(8):857-62.
61. Koob TJ, Rennert R, et al, Biological properties of dehydrated human amnion/chorion composite graft: implications for chronic wound healing. *Int Wound J*. 2013 Oct;10(5):493-500.
62. Koob TJ, Lim JJ, et al, Angiogenic properties of dehydrated human amnion/chorion allografts: therapeutic potential for soft tissue repair and regeneration. *Vasc Cell*. 2014 May 1;6:10.
63. Landsman A, Living Cell Therapy for Wounds- What's the Big Deal? *Podiatry Management*;Nov/Dec2013, Vol. 32 Issue 9, p75-80.
64. Landsman A, Cook J, et al, Retrospective Study of 188 consecutive patients treated with a Biologically Active Human Skin Allograft (TheraSkin®) for Diabetic Foot and Venous Leg Ulcers, *Foot Ankle Spec*. 2011 Feb;4(1):29-41.
65. Landsman A, Rosines E, et al, Characterization of a Cryopreserved Split-Thickness Human Skin Allograft-TheraSkin. *Adv Skin Wound Care*. 2016 Sep;29(9):399-406.
66. Larson KW, Austin CL, Thompsen SJ. Treatment of a Full-Thickness Burn Injury With NovoSorb Biodegradable Temporizing Matrix and RECELL Autologous Skin Cell Suspension: A Case Series. *J Burn Care Res*. 2020 Jan-Feb; 41(1): 215–219. PMID: 31765469.
67. Lavery LA, Fulmer J, et al, The efficacy and safety of Grafix® for the treatment of chronic diabetic foot ulcers: results of a multi-centre, controlled, randomized, blinded, clinical trial. *Int Wound J*. 2014 Oct;11(5):554-60.
68. Lavery LA, Weir D, Advances in Wound Therapy: Understanding Differences Between Cellular and Acellular Therapies in the Treatment of Chronic Wounds. *Wounds*, 2014; Suppl 8. Accessed at woundsresearch.com 06/02/16.

69. Leon-Villapalos J. Skin autografting. In: UpToDate, Jeschke MG, Colwell AS, Collins KA (Eds) UpToDate, Waltham, MA; accessed at uptodate.com.
70. Lipsky BA, Berendt AR, Cornia PB et al. 2012 Infectious Diseases Society of America clinical practice guideline for the diagnosis and treatment of diabetic foot infections. *Clin Infect Dis*. 2012 Jun;54(12):e132-173. 2012, accessed at idsociety.org 01/22/14.
71. Lombardi J, Stec E, et al. Comparison of mechanical properties and host tissue response to OviTex™ and Strattice™ surgical meshes. *Hernia*. 2023 Aug;27(4):987-997.
72. Loo YL, Kamalathevan P, et al. Comparing the Outcome of Different Biologically Derived Acellular Dermal Matrices in Implant-based Immediate Breast Reconstruction: A Meta-analysis of the Literatures. *Plast Reconstr Surg Glob Open*. 2018 Mar 19;6(3):e1701.
73. Lotal AM, Yehuda DB, et al. Comparative Study of Meshed and Nonmeshed Acellular Dermal Matrix in Immediate Breast Reconstruction. *Plast Reconstr Surg*, 144 (5), 1045-1053 Nov 2019. PMID: 31441807.
74. Lotan AM, Cohen D, et al. Histopathological Study of Meshed Versus Solid Sheet Acellular Dermal Matrices in a Porcine Model. *Ann Plast Surg*. 2018 Nov;81(5):609-614.
75. Lullove E, Acellular Fetal Bovine Dermal Matrix in the Treatment of Nonhealing Wounds in Patients with Complex Comorbidities, *Journal of the American Podiatric Medical Association*, Vol 102, No 3, May/June 2012.
76. Lullove EJ, Liden B, et al. A Multicenter, Blinded, Randomized Controlled Clinical Trial Evaluating the Effect of Omega-3-Rich Fish Skin in the Treatment of Chronic, Nonresponsive Diabetic Foot Ulcers. *Wounds*. 2021 Jul;33(7):169-177.
77. McQuilling JP, Vines JB, Mowry KC. In Vitro Assessment of a Novel, Hypothermically Stored Amniotic Membrane for Use in a Chronic Wound Environment. *T Wound J*, 14 (6), 993-1005, Dec 2017.
78. Malkoc A, Wong DT. Lessons Learned From Two Survivors of Greater Than 90% TBSA Full-Thickness Burn Injuries Using NovoSorb Biodegradable Temporizing Matrix™ and Autologous Skin Cell Suspension, RECELL™: A Case Series. *J Burn Care Res*. 2021 May 7;42(3):577-585. PMID: 33022032.
79. Masee M, Chinn K, et al, Dehydrated human amnion/chorion membrane regulates stem cell activity in vitro. *J Biomed Mater Res B Appl Biomater*. 2015 Jul 14.
80. Maus EA, Successful Treatment of Two Refractory Venous Stasis Ulcers Treated with a Novel Poly-N-Acetyl Glucosamine-Derived Membrane, *BMJ Case Reports* 2012; doi:10.1136/bcr.03.2012.6091.
81. Michael S, Winters C, Khan M. Acellular Fish Skin Graft Use for Diabetic Lower Extremity Wound Healing: A Retrospective Study of 58 Ulcerations and a Literature Review. *Wounds*. 2019 Oct;31(10):262-268.
82. MicroVascular Tissues, Inc. mVASC® Microvascular Tissue Graft Product Information; March 2023.
83. MicroVascular Tissues, Inc. mVASC® Microvascular Tissue Graft Product Instructions; 2023.
84. Mowry KC, Bonvallet PP, Bellis SL. Enhanced Skin Regeneration Using a Novel Amniotic-derived Tissue Graft. *Wounds*, 29 (9), 277-285, Sep 2017.
85. Mrugala A, Sui A, et al, Amniotic membrane is a potential regenerative option for chronic non-healing wounds: a report of five cases receiving dehydrated human amnion/chorion membrane allograft. *Int Wound J*. 2015 May 14. Doi: 10.1111/iwj.12458.
86. National Institute for Health and Clinical Excellence (NICE). Diabetic foot problems: Inpatient management of diabetic foot problems. 2011.

87. National Institute for Health and Clinical Excellence (NICE). Diabetic Foot Problems: Prevention and Management [NG19]; Last updated: October 2019. Accessed at nice.org.uk. Nherera LM, Romanelli M, et al, An Overview of Clinical and Health Economic Evidence Regarding Porcine Small Intestine Submucosa Extracellular Matrix in the Management of Chronic Wounds and Burns. *Ostomy Wound Manage.* 2017 Dec;63(12):38-47.
88. Ohkuma R, et al Initial experience with the use of foetal/neonatal bovine acellular dermal collagen matrix (SurgiMend™) for tissue-expander breast reconstruction. *Journal of Plastic, Reconstructive & Aesthetic Surgery* (2013)1-7.
89. Parker MJ, Kim RC, et al. A novel biosynthetic scaffold mesh reinforcement affords the lowest hernia recurrence in the highest-risk patients. *Surg Endosc.* 2021 Sep;35(9):5173-5178. PMID: 32970208.
90. Penny H, Rifkah M, et al, Dehydrated human amnion/chorion tissue in difficult-to-heal DFUs: a case series. *J Wound Care.* 2015 Mar;24(3):104; 106-9; 111. Doi: 10.12968/jowc.2015.24.3.104.
91. Requski M, Jacobstein DA, et al, A retrospective analysis of a human cellular repair matrix for the treatment of chronic wounds. *Ostomy Wound Manage.* 2013 Dec;59(12):38-43.
92. Robson MC, Cooper DM, Aslam R et al. Guidelines for the treatment of venous ulcers. *Wound Repair Regen* 2006; 14(6): 649-62. 2006; 2007/01/04. Accessed at plasticsurgery.org 05/14/13.
93. 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*, 4 (2), 49-52 2014 Oct 26.
94. Sabo M, Moore S, et al. Fresh hypothermically stored amniotic allograft in the treatment of chronic nonhealing ulcers: a prospective case series. *Chronic Wound Care Management and Research* 2018;5 1–4.
95. Sanders L, Landsman AS, Landsman A, et al. A prospective, multicenter, randomized, controlled clinical trial comparing a bioengineered skin substitute to a human skin allograft. *Ostomy Wound Manage.* Sep 2014;60(9):26-38.
96. Santema TB, Poyck PP, et al. Systematic review and meta-analysis of skin substitutes in the treatment of diabetic foot ulcers: Highlights of a Cochrane systematic review. *Wound Repair Regen.* 2016 Jul;24(4):737-44.
97. Saudek CD, Kalyani RR, et al, Johns Hopkins Diabetes Guide 2012: Treatment and Management of Diabetes (Johns Hopkins Medicine), accessed at hopkinsmedicine.org 06/02/14.
98. Schefflan M, Grinberg-Rashi H, et al. Bovine Acellular Dermal Matrix in Immediate Breast Reconstruction: A Retrospective, Observational Study with SurgiMend. *Plast Reconstr Surg.* 2018 Jan;141(1):1e-10e.
99. Schefflan M, Lotan, et al. Trans-Vertical Mastectomy With Immediate Implant-Based Reconstruction: A Retrospective, Observational Study. *Aesthet Surg J.* 2018 Jul 24.
100. Serena T, Bates-Jensen B, et al, Consensus principles for wound care research obtained using a Delphi process, *Wound Repair Regen.* 2012 May-Jun;20(3):284-93.
101. Serena TE, et al, Dehydrated human amnion/chorion membrane treatment of venous leg ulcers: correlation between 4-week and 24-week outcomes. *J Wound Care.* 2015 Nov;24(11):530-4.
102. Serena TE, Carter MJ, et al, 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 Nov;22(6):688-93.
103. Serena TE, Yaakov R, et al. A Randomized Controlled Clinical Trial of a Hypothermically Stored Amniotic Membrane for Use in Diabetic Foot Ulcers. *J Comp Eff Res*, 9 (1), 23-34, Jan 2020.
104. Shah AP, Using amniotic membrane allografts in the treatment of neuropathic foot ulcers. *J Am Podiatr Med Assoc.* 2014 Mar;104(2):198-202.

105. Sheena Y, Ball J, et al. The Comparison of Strattice and SurgiMend in Acellular Dermal Matrix-Assisted, Implant-Based Immediate Breast Reconstruction. *Plast Reconstr Surg*. 2018 Nov;142(5):789e-790e.
106. Sheikh ES, Sheikh ES, et al, Use of dehydrated human amniotic membrane allografts to promote healing in patients with refractory non healing wounds. *Int Wound J* 2013.
107. 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*, 4 (2), 62-5 2014 Oct 26.
108. Sivaraj D, Fischer KS, et al Outcomes of Biosynthetic and Synthetic Mesh in Ventral Hernia Repair. *Plast Reconstr Surg Glob Open*. 2022 Dec 12;10(12):e4707. PMID: 36530858.
109. Sivaraj D, Henn D, et al. Reinforced Biologic Mesh Reduces Postoperative Complications Compared to Biologic Mesh after Ventral Hernia Repair. *Plast Reconstr Surg Glob Open*. 2022 Feb 7;10(2):e4083. PMID: 35141102.
110. Smith SP. Use of a transforming powder dressing in the lower leg wounds of two older patients: case studies. *JwoundCare*. 2019 Jul 1;28(Sup7):S40-S43.PMID:31295078.
111. Smith SP, Konnikov N. Rapid, economical healing of two large Mohs surgery wounds with transforming powder dressing. *DermatolTher*. 2019 Jul;32(4):e12965. PMID:31106461.
112. Solsys™ Medical Dossier: TheraSkin, 03/14/19.
113. Steed DL, Attinger C, Colaizzi T et al. Guidelines for the treatment of diabetic ulcers. *Wound Repair Regen* 2006; 14(6):680-92. 2006; 2007/01/04. Accessed at plasticsurgery.org 05/14/13.
114. Subach BR, Copay AG. The use of a dehydrated amnion/chorion membrane allograft in patients who subsequently undergo reexploration after posterior lumbar instrumentation. *Adv Orthop*. 2015;2015:501202.
115. Tenenhaus M, Rennekampff HO. Treatment of Superficial Burns Requiring Hospital Admission. In: *UpToDate*, Jeschke MG, Collins KA (Eds) *UpToDate*, Waltham, MA; accessed at uptodate.com.
116. Tettelbach W, Cazzell S, 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*. 2019 Feb;16(1):19-29.
117. Tettelbach W, Cazzell S, et al. A Multicentre Prospective Randomised Controlled Comparative Parallel Study of Dehydrated Human Umbilical Cord (EpiCord) Allograft for the Treatment of Diabetic Foot Ulcers. *Int Wound J*. 16 (1), 122-130, Feb 2019. PMID: 30246926.
118. Timmer AS, Claessen JM, et al. Clinical outcomes of open abdominal wall reconstruction with the use of a polypropylene reinforced tissue matrix: a multicenter retrospective study. *Multicenter Study Hernia*. 2022 Oct;26(5):1241-1250. PMID: 35441284.
119. TissueTech, Inc. Consideration of Modification of Medical Policy to add NEOX 100 and NEOX 1K tissue for Diabetic Foot Ulcers and Venous Leg Ulcers; Feb 2022.
120. Towler MA, Rush EW, et al. Randomized, Prospective, Blinded-Enrollment, Head-To-Head Venous Leg Ulcer Healing Trial Comparing Living, Bioengineered Skin Graft Substitute (Apligraf) with Living, Cryopreserved, Human Skin Allograft (TheraSkin). *Clin Podiatr Med Surg*. 2018 Jul;35(3):357-365.
121. Trinh TT, Dünschede F, et al, Marine Omega3 wound matrix for the treatment of complicated wounds; *Phleb-Stuttgart* 45(2):93-98, Jan 2016.
122. ULURU Inc. Altrazeal™ Transforming Powder Dressing; accessed at altrazeal.info.
123. U.S. Food and Drug Administration (FDA); accessed at fda.gov.
124. Wilson TC, Wilson JA, et al, The Use of Cryopreserved Human Skin Allograft for the Treatment of Wounds With Exposed Muscle, Tendon, and Bone. *Wounds*. 2016 Apr;28(4):119-25.

125. Yang CK, Polanco TO, Lantis JC, A Prospective, Postmarket, Compassionate Clinical Evaluation of a Novel Acellular Fish-skin Graft Which Contains Omega-3 Fatty Acids for the Closure of Hard-to-heal Lower Extremity Chronic Ulcers. *Wounds*. 2016 Apr;28(4):112-8.
126. Yonehiro L, Burleson G, Sauer V. Use of a New Acellular Dermal Matrix for Treatment of Nonhealing Wounds in the Lower Extremities of Patients With Diabetes. *Wounds*, 25 (12), 340-4 Dec 2013.
127. 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* 4 (2014) 1–4; available online 11/19/13.
128. Zelen CM. An evaluation of dehydrated human amniotic membrane allografts in patients with DFUs. *J Wound Care*. 2013 Jul;22(7):347-8, 350-1.
129. Zelen CM, Gould LJ, Li WW. Clinical Achievement of Wound Closure and Tissue Quality With a Novel Microvascular Tissue Graft. *Wounds*. 2019 Apr;31(4):E29-E32. PMID:31008717.
130. Zelen CM, Orgill DP, et al. An aseptically processed, acellular, reticular, allogenic human dermis improves healing in diabetic foot ulcers: A prospective, randomized, controlled, multicentre follow-up trial. *Int Wound J*. 2018 Oct;15(5):731-739.
131. Zelen CM, Orgill DP, et al, Prospective, randomized, controlled, multicenter 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. *Int Wound J*. 2016 Apr 12. Doi: 10.1111/iwj.12600.
132. Zelen CM, Poka A, et al, Prospective, randomized, blinded, comparative study of injectable micronized dehydrated amniotic/chorionic membrane allograft for plantar fasciitis – a feasibility study. *Foot Ankle Int*. 2013 Oct;34(10):1332-9.
133. Zelen CM, Serena TE, et al, A prospective, randomized 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 Apr;11(2):122-8.
134. Zelen CM, Serena TE, Denoziere G et al. A prospective randomized comparative parallel study of amniotic membrane wound graft in the management of diabetic foot ulcers. *Int Wound J* 2013.
135. Zelen CM, Serena TE, et al, Treatment of chronic diabetic lower extremity ulcers with advanced therapies: a prospective, randomized, controlled, multi-centre comparative study examining clinical efficacy and cost. *Int Wound J*. 2016 Apr;13(2):272-82.
136. Zelen CM, Snyder RJ, et al, The use of human amnion/chorion membrane in the clinical setting for lower extremity repair: a review. *Clin Podiatr Med Surg*. 2015 Jan;32(1):135-46.

COMMITTEE APPROVAL:

This Medical Coverage Guideline (MCG) was approved by the Florida Blue Medical Policy and Coverage Committee on 04/25/24.

GUIDELINE UPDATE INFORMATION:

01/01/01	New Medical Coverage Guideline.
01/01/02	Annual HCPCS coding update.
01/01/03	Annual HCPCS coding update.
02/15/03	Annual Review.

06/15/04	Unscheduled review and revision to guideline; consisting of updated references, deleted J7350 and changed name of MCG from Apligraf (Graftskin) to Human Skin Equivalent Grafts.
01/01/05	Annual HCPCS coding update: consisting of addition of J7343 and J7344 and deletion of Q0182 and Q0183.
01/01/06	Annual HCPCS coding update: added 15000, 15340, 15341, 15360, 15361, 15365, and 15366. Deleted: 15342, 15343, J7343. Revised: J7340, J7342, and J7344.
08/15/06	Biennial review; new information added for Integra, TransCyte, allograft, OrCel, xenograft, AlloDerm; revision to code information; code J7343 added.
01/01/07	Annual HCPCS coding update: added J7345, J7346; deleted 15000 – 15400 & changed to 15002 – 15005 to describe codes used for graft site preparation & graft application.
03/15/07	Revision to guideline; consisting of addition of OASIS Wound Matrix (J7341), revision to criteria for Apligraf (J7340), revision to code information for J7344 and J7343, updated references.
06/15/07	Reformatted guideline.
08/15/07	Review, coverage statements maintained, references updated.
01/01/08	Annual HCPCS coding update: deleted J7345; added J7347, J7348, J7349.
01/01/09	Annual HCPCS coding update: added HCPCS codes Q4100 – Q4114; updated ICD-9 codes 707.10 – 707.19 & 707.8; and deleted HCPCS codes J7340-J7349.
07/01/09	Biennial review: description section, Alloderm position statement, coding and references updated. HCPCS 3 rd quarter coding update: added new codes Q4115 and Q4116.
10/15/10	Revision; related ICD-10 codes added.
01/01/11	Annual HCPCS coding update. Added Q4117 – Q4121; revised Q4101 – Q4116; deleted Q4109.
07/15/11	Scheduled review; position statements maintained, coding section and references updated.
01/01/12	Annual HCPCS coding update; added HCPCS codes Q4122-Q4130; CPT coding section updated.
07/15/12	Annual review; position statements, billing/coding information, description section, Medicare program exception, and references updated; formatting changes.
01/01/13	Annual HCPCS update; added Q4131-Q4136; revised Q4119, Q4126, & Q4128. Experimental list updated; formatting changes.
07/15/13	Annual review; description section, position statement, and references updated; formatting changes.
01/01/14	Annual HCPCS update. Added codes Q4137-Q4149. Position statement updated; formatting changes.
03/15/14	Annual review; position statements, Coding, Description, and references updated; formatting changes.
06/15/14	Revision; references updated.
01/01/15	Annual HCPCS/CPT update. Added codes Q4150-Q4160; revised codes Q4119 & Q4147.
03/15/15	Annual review; description and position statement section updated; coding and references updated; formatting changes.
10/01/15	Revision; ICD9 and ICD10 coding sections updated.

11/01/15	Revision: ICD-9 Codes deleted.
01/01/16	Annual HCPCS/CPT update; codes Q4161-Q4165 added; code Q4153 revised.
08/15/16	Revision; policy title, description section, position statement section, coding, and references updated; formatting changes.
10/01/16	Revision; formatting changes. Investigational product list updated.
11/15/16	Revision; coding section updated.
01/01/17	Annual CPT/HCPCS update. Added Q4166-Q4175; revised Q4105 & Q4131; deleted Q4119, Q4120, Q4129.
03/15/17	Revision; Position statements including treatment of diabetic ulcers, amniotic membrane, and investigational product list updated; Code Q4151, program exception, and references updated.
04/15/17	Revision; code C9349 deleted.
08/15/17	Revision; Integra Omnigraft deleted from investigational product list and added to bullet for Integra® Dermal Regeneration Template.
01/01/18	Annual CPT/HCPCS update. Added codes Q4176-Q4182; revised codes Q4132, Q4133, Q4148, Q4156, Q4158, Q4162, Q4163.
04/15/18	Revision; description, position statements, coding, and references updated.
01/01/19	Annual CPT/HCPCS coding update. Added codes Q4183-Q4204; revised codes Q4133 & Q4137; deleted codes Q4131 & Q4172.
04/15/19	Review; Investigational product list and references updated.
07/01/19	Revision; Investigational product list updated.
10/01/19	Quarterly CPT/HCPCS coding update. Added codes Q4205-Q4226; revised codes Q4122, Q4165, Q4184.
04/15/20	Review; position statements and references updated.
07/01/20	Quarterly CPT/HCPCS coding update. Added codes Q4227-Q4248; revised code Q4176.
08/15/20	Revision; coding section updated.
10/01/20	Quarterly CPT/HCPCS coding update. Added codes Q4249, Q4250, Q4254, Q4255.
04/15/21	Review; Position statements, investigational product list, coding and references updated.
05/21/21	Revision; investigational product list updated.
10/01/21	Quarterly CPT/HCPCS coding update. Codes Q4251-Q4253 added; codes Q4228 & Q4236 deleted.
01/01/22	Annual CPT/HCPCS coding update. Codes A2001-A2010, Q4199 added.
01/05/22	Revision; code A2003 deleted.
04/01/22	Review: Amniotic membrane position statement updated and references updated. Quarterly CPT/HCPCS coding update. Codes A2011-A2013, A4100, Q4224, Q4225, Q4256-Q4258 added.
07/01/22	Quarterly CPT/HCPCS coding update. Codes Q4259-Q4261 added; code A2004 revised.
10/01/22	Quarterly CPT/HCPCS coding update. Codes A2014-A2018 added; code Q4128 revised.
01/01/23	Annual CPT/HCPCS coding update. Codes Q4236, Q4262-Q4264 added.
04/01/23	Quarterly CPT/HCPCS coding update. Codes A2019-A2021, Q4265-Q4271 added.
07/01/23	Quarterly CPT/HCPCS coding update. Codes Q4272-Q4284 added.
10/01/23	Review: Investigational product list, coding, and references updated. Quarterly CPT/HCPCS coding update. Codes A2022-A2025, Q4285, Q4286 added.

01/01/24	Annual CPT/HCPCS coding update. Codes Q4279, Q4287-Q4304 added; code Q4225 revised.
04/01/24	Quarterly CPT/HCPCS coding update. Codes A2026, Q4305-Q4310 added; deleted Q4244.
05/15/24	Review: Position statements, description, coding, reimbursement, and references updated.
07/01/24	Quarterly CPT/HCPCS coding update. Codes Q4311-Q4333 added; codes Q4210, Q4277 deleted.
09/15/24	Revision: Collagen dressing position statements added; coding, reimbursement, and references updated.
10/01/24	Quarterly CPT/HCPCS coding update. Codes A2027-A2029, Q4336-Q4345 added; code A2024 revised.
01/01/25	Annual CPT/HCPCS coding update. Codes 15011-15018, C8002, Q4346-Q4353 added.
04/01/25	Quarterly CPT/HCPCS coding update. Codes A2030-A2035, Q4354-Q4367; code Q4231 deleted.