matriderm®

Flexible solutions for complex wound reconstruction

medskin solutions
DR. SUWELACK

Bibliography
Abstracts of main publications

Author	Bloemen
Year	2010
Title	Dermal substitution in acute burns and reconstructive surgery: a 12-year follow-up
Study Type	RCT
Number of Patients	46

Abstract

Background:
Application of dermal substitutes has been reported to improve the outcome of burns. However, the long-term effectiveness of dermal substitutes has not been investigated objectively. The aim of this study was to evaluate long-term effectiveness of a collagen-elastin dermal substitute in acute and reconstructive burn surgery.

Methods:
From 1996 to 1998, an intraindividual comparison was carried out between a dermal substitute with a split-skin graft and a split-skin graft alone in patients with acute and reconstructive wounds. In this follow-up, scar elasticity, vascularization, pigmentation, and surface roughness were determined objectively. In addition, a subjective scar assessment was performed.

Results:
In 46 patients, 69 pairs of substituted and conventionally treated sites were measured, consisting of acute and reconstructive burn scars. In reconstructive scars, one surface roughness parameter was significantly better in substituted scars. Subjective assessment in acute and reconstructive burn scars showed several statistically significant differences in favor of substituted scars, such as pliability, relief, and the general observer score. Elasticity measurements showed higher scores for substituted scars, although the difference was not statistically significant. For the subcategory of scars treated with a largely expanded meshed skin graft, a significantly higher elasticity was found for the substituted area.

Conclusion:
In this first long-term and objective follow-up of dermal substitution, the authors found improved scar parameters in both acute and reconstructive wounds treated with the substitute, indicating a long-lasting effect on scar quality.

Reference	Bloemen MC et al., Plast Reconstr Surg, 2010, 125(5):1450-9
Links	https://pubmed.ncbi.nlm.nih.gov/20440164/

Author	Bloemen
Year	2012
Title	Clinical effectiveness of dermal substitution in burns by topical negative pressure: a multicenter randomized controlled trial
Study Type	RCT
Number of Patients	86
Abstract	Previous research has shown clinical effectiveness of dermal substitution; however, in burn wounds, only limited effect has been shown. A problem in burn wounds is the reduced take of the autograft, when the substitute and graft are applied in one procedure. Recently, application of topical negative pressure (TNP) was shown to improve graft take. The aim of this study was to investigate if application of a dermal substitute in combination with TNP improves scar quality after burns. In a four-armed multicenter randomized controlled trial, a split-skin graft with or without a dermal substitute and with or without TNP was compared in patients with deep dermal or full-thickness burns requiring skin transplantation. Graft take and rate of wound epithelialization were evaluated. Three and 12 months postoperatively, scar parameters were measured. The results of 86 patients showed that graft take and epithelialization did not reveal significant differences. Significantly fewer wounds in the TNP group showed postoperative contamination, compared to other groups. Highest elasticity was measured in scars treated with the substitute and TNP, which was significantly better compared to scars treated with the substitute alone. Concluding, this randomized controlled trial shows the effectiveness of dermal substitution combined with TNP in burns, based on extensive wound and scar measurements.
Reference	Bloemen MC et al., Wound Repair Regen. 2012;20(6):797-805.
Links	https://pubmed.ncbi.nlm.nih.gov/23110478/

Author	Cervelli
Year	2011
Title	The use of MatriDerm® and skin grafting in post-traumatic wounds
Study Type	Prospective controlled study
Number of Patients	60

Abstract

The aim of this study was to prove the effectiveness of MatriDerm(®) combined with skin grafting versus skin grafting alone in post-traumatic wounds treatment. At the Department of Plastic and Reconstructive Surgery of the University of Rome Tor Vergata, we treated 60 patients: 30 patients with dermal substitutes (MatriDerm®) combined with autologous skin graft and 30 with skin graft alone. Two weeks after the first treatment, 95% of wounds treated with MatriDerm(®) and skin graft showed a re-epithelisation, whereas it was 75-80% in the control group. We used the Manchester Scar Scale (MSS) and patient's self-estimation scale to assess the outcomes. Mann-Whitney U test was performed for the five items of the MSS and the results were combined to those of patient's self-estimation scale and the re-epithelialisation percentage to test the significance between the two groups. These data confirm the evidence of the clinical use of MatriDerm(®) technology in the healing of soft tissue wounds and prove the effectiveness of combining MatriDerm(®) and skin grafting for the first time. Furthermore, we observed a percentage reduction of wound contraction and in the same time an improvement of elasticity, quality of scars tissue and dermal architecture.

Reference	Cervelli V et al., Int Wound J. 2011;8(4):400-5.
Links	https://pubmed.ncbi.nlm.nih.gov/21564554/

Author	De Vries
Year	1994
Title	Dermal regeneration in native non-cross-linked collagen sponges with different extracellular matrix molecules
Study Type	Animal study
Number of Patients	-
Abstract	Collagenous dermal templates can prevent scarring and wound contraction in the healing of full-thickness defects. In a porcine wound model, full-thickness wounds were substituted by reconstituted and native collagen sponges in combination with autologous split-skin mesh grafts and covered with a semipermeable wound membrane. Native collagen sponges were also linked with either hyaluronic acid, elastin, or fibronectin. Reconstituted collagen matrixes, composed of cross-linked small collagen fibrils, disintegrated within a week and did not contribute to dermal regeneration, whereas native collagen matrixes, composed of intact collagen fibers, disintegrated within 2 weeks and did contribute to dermal regeneration. Addition of extracellular matrix proteins retarded the disintegration to 4 weeks. However, fibronectin-treated matrixes caused aberrant epithelization. When hyaluronic acid was added, matrixes were invaded by more fibroblasts and myofibroblasts. This process correlated with fibrosis and wound contraction. In contrast, the native collagen/elastin matrix reduced the amount of fibroblasts and myofibroblasts. This latter matrix resulted in optimal dermal regeneration and little wound contraction.
Reference	De Vries H et al., Wound Repair Regen. 1994;2(1):37-47.
Links	https://pubmed.ncbi.nlm.nih.gov/17168910/

Author	De Vries
Year	1995
Title	Reduced wound contraction and scar formation in punch biopsy wounds. Native collagen dermal substitutes. A clinical study
Study Type	Prospective intra-individual study
Number of Patients	7
Abstract	In full-thickness skin wounds dermal regeneration usually fails, resulting in scar formation and wound contraction. We studied dermal regeneration by implantation of collagenous matrices in a human punch biopsy wound model. Matrices were made of native bovine collagen I fibres, and either hyaluronic acid, fibronectin, or elastin was added. Matrices were placed in 6-mm punch biopsy holes in seven patients (biopsies were used for the grafting of leg ulcers), and covered with a protective semi-permeable polyether urethane membrane. Histology, wound contraction and dermal architecture were studied. Dermal architecture was evaluated using a recently developed laser scatter technique. All collagen matrices showed a tendency to reduce wound contraction, compared with control wounds; elastin- and fibronectin-treated matrices showed significantly less contraction than control wounds. Only the addition of elastin had a clear beneficial effect on dermal architecture; collagen bundles were more randomly organized, compared with control wounds, and wounds treated with collagen matrices coated with fibronectin or hyaluronic acid, or without coating. We conclude that the punch biopsy wound model provides important information on dermal regeneration in humans. Native collagen matrices with elastin contributed to dermal regeneration and reduced wound contraction, in contrast with matrices coated with fibronectin or hyaluronic acid, or without coating. Future clinical studies of large-area, full-thickness wounds will be required to establish their clinical relevance for leg ulcer and burn treatment.
Reference	De Vries HJ et al., Br J Dermatol. 1995;132(5):690-7.
Links	https://pubmed.ncbi.nlm.nih.gov/7772472/

Author	Dill and Mörgelin
Year	2020
Title	Biological dermal templates with native collagen scaffolds provide guiding ridges for invading cells and may promote structured dermal wound healing
Study Type	In vitro
Number of Patients	-
Abstract	Dermal substitutes are of major importance in treating full thickness skin defects. They come in a variety of materials manufactured into various forms, such as films, hydrocolloids, hydrogels, sponges, membranes, and electrospun micro- and nanofibers. Bioactive dermal substitutes act in wound healing either by delivery of bioactive compounds or by being constructed from materials having endogenous activity. The healing success rate is highly determined by cellular and physiological processes at the host-biomaterial interface during crucial wound healing steps. Hence, it is important to design appropriate wound treatment strategies with the ability to work actively with tissues and cells to enhance healing. Therefore, in this study, we investigated biological dermal templates and their potential to stimulate natural cell adherence, guidance, and morphology. The most pronounced effect was observed in biomaterials with the highest content of native collagen networks. Cell attachment and proliferation were significantly enhanced on native collagen scaffolds. Cell morphology was more asymmetrical on such scaffolds, resembling native in vivo structures. Importantly, considerably lower expression of myofibroblast phenotype was observed on native collagen scaffolds. Our data suggest that this treatment strategy might be beneficial for the wound environment, with the potential to promote improved tissue regeneration and reduce abnormal scar formation.
Reference	Dill, V. and Mörgelin, M. Int Wound J 2020;17(3):618-630.
Links	https://pubmed.ncbi.nlm.nih.gov/32045112/

Author	Haslik
Year	2010
Title	Management of full-thickness skin defects in the hand and wrist region: first long-term experiences with the dermal matrix MatriDerm®.
Study Type	Case Study
Number of Patients	17
Abstract	The gold standard for the coverage of full-thickness skin defects is autologous skin grafts. However, poor skin quality and scar contracture are well-known problems in functional, highly strained regions. The use of dermal substitutes is an appropriate way to minimise scar contraction and, thereby, to optimise the quality of the reconstructed skin. The aim of this study was to evaluate the impact of the collagen-elastin matrix, MatriDerm, for the single-step reconstruction of joint-associated defects of the upper extremity. Seventeen patients with full-thickness skin defects of the upper extremity were treated with the dermal substitute, MatriDerm, and unmeshed skin graft in the functional critical region of the distal upper extremity in a single-step procedure. The take rate of the matrix-and-skin graft was 96 %. Long-term follow-up revealed an overall Vancouver scar scale of 1.7. No limitation concerning hand function was observed; DASH-score analysis revealed excellent hand function in patients with burn injury and patients with a defect due to the harvest of a radial forearm flap achieved satisfying hand function. This matrix represents a viable alternative to other types of defect coverage and should therefore be considered in the treatment of skin injuries, especially in very delicate regions such as the joint regions. The possibility of performing a one-stage procedure is supposed to be a major advantage in comparison to a two-stage procedure.
Reference	Haslik W et al., J. Plast Reconstr Aesthet Surg. 2010;63(2):360-4.
Links	https://pubmed.ncbi.nlm.nih.gov/19042169/

Author	Hop
Year	2013
Title	Cost study of dermal substitutes and topical negative pressure in the surgical treatment of burns.
Study Type	RCT
Number of Patients	86

Abstract

Background:
A recently performed randomised controlled trial investigated the clinical effectiveness of dermal substitutes (DS) and split skin grafts (SSG) in combination with topical negative pressure (TNP) in the surgical treatment of burn wounds. In the current study, medical and non-medical costs were investigated, to comprehensively assess the benefits of this new treatment.

Methods:
The primary outcome was mean total costs of the four treatment strategies: SSG with or without DS, and with or without TNP. Costs were studied from a societal perspective. Findings were evaluated in light of the clinical effects on scar elasticity.

Results:
Eighty-six patients were included. Twelve months post-operatively, highest elasticity was measured in scars treated with DS and TNP ($p=0.027$). The initial cost price of treatment with DS and TNP was € 2912 compared to treatment with SSG alone € 1,703 ($p<0.001$). However, mean total costs per patient did not differ significantly between groups (range € 29,097 – € 43,774).

Discussion:
Costs of the interventional treatment contributed maximal 7 % to the total costs and total costs varied widely within and between groups, but were not significantly different. Therefore, in the selection of the most optimal type of surgical intervention, cost considerations should not play an important role.

Reference	Hop M. et al., Burns 2013, 40(3):388-96
Links	https://pubmed.ncbi.nlm.nih.gov/24035577/

Author	Hur
Year	2014
Title	Contracture of skin graft in human burns: effect of artificial dermis
Study Type	Prospective Case Study
Number of Patients	40

Abstract

Background:
Skin grafts with an artificial dermis have been widely used as a part of the efforts to minimize contractures and reduce donor-site scars. We conducted a prospective randomized clinical trial to study the effect of a dermal substitute by measuring the size of the graft after surgery for months.

Method:
The artificial dermis (MatriDerm, Dr. Suwelack Skin and Health Care AG, Billerbeck, Germany) was applied in combination with a split-thickness autograft in 40 patients with acute burn wounds or scar reconstruction. Demographic and medical data were collected on each patient. We directly measured the graft size by using a transparent two-ply film (Visitrak Grid, Smith & Nephew Wound Management, Inc, Largo, FL, USA) intraoperatively and 1, 2, 3, and 6 months postoperatively. For effective data comparison, the size of the graft at the time of surgery was taken to be "100%." Then, the size in each phase was estimated in percentage (%).

Result:
This study examined the progress of skin grafts through the measurement of graft size in the human body. The grafted skin underwent contracture and remodeling for 3-6 months. In terms of skin contraction, an acute burn was more serious than scar reconstruction. The use of an artificial dermis that contains elastin is very effective from the functional and esthetic perspective by minimizing contractures and enhancing skin elasticity.

Reference	Hur GY, Seo DK, Lee JW. Burns. 2014;40(8):1497-503.
Links	https://pubmed.ncbi.nlm.nih.gov/25270084/

Author	Jeon
Year	2013
Title	Treatment of diabetic foot ulcer using MatriDerm® in comparison with a skin graft
Study Type	Prospective controlled
Number of Patients	60 (30/30)

Abstract

Background:
For patients with neuropathy, vasculopathy, and impairment of wound healing, treatment of a diabetic foot ulcer poses many challenges. A large number of dermal analogues have been invented in an effort to overcome these challenges. MatriDerm, a dermal analogue, is made from bovine collagen and elastin. This study was conducted in order to evaluate the effectiveness of MatriDerm for treatment of diabetic foot ulcers, in comparison with skin grafting.

Methods:
Sixty patients with diabetic foot ulcer were included in this prospective study. The average age of the patients, who had type II diabetes mellitus, was 58 years old. The patients were allocated to an experimental or control group with their consents. The patients were selected with their consent for inclusion in an experimental group and a control group. Patients in the experimental group received a MatriDerm appliance and a split-thickness skin graft, while those in the control group received only a split-thickness skin graft.

Results:
A shorter hospitalization period (7.52 weeks) was observed in the experimental group than in the control group (9.22 weeks), and a shorter period of time (8.61 weeks) was required for complete healing, compared with the control group (12.94 weeks), with statistical significance ($P<0.05$). A higher elasticity ratio of the affected side to the non-affected side was observed in the experimental group, compared with the control group ($P<0.01$).

Conclusions:
MatriDerm enables effective healing and improves elasticity in treatment of patients with diabetic foot ulcer.

Reference	Jeon H. et al., ArchPlast Surg 2013, 40(4):403-8
Links	https://pubmed.ncbi.nlm.nih.gov/23898439/

Author	Killat
Year	2013
Title	Cultivation of keratinocytes and fibroblasts in a three-dimensional bovine collagen-elastin matrix (MatriDerm®) and application for full thickness wound coverage in vivo
Study Type	In vitro/ animal study
Number of Patients	-
Abstract	New skin substitutes for burn medicine or reconstructive surgery pose an important issue in plastic surgery. MatriDerm® is a clinically approved three-dimensional bovine collagen-elastin matrix which is already used as a dermal substitute of full thickness burn wounds. The drawback of an avital matrix is the limited integration in full thickness skin defects, depending on the defect size. To further optimize this process, MatriDerm® has also been studied as a matrix for tissue engineering of skin albeit long-term cultivation of the matrix with cells has been difficult. Cells have generally been seeded onto the matrix with high cell loss and minimal time-consuming migration. Here we developed a cell seeded skin equivalent after microtransfer of cells directly into the matrix. First, cells were cultured, and microinjected into MatriDerm®. Then, cell viability in the matrix was determined by histology in vitro. As a next step, the skin substitute was applied in vivo into a full thickness rodent wound model. The wound coverage and healing was observed over a period of two weeks followed by histological examination assessing cell viability, proliferation and integration into the host. Viable and proliferating cells could be found throughout the entire matrix. The presented skin substitute resembles healthy skin in morphology and integrity. Based on this study, future investigations are planned to examine behaviour of epidermal stem cells injected into a collagen-elastin matrix under the aspects of establishment of stem cell niches and differentiation.
Reference	Killat J et al., Int J Mol Sci. 2013 Jul 11;14(7):14460-74.
Links	https://pubmed.ncbi.nlm.nih.gov/23852021/

Author	Pauchot
Year	2013
Title	Dermal equivalents in oncology: benefit of one-stage procedure
Study Type	Retro-spective Case Study
Number of Patients	23

Abstract

Background:
In oncology, dermal equivalent may be indicated to cover losses of substance related to skin tumors or after the removal of skin flaps.

Objective:
To report our experience of two dermal equivalents, MatriDerm 1mm with a one-stage graft (DE1) and Integra DL with a two-stage graft (DE2) in oncology.

Patients and method:
Retrospective, single-center study involving 16 patients.

Results:
Sixteen patients received dermal equivalents as an alternative to flaps (7 cases), over tendinous areas (7 cases), and for cosmetic purposes (2 cases). Twelve patients received DE1 and four DE2. Wound healing times with DE1 were 4 weeks less than those with DE2. Three cases of infection were noted with DE2. The use of dermal equivalents as an alternative to skin flaps was effective, and no adhesions were found over the tendinous areas.

Conclusion:
The learning curve, the two-stage graft required with DE2, and not using a vacuum-assisted closure system can explain the high infection rate. The use of dermal equivalents is particularly indicated in the treatment of skin defect in oncology. The possibility of a one-stage graft with DE1 and combination with negative pressure therapy is beneficial.

Reference	Pauchot J et al., Dermatol Surg. 2013;39(1 Pt 1):43-50.
Links	https://pubmed.ncbi.nlm.nih.gov/23190429/

Author	Ryssel
Year	2010
Title	Dermal substitution with MatriDerm® in burns on the dorsum of the hand
Study Type	Prospective intra-individual controlled study
Number of Patients	18

Abstract

Background:
Dermal substitutes are used increasingly in deep partial and full-thickness burn wounds in order to enhance elasticity and pliability. In particular, the dorsum of the hand is an area requiring extraordinary mobility for full range of motion. The aim of this comparative study was to evaluate intra-individual outcomes among patients with full-thickness burns of the dorsum of both hands. One hand was treated with split-thickness skin grafts (STSG) alone, and the other with the dermal substitute MatriDerm® and split-thickness skin grafts.

Material and methods:
In this study 36 burn wounds of the complete dorsum of both hands in 18 patients with severe burns (age 45.1 ± 17.4 years, 43.8 ± 11.8 % TBSA) were treated with the simultaneous application of MatriDerm®, a bovine based collagen I, III, V and elastin-hydrolysate based dermal substitute, and split-thickness skin grafting (STSG) in the form of sheets on one hand, and STSG in the form of sheets alone on the other hand. The study was designed as a prospective comparative study. Using both objective and subjective assessments, data were collected at one week and 6 months after surgery. The following parameters were included: After one week all wounds were assessed for autograft survival. Skin quality was measured 6 months postoperatively using the Vancouver Burn Skin Score (VBSS). Range of motion was measured by Finger-Tip-Palmar-Crease-Distance (FPD) and Finger-Nail-Table-Distance (FNTD).

Results:
Autograft survival was not altered by simultaneous application of the dermal matrix ($p>0.05$). The VBSS demonstrated a significant increase in skin quality in the group with dermal substitutes ($p=0.02$) compared to the control group with non-substituted wounds. Range of motion was significantly improved in the group treated with the dermal substitute ($p=0.04$).

Conclusion:
From our results it can be concluded that simultaneous use of MatriDerm® and STSG is safe and feasible, leading to significantly better results in respect to skin quality of the dorsum of the hand and range of motion of the fingers. Skin elasticity was significantly improved by the collagen/elastin dermal substitute in combination with sheet-autografts

Reference	Ryssel H et al., Burns. 2010;36(8):1248-53.
Links	https://pubmed.ncbi.nlm.nih.gov/20554395/

Author	Schmidt
Year	2017
Title	Collagen-Elastin and Collagen-Glycasaminoglycan Scaffolds Promote Distinct Patterns of Matrix Maturation and Axial Vascularization in Arteriovenous Loop-Based Soft Tissue Flaps
Study Type	Animal
Number of Patients	-

Abstract

Introduction:
Autologous free flaps are the criterion standard for reconstructions of complex soft tissue defects; however, they are limited by donor-site morbidities. The arteriovenous (AV) loop model enables the generation of soft tissue constructs based on acellular dermal matrices with a functional microvasculature and minimal donor site morbidity. The ideal scaffold for AV loop-based tissue engineering has not been determined.

Methods:
AV loops were placed into subcutaneous isolation chambers filled with either a collagen-elastin scaffold or a collagen-glycosaminoglycan scaffold in the thighs of rats. Matrix elasticity, neoangiogenesis, cell migration, and proliferation were compared after 14 and 28 days.

Results:
Mean vessel count and area had increased in both matrices at 28 compared with 14 days. Collagen-elastin matrices showed a higher mean vessel count and area compared with collagen-glycosaminoglycan matrices at 14 days. At 28 days, a more homogeneous vascular network and higher cell counts were observed in collagen-elastin matrices. Collagen-glycosaminoglycan matrices, however, exhibited less volume loss at day 28

Conclusions:
Collagen-based scaffolds are suitable for soft tissue engineering in conjunction with the AV loop technique. These scaffolds exhibit distinct patterns of angiogenesis, cell migration, and proliferation and may in the future serve as the basis of tissue-engineered free flaps as an individualized treatment concept for critical wounds.

Reference	Schmidt VJ et al., Ann Plast Surg. 2017;79(1):92-100
Links	https://pubmed.ncbi.nlm.nih.gov/28542070/

Author	Van Zuijlen
Year	2000
Title	Graft survival and effectiveness of dermal substitution in burns and reconstructive surgery in a one-stage grafting model
Study Type	Prospective intra-individual controlled study
Number of Patients	62
Abstract	Survival of the autograft and objective parameters for scar elasticity were evaluated after dermal substitution for acute burns and reconstructive surgery. The dermal substitute, which was based on bovine type I collagen and elastin-hydrolysate, was evaluated by intraindividual comparison in a clinical trial. The substitute was applied in a one-step procedure in combination with a split-thickness autograft. This treatment was compared with the conventional treatment, the split-thickness antograft. After 1 week, the percentage of autograft survival was assessed. The Cutometer SEM 474 was used to obtain objective measurements of skin elasticity parameters 3 to 4 months postoperatively. Forty-two pairs of wounds (31 patients, age 32.9 +/- 19.3 years; burned surface area, 19.8 +/- 14.5 percent) were treated because of acute burns. Reconstructive surgery was performed on 44 pairs of wounds (31 patients, age 33.9 +/- 17.5 years). Autograft survival was not altered by the substitute for reconstructive wounds, although a slight but significant reduction ($p = 0.015$) was established in the burn category for substituted compared with nonsubstituted wounds. However, the necessity for regrafting was not increased by substitution. Cutometer measurements of reconstructive wounds with a dermal substitute demonstrated a significant increase of pliability (50 percent, $p < 0.001$), elasticity (defined as immediate extension, 33 percent, $p = 0.04$), maximal extension (33 percent, $p = 0.002$), and immediate retraction (31 percent, $p = 0.01$), as compared with nonsubstituted wounds. After burn surgery, no improvement was found for the different elasticity parameters. Dermal substitution in a one-stage grafting model seems feasible with respect to graft survival. Skin elasticity was considerably improved by the collagen/elastin dermal substitute after reconstructive surgery.
Reference	van Zuijlen PP et al., Plast Reconstr Surg. 2000;106(3):615-23.
Links	https://pubmed.ncbi.nlm.nih.gov/10987468/

Author	Watfa
Year	2017
Title	MatriDerm Decreases Donor Site Morbidity After Radial Forearm Free Flap Harvest in Transgender Surgery
Study Type	Retro-spective controlled
Number of Patients	37 (29/8)

Abstract

Background:
Phalloplasty with the radial forearm free flap is associated with a large donor site defect.

Aim:
To compare two methods of donor site closure for functional and cosmetic long-term results: full-thickness skin grafting vs split-thickness skin grafting with MatriDerm.

Methods:
Thirty-seven transgender patients had a neophallus created from a radial forearm free flap, and all were operated on by the same senior surgeon. Eight patients had their donor site defect closed by total skin grafting and 29 patients, operated on after 2009, received a split-thickness skin graft with MatriDerm closure. All 37 patients were evaluated by questionnaire and by careful clinical examination. Pressure perception was assessed with the Semmes-Weinstein monofilament test. Sensory recovery, skin quality, and cosmetic result also were compared. The contralateral arm was used as the control.

Outcomes:
Pressure perception values showed better sensory return in the MatriDerm group. Split-thickness skin grafting with MatriDerm achieved superior results in skin sensibility, superficial radial nerve recovery, and cosmetic aspect.

Results:
Our findings support the hypothesis that MatriDerm can be used to preserve sensory function and decrease morbidity of the donor site.

Clinical implications:
The use of a dermal substitute decreases the morbidity of the forearm free flap donor site.

Strengths and limitations:
The strength of this study is its retrospective nature conducted of a prospectively maintained database of 37 consecutive radial forearm free flaps with superimposable dimensions and location performed by the same surgeon, thus limiting biases. A limitation is its small sample (particularly for the control group).

Reference	Watfa W. et al., J Sex Med 2017, 14(10):1277-1284
Links	https://pubmed.ncbi.nlm.nih.gov/28843466/

Author	Wiedner
Year	2014
Title	Simultaneous dermal matrix and autologous split-thickness skin graft transplantation in a porcine wound model: a three-dimensional histological analysis of revascularization.
Study Type	Animal study
Number of Patients	-
Abstract	Despite the popularity of a simultaneous application of dermal matrices and split-thickness skin grafts, scarce evidence exists about the process of revascularization involved. In this study, we aimed at analyzing the progression of revascularization by high-resolution episcopic microscopy (HREM) in a porcine excisional wound model. Following the surgical procedure creating 5 x 5 cm(2) full-thickness defects on the back, one area was covered with an autologous split-thickness skin graft alone (control group), the other with a collagen-elastin dermal matrix plus split-thickness skin graft (dermal matrix group). Two skin biopsies per each group and location were performed on day 5, 10, 15, and 28 postoperatively and separately processed for H&E as well as HREM. The dermal layer was thicker in the dermal matrix group vs. control on day 5 and 28. No differences were found for revascularization by conventional histology. In HREM, the dermal matrix did not appear to decelerate the revascularization process. The presence of the dermal matrix could be distinguished until day 15. By day 28, the structure of the dermal matrix could no longer be delineated and was replaced by autologous tissue. As assessed by conventional histology and confirmed by HREM, the revascularization process was comparable in both groups, notably with regard to the vertical ingrowth of sprouting vessels. The presented technique of HREM is a valuable addition for analyzing small vessel sprouting in dermal matrices in the future.
Reference	Wiedner M et al., Wound Repair Regen. 2014; 22(6):749-54.
Links	https://pubmed.ncbi.nlm.nih.gov/25358670/

MatriDerm®
Flex Dermal Matrix

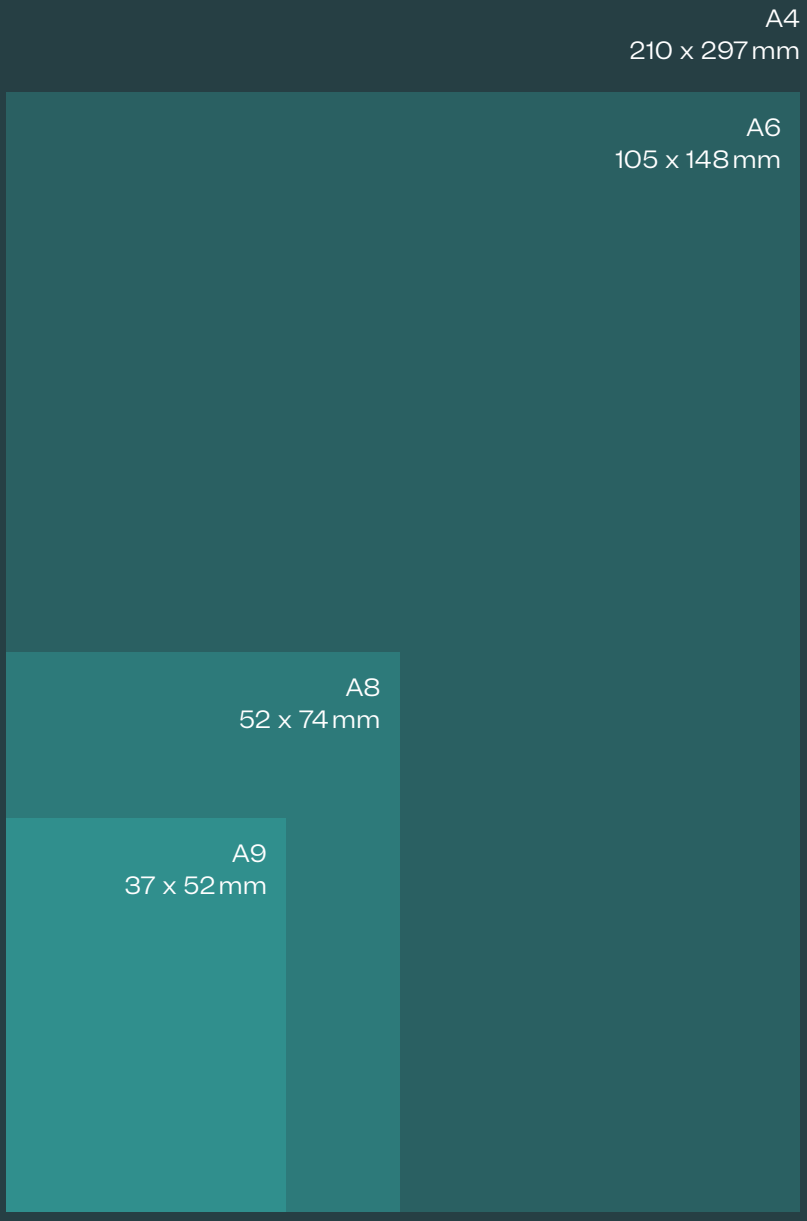
	Ref. No.	Size
A4	83440 - 200	210 x 297 x 1mm
	83460 - 200	210 x 297 x 2mm
	83470 - 200	210 x 297 x 3mm
A6	83441 - 200	105 x 148 x 1mm
	83461 - 200	105 x 148 x 2mm
	83471 - 200	105 x 148 x 3mm
A8	83442 - 200	52 x 74 x 1mm
	83462 - 200	52 x 74 x 2mm
	83472 - 200	52 x 74 x 3mm
A9	83443 - 200	37 x 52 x 1mm
	83463 - 200	37 x 52 x 2mm
	83473 - 200	37 x 52 x 3mm

MatriDerm® Fenestrated
Dermal Matrix

	Ref. No.	Size
A4	83410 - 200	210 x 297 x 1mm
	83420 - 200	210 x 297 x 2mm
	83430 - 200	210 x 297 x 3mm
A6	83411 - 200	105 x 148 x 1mm
	83421 - 200	105 x 148 x 2mm
	83431 - 200	105 x 148 x 3mm
A8	83412 - 200	52 x 74 x 1mm
	83422 - 200	52 x 74 x 2mm
	83432 - 200	52 x 74 x 3mm
A9	83413 - 200	37 x 52 x 1mm
	83423 - 200	37 x 52 x 2mm
	83433 - 200	37 x 52 x 3mm

MatriDerm® Dermal Matrix

	Ref. No.	Size
A4	83500 - 200	210 x 297 x 1mm
	83400 - 200	210 x 297 x 2mm
A6	83403 - 200	105 x 148 x 1mm
	83401 - 200	105 x 148 x 2mm
A8	83404 - 200	52 x 74 x 1mm
A9	83405 - 200	37 x 52 x 1mm



Please check complete indications and recommended application in your local Instructions for Use (IFU) before using MatriDerm®.

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