MatriDerm Literature – Top List

Randomized Control Trials

Ryssel H, Gazyakan E, Germann G, Ohlbauer M.
The use of MatriDerm in early excision and simultaneous autologous skin grafting in burns--a pilot study
Burns. 2008 Feb; 34(1):93-7. Epub 2007 Jul 17
http://www.ncbi.nlm.nih.gov/pubmed/17644263

Abstract:

The application of dermal substitutes in deep partial and full-thickness burn wounds in a two-stage procedure prior to skin grafting has become increasingly popular. Synchronous application of dermal substitutes and skin graft has not yet been established as a standard procedure. In a consecutive study 20 wounds in 10 patients with severe burns (age 49.5+/-16.2 years; TBSA 45.6+/-14.5%) were treated with either simultaneous transplantation of Matriderm, a bovine based collagen I, III, V and elastin hydrolysate based dermal substitute and split-thickness skin grafting (STSG), or STSG alone after appropriate excision of the burn wound. The study was designed as a prospective intra-individual comparative study. After 1 week all wounds were assessed for the percentage of autograft survival. Autograft survival was not altered by simultaneous application of a dermal matrix (p=0.015). Skin elasticity was measured after 3-4 months with the Vancouver Burn Skin Score (VBSS). The VBSS demonstrated a significant increase of elasticity in the group with dermal substitutes (p=0.04) as compared with non-substituted wounds for sheet autograft, but not for meshed autograft (p=0.24). From this pilot study it can be concluded that simultaneous application of a dermal matrix is safe and feasible, yielding significantly better results with respect to skin elasticity. Skin elasticity was considerably improved by the collagen/elastin dermal substitute Matriderm in combination with sheet autograft.

Hop MJ, Bloemen MC, van Baar ME, Nieuwenhuis MK, van Zuijlen PP, Polinder S, Middelkoop E; TOPSKIN Study Group.
Cost study of dermal substitutes and topical negative pressure in the surgical treatment of burns
Burns. 2013 Sep 12. pii: S0305-4179(13)00264-7. doi: 10.1016/j.burns.2013.08.025.
http://www.ncbi.nlm.nih.gov/pubmed/?term=Cost+study+of+dermal+substitutes+and+topical+negative+pressure+in+the+surgical+treatment+of+burns

Abstract:

BACKGROUND: A recently performed randomized 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 €1703 (p<0.001). However, mean total costs per patient did not differ significantly between groups (range €29097-€43774).**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.

Prospective controlled

Jeon H, Kim J, Yeo H, Jeong H, Son D, Han K.
Treatment of diabetic foot ulcer using matriderm in comparison with a skin graft.
Arch Plast Surg. 2013 Jul; 40(4):403-8. doi: 10.5999/aps.2013.40.4.403. Epub 2013 Jul 17.
http://www.ncbi.nlm.nih.gov/pubmed/?term=Treatment+of+diabetic+foot+ulcer+using+matriderm+in+comparison+with+a+skin+graft
(free access to complete article)

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.

Bloemen MC, van Leeuwen MC, van Vucht NE, van Zuijlen PP, Middelkoop E.
Dermal substitution in acute burns and reconstructive surgery: a 12-year follow-up.
Plast Reconstr Surg. 2010 May; 125(5):1450-9. doi: 10.1097/PRS.0b013e3181d62b08.
http://www.ncbi.nlm.nih.gov/pubmed/20440164

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.

Cervelli V, Brinci L, Spallone D, Tati E, Palla L, Lucarini L, De Angelis B.
The use of MatriDerm® and skin grafting in post-traumatic wounds.
Int Wound J. 2011 Aug; 8(4):400-5. doi: 10.1111/j.1742-481X.2011.00806.x. Epub 2011 May 12.
http://www.ncbi.nlm.nih.gov/pubmed/21564554

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.

Ryssel H, Germann G, Kloeters O, Gazyakan E, Radu CA.
Dermal substitution with Matriderm(®) in burns on the dorsum of the hand
Burns. 2010 Dec; 36(8):1248-53. doi: 10.1016/j.burns.2010.05.003. Epub 2010 Jun 15.
http://www.ncbi.nlm.nih.gov/pubmed/?term=Dermal+substitution+with+Matriderm(%C2%AE)+in+burns+on+the+dorsum+of+the+hand

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.

Prospective intra-individual controlled study

van Zuijlen PP, van Trier AJ, Vloemans JF, Groenevelt F, Kreis RW, Middelkoop E.
Graft survival and effectiveness of dermal substitution in burns and reconstructive surgery in a one-stage grafting model.
Plast Reconstr Surg. 2000 Sep; 106(3):615-23.
http://www.ncbi.nlm.nih.gov/pubmed/?term=Graft+survival+and+effectiveness+of+dermal+substitution+in+burns+and+reconstructive+surgery+in+a+one-stage+grafting+model

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.

Prospective, intra-individual study

De Vries HJ1, Zeegelaar JE, Middelkoop E, Gijsbers G, Van Marle J, Wildevuur CH, Westerhof W.
Reduced wound contraction and scar formation in punch biopsy wounds. Native collagen dermal substitutes. A clinical study.
Br J Dermatol. 1995 May; 132(5):690-7
http://www.ncbi.nlm.nih.gov/pubmed/?term=Reduced+wound+contraction+and+scra+formation+in+punch+biopsy+wounds.+Native+collagen+dermal+substitutes

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.

Case series

Haslik W, Kamolz LP, Manna F, Hladik M, Rath T, Frey M
Management of full-thickness skin defects in the hand and wrist region: first long-term experiences with the dermal matrix Matriderm.
J Plast Reconstr Aesthet Surg. 2010 Feb; 63(2):360-4. doi: 10.1016/j.bjps.2008.09.026. Epub 2008 Nov 30.
http://www.ncbi.nlm.nih.gov/pubmed/19042169

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 minimize scar contraction and, thereby, to optimize 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.

Lamy J, Gourari A, Atlan M, Zakine G.
Use of Matriderm® 1mm in reconstructive surgery. Series of 31 cases.
Ann Chir Plast Esthet. 2013 Jun; 58(3):235-42. doi: 10.1016/j.anplas.2013.01.001. Epub 2013 Feb 11.
http://www.ncbi.nlm.nih.gov/pubmed/23410720 [French]
(English translation available)

Abstract:

INTRODUCTION: Dermal substitute are used for soft-tissue defect for their functional and aesthetic advantages. Matriderm® 1mm, single layer dermal matrix, composed of collagen and elastin covered by a split thickness skin graft simultaneously to its application, has been used most often in burned surgery. This prospective series evaluates the interest of this recent dermal matrix in reconstructive surgery. **PATIENTS AND METHOD**: Twenty-eight patients have been treated with the substitute in our department for reconstructive surgery indication between November 2008 and May 2012. Indications were tissue losses treatment after limb or trunk sarcoma resection, melanoma, extended baso- or spinocellular carcinoma, palmoplantar keratodermy, burn sequels, or traumatic tissue losses. Indications were preferentially deep tissue losses, functional areas and the face. **RESULTS**: Mean treated area has been 82.4 cm(2) (10 to 600 cm(2)). Mean taken rate has been 87±19% of the area and mean day of discharge has been 4.8 days and the mean cost per patient 906.5 euros. Negative wound therapy, until D3, was used 6 times. Three patients treated for limb sarcoma had radiotherapy performed on the grafted area. Aesthetic and functional results have been encouraging. **CONCLUSIONS**: Matriderm® 1mm, dermal substitute commonly used in acute burn treatment can be indicated in reconstructive surgery. This series show that it permits to obtain a good graft taken rate, a quick healing with a satisfying aesthetic and functional results and permit an early discharge. However, its indications are limited by its cost.