

[EP149] AN AUTOMATED AND MINIMALLY INVASIVE TOOL FOR GENERATING AUTOLOGOUS, VIABLE, AND PROLIFERATIVE EPIDERMAL MICROGRAFTS

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E-poster session: Devices & Intervention

Aim: Skin grafts are often performed to treat chronic wounds including venous leg, diabetic foot, and pressure ulcers. Although traditional skin grafting has been successful for many years, it is often associated with donor site damage, and necessitates a surgical suite. In this IRB-approved study, an epidermal harvesting tool* was used to create epidermal grafts from 12 healthy human subjects. Epidermal grafts were assessed for uniform viability and formation at the dermal/epidermal (DE) junction.

Method: An automated epidermal harvesting tool* that applies both heat and suction concurrently to normal skin was used to generate epidermal grafts in an outpatient setting. Epidermal grafts were assessed for viability and growth factor secretion using standard cell viability and immunoassays. Formation at the DE junction was assessed using immunohistochemistry.

Results / Discussion: Results showed that epidermal grafts formed at the DE junction and contained viable basal epidermal cells capable of outgrowth and growth factor secretion. The average viability of epidermal grafts was 99.5% overall. In addition, 100% of all assessed subjects demonstrated uniform graft viability, showing that the automated epidermal grafting tool* was precise and reproducible in generating viable epidermal grafts. Donor site dermal scores and pain were also assessed, and skin assessment results showed that 76-100% of donor sites were the same in appearance to the surrounding skin by 14 days after epidermal harvest with a mean pain of 1.3 (scale of 1-5) throughout the harvesting process.

Conclusion: These results showed that all subjects experienced minimal discomfort during the epidermal harvesting process in an outpatient setting using this novel automated epidermal harvesting technique.

*CelluTome™ Epidermal Harvesting System (KCI, an Acelity Company, San Antonio, TX)

[EP150] THE USE OF A NOVEL EPIDERMAL GRAFT DEVICE TO OPTIMISE OUTPATIENT WOUND MANAGEMENT

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E-poster session: Devices & Intervention

Aim: Current wound management with the use of split thickness skin graft often requires hospital admission, a period of immobility for some, attentive donor site wound care and pain management. This study evaluates the feasibility of using a novel epidermal graft-harvesting device, which allows pain-free epidermal skin grafting in the outpatient setting.

Method: A prospective analysis of 10 patients was performed, 5 acute and 5 chronic wounds. All patients underwent epidermal grafting in the outpatient clinic. The device harvests epidermal micro grafts through the formation of suction blisters without the use of anaesthesia. Combining negative pressure (200mmHg) and heat (40°C), it produces a uniform arrangement of epidermal grafts within 30 minutes, which are then transferred on a dressing to the wound bed.

Results / Discussion: Completely healed wounds were noted in 4 patients, while more than 50% reduction in wound size was seen in another 4 patients. There were only 2 failed grafts due to underlying medical comorbidities and an infected bed prior to application, which destroyed the graft. The donor sites healed within 5 days in all patients. Our patients reported none or very minimal pain, were mobilising immediately after the procedure and returned home the same day with a lightweight, simple dressing.

Conclusion: This automated device offers a novel method in autologous skin harvesting resulting in minimal pain and a scar free donor site. Complete wound coverage is achieved, while maintaining patient independence. It has the potential to save NHS resources by eliminating the need for theatre space and a hospital bed, while at the same time benefiting patient care.

[EP151] DOCUMENTING WOUND MANAGEMENT

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E-poster session: Devices & Intervention

Aim: This study on documenting wound management was conducted on five wards, 126 beds, in Lohja health care center. In the study the TIME-procedure was used consisting of tissue treatment, inflammation management, moisture balance and growth of wound edge. The aim of the study was to enhance the documenting practices in wound care as well as describe documentation using the TIME-procedure before and after the ward meeting interventions.

Method: The study comprises of two phases. In the first phase 130 patient documents were perused retrospectively during 3.2.-30.3.2014. Before the second phase a ward meeting was held on the documentation concentrating on the TIME-procedure. In the second phase 105 patient documents were perused during 12.5-6.7.2014. The study includes the documentations of 141 wounds.

Results / Discussion: In the first phase: Change of skin integrity 83, acute wound 21 and chronic wound 26 notes. Phase two: Change of skin integrity 55, acute wound 23 and chronic wound 27 notes.

The instants of documentation increased on all areas of the TIME procedure in the second phase compared to the first phase. The relative increase in the notes on cleansing the wound was 48%, on the secretion 42%, on the increase of secretion 86%, on the state of wound surround 47% and on the wound size 76%. The usage of dressing product based on honey, silver and carbon increased by 43%.

Conclusion: The ward meetings had a positive influence. From the mere listing of the care actions there was a clear transition towards documenting items like amount of secretion in the dressing, the relative amount of cover and size of wound. Further training is required to unify the documenting practices.

[EP152] A PILOT STUDY OF PATIENTS WITH DIABETIC FOOT ULCERS TREATED WITH TOPICAL OXYGEN THERAPY

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E-poster session: Devices & Intervention

Aim: The cost of diabetic foot ulceration is £600M/year. Healing wounds require large amounts of energy for cell division, angiogenesis, fighting infection and collagen production. Glucose is converted into energy 18 times more efficiently in the presence of oxygen. Many wounds have a degree of hypoxia.

The aim of this phase 1 study was to use an ambulatory oxygen delivery device*, to deliver continuous moist oxygen directly to 10 chronic diabetic wound foot wounds and assess improvement in healing.

Method: 10 patients were recruited from 2 specialists, hospital diabetic foot practices in the UK. They had a full diabetes/arterial assessment. Weekly review was undertaken, and data collected on device satisfaction and pain. Standardized digital images were collected. The images were measured by a clinician blinded to the nature of the study.

Results / Discussion: Median duration of ulceration was 25 weeks (mean 43) prior to treatment. Pain decreased by 24%. Device satisfaction was 9.9/10. By week 8 the median ulcer size decreased by 53% (mean 51%). Seven of the 10 ulcers were on a healing trajectory. One ulcer that had been present for 56 weeks healed completely, a 2-year old ulcer reduced by >50% and a third that had been present for 88 weeks was down to 10% at the end of the 8 week study.

Conclusion: The ambulatory oxygen delivery device had a significant beneficial effect on wound size. The device is completely ambulatory and is worn 24/7. It is safe and straight forward to apply.

*NATROX Oxygen Wound Therapy

Reference: Inotec AMD Ltd Cambridge

[EP153] TREATMENT OF CHRONIC VENOUS ULCERS WITH PHOTODYNAMIC THERAPY: PRELIMINARY IMMUNOHISTOLOGICAL FINDINGS

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E-poster session: Devices & Intervention

Aim: We studied the effects of Photodynamic Therapy (PDT) in treatment of chronic ulcers, clinically and immunohistologically.

Method: 22 patients with chronic venous ulcers were treated with PDT, and biopsies performed before and after treatment.

Results / Discussion: After PDT (median 4.5 sessions), a constant – although quantitatively variable - decrease of ulcers' size and depth, and of the wound bed's fibrin layer's thickness, with formation of granulation tissue and reactivation of the wound borders, was seen. In parallel, a variable decrease in secretion and perilesional hyperemia was found, and the cultures showed an overall reduction in bacteria load.

Immunohistologically, cellular infiltrate, thickness of epidermis, vascularization, mast cell and fibroblast numbers, were increased in chronic wounds. Early after completion of PDT, fibroblasts appeared further increased. Mast cells, closely clustered with fibroblasts, also showed an increase in their numbers, degranulation index and expression of basic fibroblast growth factor (bFGF). In addition, the density of dendritic cells (antigen presenting cells) was overall reduced after PDT.

Conclusion: Our preliminary findings suggest a primary role of fibroblasts in the wound healing process upon PDT treatment, given their early and intense reaction to injury. Mast cells seem to play an accessory yet important role, for number and degranulation index variations and for expression of bFGF. In addition, the clustering of mast cells with fibroblasts around blood vessels suggest that these cells may stimulate angiogenesis and fibroblasts to secrete extracellular matrix during PDT therapy. The observed down regulating effect of PDT on dendritic cells' density leads to hypothesize a decrease of inflammation.

[EP154] HAIR FOLLICLE TRANSPLANTATION AS A NOVEL APPROACH TO HEALING CHRONIC WOUNDS IN THE PORCINE MODEL

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E-poster session: Devices & Intervention

Aim: Chronic wounds have been demonstrated to lack functional dermis by which to protect and regenerate epidermis. Stem cells in the hair follicle bulge region are a potential source of new functional dermis to the chronic wound bed while affecting only a limited area of the donor site. The goal of this translational study is to regenerate full thickness dermis in a porcine chronic wound model by autologous transplant of stem cells in hair follicle bulge regions.

Method: A diabetic state was induced in four pigs with 150mg/kg streptozotocin. Four dorsal wounds were then created on each pig. Wounds were maintained with hydrogel for a period of 7 days at which point wounds on each pig received either low density hair follicle transplant, high density hair follicle transplant, sham, or full thickness skin graft (FSTG). Wounds were maintained for an additional 7 days before biopsied for histological analysis.

Results / Discussion: Both low density and high density showed histological evidence of dermal regeneration, namely density, depth, and adnexal structures that were comparable to the FSTG group but not seen in the sham group. The high density hair follicle group had additional evidence of capillary ingrowth and connective tissue formation comparable to the FSTG group. Inflammatory cells were present in all wounds.

Conclusion: Hair follicle transplantation in a diabetic porcine wound model results in dermal regeneration comparable to FSTG. These results serve as a proof of concept and framework for further studies on hair follicle transplantation as a tool to heal chronic wounds.

[EP155] EVALUATION OF THE KLOX BIOPHOTONIC THERAPY SYSTEM ON GRADE II-III PRESSURE SORES

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E-poster session: Devices & Intervention

Introduction and Aims: The development of a chronic wound impacts patients at multiple levels. The wound affects the physical, mental and psycho-social state of the patient. The recalcitrant wound is one in which current treatment modalities rarely if ever lead to a favourable wound outcome. The cause is frequently multifactorial involving systemic patient factors (catabolic state, systemic infection, malnutrition), local wound factors (local wound infection, contamination and necrosis) and external factors (pressure, humidity etc...).

The goal in treating the chronic wound is wound closure or at least change in wound status from an unresponsive one to a responding one. The rate of wound closure in chronic wounds varies, and has been reported to range between 10 and 35% in this complex patient population.

The purpose of the present study was to evaluate outcomes following treatment with the KLOX BioPhotonic therapy program in 15 non-healing, chronic pressure sores.

Method: Fifteen wounds present for over three months located in the sacral, ischial, trochanteric, as well as heel regions were treated bi-weekly for up to 32 weeks with the KLOX BioPhotonic therapy. Evaluation of the wounds included biopsies, measurements, photography and general indicators of patient wellness including serial blood tests and clinical examinations.

Results / Discussion: A closure rate of approximately 70% was achieved. The average number of treatments was 32 (16 weeks). Furthermore, the closure rate would have been greater given their wound closure progression at time of discharge had several patients not been transferred to distant hospital sites where the treatment was not available.

Conclusion: Treatment of major chronic wounds with the KLOX BioPhotonic therapy demonstrated a remarkable high rate of complete wound closure. A prospective, randomized, controlled multicentre clinical trial is warranted.

[EP156] THE PRECAUTIONARY MEASURES OF POOR WOUND HEALING AFTER THE REMOVAL OF ABDOMINAL CAVITY DRAINAGE TUBE

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E-poster session: Devices & Intervention

Objective: To explore the application effect of the predictable intervention plan in the clinical nursing about poor wound healing after abdominal cavity drainage tube removal.

Methods:

1. Against its risk factors to establish the predictable intervention plan in the poor wound healing after abdominal cavity drainage tube removal. Through expert group discussion to determine the intervention plan.
2. Totally 100 patients with drainage tube in abdominal cavity investigated in June 2014 to September. The research object were divided into control group and intervention group according to the order in the study.
3. The control group patients routine nursing: Regular health education, to patients with oral introduce relevant matters needing attention; Use gauze bandage as dressing; When told the patient to relax after extubation be crushed; When the patients out of the hospital, regular hospital health education, told patients to periodic review of follow-up.
4. Intervention group nursing measures. For given health education handbook and one-to-one and individualized instruction; change medicine with absorbability self-adhesive dressing ; Pull out the tube before except after extracting drainage fluid with a syringe. The Patients discharged from hospital in addition to the regular hospital health education, follow up is to wound healing.
5. To evaluate the defective rate, degree and the healing time of the wound after pull out urinous catheter between the grounds.

Results It is no significant difference that the failure rate of the wound healing after extubation between two groups of patients. But it is significant difference that the healing time of the control group were slower than the Intervention group.

Conclusion Predictive nursing intervention program can shorten the wound healing time after extubation.

[EP157] MICROWAVE-BASED IN VIVO MEASUREMENT OF WOUND-RELATED EDEMA

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E-poster session: Devices & Intervention

Aim: There has been a lack of easily applicable tissue water-specific techniques for local or loco-regional assessment of wound-related edema since MR imaging is expensive and not a readily available technique for widespread use. A multiprobe edema meter* and a hand-held integrated-probe edema meter* were developed for the quick, easy and sensitive measurement of localized edema at any site of the body.

Method: The concept of the edema meters applies microwaves at 300 MHz and their interaction with tissue water molecules. High frequency microwaves are needed to have equal access to tissue free and bound water components. Water molecules are rotating in the microwave field but not large tissue macromolecules. Tissue water thus absorbs energy from the microwave field enabling calculation of the so-called tissue dielectric constant (TDC). The TDC parameter is directly proportional to local tissue water content. The TDC parameter can also be converted into percentage of tissue water to be more understandable for the users.

Results / Discussion: Edema meters were validated in clinical conditions and calibrated against samples with known water content. The devices have differentiated partial thickness and deep burns in experimental and human burns already at 8 h after injury, detected early increase (up to 120%) of tissue water in lymphedema, found increase of tissue water in diabetes mellitus and assisted edema assessment after lymphatic microsurgery and angiologic interventions.

Conclusion: Detection, degree and follow-up of wound-related edema may be assessed by quick edema meter measurements on skin surface.

*MoistureMeterD and MoistureMeterD Compact

[EP158] USE OF NEGATIVE PRESSURE WOUND THERAPY WITH A PORTABLE DEVICE ON MANAGING SURGICAL AND TRAUMATIC WOUNDS

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E-poster session: Devices & Intervention

USE OF NEGATIVE PRESSURE WOUND THERAPY WITH A PORTABLE DEVICE ON MANAGING SURGICAL AND TRAUMATIC WOUNDS

Aim: The aim of this study is to evaluate the benefits of the use of Negative Pressure Wound Therapy with a portable device* in the management of different types of wounds compared with the conventional system; to measure the duration, time of stay in the hospital and comfort of the treatment by using this therapy.

Method: It is a retrospective, descriptive, analytic and non-comparative study, in which we analysed the information of 7 patients treated with the Negative Pressure Wound Therapy applied by an electronic portable device* over a period of 9 months. There were two traumatic wounds, a burn, an insect bite, a wound dehiscence and two autografts in total.

Results / Discussion: All the patients were treated as an ambulatory patient with the change of dressings every 3 or 4 days, depending on the amount of exudate. The 7 patients presented a stable closed wound without complications, the time of treatment was from 5 to 21 days, and we used 1 to 3 devices per patient. The use of a portable device can diminish the hospital stay as well as the cost of the treatment, making the therapy more comfortable to the patient.

Conclusion: We observed more comfort for both, patient and surgeon, as well as less hospital stay during the healing process. It turns to be a quite new comfortable and easy-to-use way to apply negative pressure therapy with similar results obtained by the conventional one.

*Single Use Negative Pressure Wound Therapy System PICO™

[EP159] THE EFFECTS OF CERTAIN LOW ENERGY PULSED ELECTROMAGNETIC FIELDS ON MICROCIRCULATION IN HARD TO HEAL WOUNDS

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E-poster session: Devices & Intervention

Aim: The aim of our study is to assess whether there is a real benefit from the application of this procedure in hard-to-heal wounds.

Method: The device with non-invasive application of certain changing magnetic fields was used in order to stimulate vasomotion, especially in small-caliber arterioles in the subcutis. The therapy treatment was held twice a day during 20 minutes (always at the same time, each approximately 6 hours apart). Treatment period was from 30 to 60 days.

Results / Discussion: The success of the applied therapy was evaluated solely according to whether the wound was healed or not. Encouraging results were found in diabetic wounds. That is understandable because the clinical picture of diabetic polyneuropathy (which inhibits nociception and perception of pain) is accompanied by microcirculatory disorders. High blood glucose interferes with the ability of the nerves to transmit signals. It also weakens the small blood vessels that supply the nerves with oxygen and nutrients (complex interaction between nerves and small blood vessels). Very often small vessel dysfunction is the main reason for poor ulcer healing when palpable peripheral pulses are present.

Conclusion: Stimulation of deficient vasomotion in the microcirculatory network seems to be very important adjunct wound healing therapy, preferable in diabetic foot ulcers. This is very important because patients with diabetes and neuropathy may still be at high risk for the development of foot ulceration or the failure to have an existing ulcer heal despite adequate correction of large blood flow (J. Vasc Surg 2002; 35:501-5.).

[EP160] PHOTOTHERAPY FOR WOUND HEALING: A SYSTEMATIC REVIEW

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E-poster session: Devices & Intervention

Aim: To explore the benefit associated with phototherapy on wound healing through systematic literature review and meta-analysis and identify the optimum wound treatment regimen, in terms of light wavelength, energy density, frequency and duration.

Method: Search RCTs about phototherapy in wound care on databases as follows: CENTRAL、MEDLINE、EMBASE、AMED、CINAHL、The Chinese medical literature databases as CBM, CNKI and VIP. In addition, we searched online clinical trials register websites. Reference lists of included studies were concluded too. Languages were limited to Chinese or English, literature type were limited to publish. Outcome measures included wound healing proportion, wound healing time, wound healing rates, pain score, quality of life, length of hospital stay and adverse effects. Two evaluators have completed the data collection and analysis independently. Use Revman 5.2.5 to statistical analysis.

Results / Discussion: Through 52 eligible trials, 6 pooled analyses were carried on; Meta-analysis shows that there are significantly benefits in healing while treated wounds with GaAlAs laser, He-Ne laser, 254nm ultraviolet light and 640±10nm red light, but no evidence approved the efficacy of 904nm GaAs laser. What's more, in bias evaluation, we found that 43(82.69%) trials have unclear bias and 9 (17.31%) trials shows high risk of bias.

Conclusion: This systematic review found that GaAlAs laser, He-Ne laser, 254nm ultraviolet light and 640±10nm red light can promote wound healing, but the treatment regimen still needs clarifying. Even though meta-analysis shows some specified types of phototherapy can promote wound healing, the risk of bias should be considered.

[EP161] HIGH FREQUENCY AND LOW INTENSITY ELECTROMAGNETIC WAVES IN SKIN ULCER TREATMENT.PILOT STUDY

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E-poster session: Devices & Intervention

Aim: Chronic and acute cutaneous ulcers are a difficult problem of hospital and extra hospital management, above all if we consider chronic lesions hardly benefit from standard treatments and they may imply side effects.

Method: We have used a non-invasive medical device, based on low power and high frequency electromagnetic currents; the electromagnetic pulse is perceived as heat by the patient.

Results / Discussion: We treated 21 lesions of several etiologies that had not shown signs of improvement with conventional therapies and by using advanced interactive medications 14 lesions were healed and did not recur, 4 lesions were reduced in their size and 3 lesions enlarged.

Conclusion: In the lesions that were not healed, we saw an improvement in the bottom of the lesions with edge flattening and activation of the epithelization process.

[EP162] "PILOT STUDY: THE USE OF LYMPHOTAPING ON PERIWOUND SKIN OF LOWER LIMB CHRONIC WOUNDS FOR EVALUATION OF OEDEMA REDUCTION, PAIN CONTROL AND TRANSCUTANEOUS OXYMETRY VALUES INCREASE".

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Thursday, May 14, 2015

E-poster session: Devices & Intervention

Aim: Often, leg ulcers present periwound oedema, leading to a delay and/or total halt of the healing process.

The use of kinesiotaping in lymphology (**Lymphotaping**) is based on the assumption of using an external support to the lymphatic and circulation systems to improve their activity.

To demonstrate and document that, by applying a Lymphotaping technique on periwound skin of leg ulcer patients (Ulcertaping), the following could be achieved:

- Oedema reduction
- Increase of transcutaneous oxymetry values (main end point)
- Pain reduction
- Wound Area reduction.

Method: The study design is interventional, monocentric, open, single patient group treatment. Population: 15 patients.

The study involves the mapping of the following parameters in the 14 days of treatment with Lymphotaping and at 14 days after the conclusion of treatment:

- Transcutaneous oximetry values;
- Wound area;
- Quantity of exudate;
- Pain intensity (numeric score: NRS);
- Lower limb circumference.

Results / Discussion: A first analysis of data at 14 days from end of Lymphotaping treatment shows an increase of average values of transcutaneous oxymetry on periwound skin of +9,5 mmHg and an average reduction of wound area of -12,6%.

Conclusion: The study's preliminary results indicate that Lymphotaping applied on periwound skin of leg ulcers (ULCERTAPING) can reduce oedema with consequent increase of transcutaneous oximetry values and reduction of the wound size.

[EP163] DETERMINATION OF THE REDUCTION OF BIOFILM IN VITRO DURING WOUND CLEANSING USING A MONOFILAMENT DEBRIDER*, A CLEANSING SYSTEM WITH POLOXAMER AND CONVENTIONAL COTTON GAUZE**

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E-poster session: Devices & Intervention

Aim: Traditional methods of rapid wound debridement include sharp debridement, mechanical debridement, hydrosurgery or ultrasonic therapy. This could be amended by specific wound debridement procedures like the monofilament wound debrider* or the cleansing system containing poloxamer**. Cleansing efficacies and capacities of these products were evaluated in vitro and compared to the effects of gauze.

Method: *S.aureus* biofilm was cultivated on glass plates. Debrider*, cleansing system**, and gauze were used to wipe the plates under standardized conditions ($p=0.067\text{N/cm}^2$, $v=1.6\text{cm/s}$). Plates were then stained with crystal violet to visualize the bacteria residuals. Plate images were obtained and all images were processed using ImageJ 1.45m.

Results / Discussion: It was shown that debrider*, cleansing system**, and cotton gauze pads were able to eradicate the biofilm present on the glass plates. However, further testing of the cleansing capacities displayed significant supremacy of the debrider* compared to the cleansing system**, and gauze. Eight plates with biofilm were consecutively wiped with one sample of debrider*, cleansing system**, or gauze. The debrider* exhibited a retained removal of biofilm over the total of eight plates, while the cleansing system** and gauze quickly lost their effect.

Conclusion: Monofilament debrider* and cleansing system with poloxamer** as well as cotton gauze pads were able to eradicate the biofilm present on the glass plates. However, the debrider* demonstrated a retained removal of biofilm, while the cleansing system** and gauze quickly lost their effect. Hence, it can be concluded that wound cleansing using the debrider* is a successful and promising antibiofilm strategy.

*Debrisoft[®], Lohmann & Rauscher; **UCS[™] Debridement, Medi

[EP164] COMPARISON OF 24 HOURS FLUID HANDLING AND ABSORPTION UNDER PRESSURE BETWEEN TEN WOUND DRESSINGS WITH SILICONE ADHESIVE

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E-poster session: Devices & Intervention

Aim: The aim of this study was to compare 24h fluid handling capacity as well as absorption under pressure of a new silicone foam dressing (A) with nine other silicone foam dressings (B-J).

Method: 24h fluid handling was tested according to EN 13726-1, section 3.3. For absorption under pressure, dressing samples were weighed and placed on ceramic filter plates and pressed down to 40mm Hg. Solution A was added without direct contact with the foam. After 90min the liquid was removed and the samples weighed. Ten samples of each dressing were tested. Comparisons of means were performed using a Tukey-Kramer HSD. All tests were performed by an independent laboratory*.

Results / Discussion: A had significantly higher absorption (0.91 mg/cm²) than seven other dressings (p<0.001 vs. B,C,D,F,G,I,J). A had significantly higher permeability (0.74 mg/cm²) than eight other dressings (p<0.001 vs. C,D,E,F,G,H,J; p<0.05 vs. B). A had significantly higher total fluid handling (1.65 mg/cm²) than all other dressings (p<0.001). A had significantly higher absorption under pressure (0.87 mg/cm²) than eight other dressings (p<0.001 vs. B,C,D,E,F,G,I,J).

Conclusion: Dressing A had a statistically significant higher 24h total fluid handling in comparison with all other dressings, consistent with the performance in relation to absorption and permeability. Additionally, A had statistically significant higher absorption under pressure compared with eight other dressings.

(A)Biatain® Silicone, (B)Mepilex® Border, (C)Allevyn◇ Gentle Border, (D)AQUACEL® foam, (E)UrgoTul® Absorb Border, (F)Optifoam® Gentle, (G)KerraFoam® Gentle Border, (H)Allevyn◇ Life, (I)Askina® DresSil Border, and (J)Suprasorb® P silicone border

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[EP165] A TOPICAL HAEMOGLOBIN SPRAY FOR OXYGENATING CHRONIC VENOUS LEG ULCERS: A PILOT STUDY

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E-poster session: Devices & Intervention

Aim: This pilot study aims to investigate the effect a topical haemoglobin spray in reducing the size of chronic venous leg ulcers (VLU).

Method: Patients whose VLU wounds were non-healing after 4 weeks of standard care (decreased wound size <40%) were treated with the haemoglobin spray at each dressing change in addition to standard care for 4 weeks. The spray is designed to deliver oxygen to wounds through facilitated diffusion. Standard care comprised compression therapy and wound dressings. Wound size, number of dressing changes, wound-bed characteristics, exudate level and patient-reported pain were recorded during the treatment period.

Results / Discussion: Seventeen patients were recruited. Three were withdrawn and data from 14 patients were analysed. Seventeen wounds were assessed; the average baseline wound duration was 41 months (range 6–120). The average wound area decreased from 52.5 cm² (range 11.25–130.5) before treatment to 45.29 cm² after treatment, with an average reduction of 7.21 cm² (range 15.5–96%; median 68%). All participants showed a reduced wound area after the 4-week treatment period, with a reduction of slough and increase in granulation and epithelial tissue, and most reported reduced pain.

Conclusion: Fourteen of the 17 patients were progressing towards healing, despite the relatively short treatment period of 4 weeks. The results support those of two earlier randomised studies on the efficacy of haemoglobin spray on chronic wounds.

NB: The haemoglobin spray used in this study was Granulox (Infirst).

[EP166] COBLATION DEBRIDEMENT OF CHRONIC VENOUS ULCERS – A PILOT CLINICAL CASE SERIES

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Thursday, May 14, 2015

E-poster session: Devices & Intervention

Aim: The aim of the study was to evaluate the effect of debridement using plasma-mediated bipolar radiofrequency ablation* on the healing of chronic venous ulcers, the efficacy of the debridement in decreasing bacteria-colonization, and evaluation of complications to the treatment.

Method: The study was a prospective single centre clinical case series. Inclusion criteria were women or men 50-90 years old with a chronic, maximum 8 cm diameter venous insufficiency ulcer in need of debridement. Exclusion criteria were Ankle Brachial Index < 0.8, insulin treated Diabetes mellitus, immuno compromisation, current treatment with antibiotics, surgically inserted pacemaker or other electrical equipment, or BMI > 40.

Wound swabs for quantitative and qualitative bacteria analysis were performed before and after debridement. Follow-up was done every second week for eight weeks.

Results / Discussion: Eight patients with 16 wounds were included (6 male, 2 female, mean age 62.9±10.5). Mean ulcer duration was 26.8 months. All patients were treated and followed-up according to protocol.

Wound debridement was clinically efficient and easy to perform. 2 of 16 of the wounds healed within eight weeks. The mean quantitative bacteria count was reduced by treatment from 5.4±1.1 to 3.9±1.0 log CFU/ml. No adverse events occurred and no patient had ulcer infection in the treated wound that required systemic antibiotics.

Conclusion: This study indicate that plasma-mediated bipolar radiofrequency ablation is efficient for ulcer debridement and reduce the bacterial wound load. The treatment method should be further evaluated in randomized controlled trials.

*Coblation® WoundWand® (ArthroCare corp., Austin, USA)

[EP167] THE IMPACT OF LARVAE THERAPY ON THE DEBRIDEMENT OF CHRONIC WOUNDS: A SYSTEMATIC REVIEW

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Thursday, May 14, 2015

E-poster session: Devices & Intervention

Aim: To explore the literature pertaining to the use of larvae therapy in chronic wounds to determine its impact on debridement.

Method: This systematic review included studies in English, randomized control trials, clinical control trials, comparative studies, retrospective studies, prospective studies and systematic reviews. The chronic wounds included in the review were pressure ulcers, diabetic foot ulcers and leg ulcers. Studies that fit the inclusion criteria were included in this review. Data analysis was completed in narrative form. The PRISMA statement was used for synthesizing the systematic review included in this study.

Results / Discussion: After completing a systematic research of the literature, 14 studies were included in this review. The main primary outcome was rate of debridement of a chronic wound. Secondary outcomes included healing rate, pain, health related quality of life and acceptability of larvae therapy.

Conclusion: The overall results show that larvae debridement therapy is an effective, safe and fast method of debridement in chronic wounds.

[EP168] PRELIMINARY INVESTIGATION INTO ENHANCED WOUND HEALING BY MAGGOTS

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Thursday, May 14, 2015

E-poster session: Devices & Intervention

Aim: To investigate the enhanced wound healing effects of *Lucilia sericata* native excretions/secretions (nES) by elucidating molecules within the maggot nES that maybe responsible for stimulating wound healing.

Method: nES was obtained by incubating sterile *L. sericata* larvae (larval stage 2 and 3) with sterile ultrapure Milli-Q water for one hour and extracting the nES. The presence of human growth factor analogues were investigated using SDS-polyacrylamide gel electrophoresis and electrotransfer with detection using antibodies specific to human growth factors vascular endothelial growth factor, EGF, PDGF etc. Enzyme linked immunosorbent assay (ELISA) was used to confirm the presence/absence of human growth factor analogues.

Results / Discussion: Western blot analysis revealed the presence of proteins in *L. sericata* nES with homology to the human growth factors VEGF, PDGF and TGB- β , with possible homology for FGF and EGF. The presence of homologous proteins in *L. sericata* to these human growth factors was also confirmed by ELISA.

Conclusion: *L. sericata* nES possesses proteins which were found to have homology to human growth factors which may be contributing to the increased proliferation of HFF-1 cells.

[EP169] USING TISSUE DIELECTRIC CONSTANT (TDC) ANALYSIS TO DETERMINE TISSUE WATER FOR LYMPHOEDEMA, LIPOEDEMA AND NORMAL TISSUE

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Thursday, May 14, 2015

E-poster session: Devices & Intervention

Aim: TDC is being used as a quick, reliable and reproducible measurement for the early detection of lymphoedema and for treatment outcomes. Presently there is no recorded data for its use with lipoedema. This pilot study was commenced to investigate if the skin tissue water of lipoedema is within a normal range compared to that of lymphoedema. TDC using the Delphin MMDC is classed within normal range between 20-45% water. Generally with lymphoedema, an aim of treatment is to restore tissue water close to normal range.

Method: Measurements were taken using TDC on 40 of each lipoedema, lymphoedema and normal healthy tissues at the level of 10cm above the anterior malleolus. This position was used as it is free from major vessels. This test is quick and simple to take and reproducible. 40 of each type of tissue and condition were tested with a comparator of physical palpation.

Results / Discussion: Study is ongoing but will be completed in February 2015. 120 subjects will be measured. At presently there is a trend for lipoedematous skin to be within a 'normal' range whilst lymphoedema tissue water is outside of normal.

Conclusion: This small study provides evidence that TDC is a useful tool in determine lymphoedema skin but also that lipoedema TDC is within a normal range, not increased tissue water assisting with differential diagnosis.

[EP170] THE USE OF A KERATIN MATRIX IN DIFFICULT NON-HEALING WOUNDS

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Thursday, May 14, 2015

E-poster session: Devices & Intervention

Aim: To examine the role of keratin matrix in healing of difficult non-healing wounds

Method: A number of patients attending the wound clinic at Austin health in Melbourne were not responding to appropriate treatment for their wounds. A decision was taken to try the application of several forms of Keratin either as a matrix or as a matrix gel. The matrix is applied in a fenestrated form to the wound itself held in place with Fixamul tape , covered with a piece of Actisorb Plus and then a simple Foam dressing. This is replaced once a week. The gel form is inserted into the cavity wound on the chest filling the cavity covered by a Foam dressing and replaced one a week. At the next wound inspection the wound is gently cleaned and a new piece added to the wound, the previous piece has become incorporated into the wound structure. This paper will explore three patients two with long standing non-healing leg ulcers and one with a dehised chest wound post CABGS. The length of treatment varied from four to six months.

Results / Discussion: The chest wound was completely healed at sixteen weeks, one of the leg ulcers was completely healed at six months and the second leg ulcer was 90% healed at six months. Keratin is the key structural material making up the outermost layer of our skin. In addition to its role as a physical structure, research has identified the crucial biological role that keratin proteins play in the wound healing process.

Conclusion: Keratin matrix has a role to play in the management of difficult non-healing wounds

[EP171] USE OF ELECTRIC STIMULATION THERAPY FOR PEOPLE THAT DO NOT TOLERATE COMPRESSION THERAPY

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Thursday, May 14, 2015

E-poster session: Devices & Intervention

Aim: To explore if clients using low or no compression therapy adhere to and obtain clinical benefit from electric stimulation therapy.

Intervention: The electrostimulation device* is a small portable device suitable for self-administration in the home setting. Use 4 times daily (20 minutes per session). Pre-set to a non-adjustable specific low frequency (between 1-2 Hertz) to target smooth muscle. TGA approved. Registered** for use to increase circulation and reduce swelling/oedema.

Method: Case series data were obtained from 3 clients receiving care for a leg ulcer from 2 Melbourne Wound Clinics.

All clients were using no or low compression (≤ 18 mmHg) and had no contraindication to a therapy device***. Verbal consent was provided. Data were limited to information routinely recorded in client's health record.

Results / Discussion: Results were presented for each individual patient with measurements, descriptions and pictures to support at each data collection point for the duration of the study.

Conclusion: Concordance was achieved although none to the recommended schedule. The treatment was well accepted and implemented with few difficulties by clients. Positive healing trends were observed for 2 of the 3 case studies

* The Bodyflow™ Electrostimulation Device

** Registered with Medibank Private

*** Bodyflow™ Therapy device

Miller, C., McGuiness, W., Woodward, M., & Boo, E. (2014). Use of electric simulation therapy for people that do not tolerate compression therapy. (poster) Australian Wound Management Association, Gold Coast, Australia, 8-11 May

[EP172] HOW A MONOFILAMENT DEBRIDEMENT PAD HELPED TO BRIDGE THE GAP IN THE DEBRIDEMENT OF ORTHOPAEDIC WOUNDS

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Thursday, May 14, 2015

E-poster session: Devices & Intervention

Aim: Wound debridement is a technique aimed at removing nonviable tissue detrimental to healing. Formal surgical debridement techniques and multiple dressings are well established as the standard of care but there is now evidence for a Monofilament debridement pad that may help to bridge the gap.

This audit followed a process for the evaluation of a Monofilament debridement pad within an Acute Trust's busy orthopaedic outpatient clinic. The objective was to ascertain if staff were able to debride wounds quickly, safely and minimise bacterial load thus improve patient outcomes.

Method: This project was undertaken over a 4 week period, all clinic staff had attended educational seminars on the Monofilament Debridement Pad. Patient consent and evaluation forms were distributed and the results of 10 patient forms have been collated to date.

Results / Discussion: The monofilament debridement pad promoted quick and visible clearance of slough and debris, whilst at the same time ensuring that healing tissues remained undamaged.

Patients have found it comfortable, it can be used at the bedside without the need for anaesthetic. It was less aggressive than the scalpel or curette allowing protection of newly forming tissue. There was no evidence of dispersal of bacterial contamination deeper into the wound. It has gained preference for the debridement of wounds within the clinic compared with previous methods.

Conclusion: Treatment options continue to evolve and recently this monofilament pad revealed results that positively impacted on the treatment time and patient and staff experience in wound debridement.

[EP173] EVALUATION OF A NEW POLYURETHANE FOAM DRESSING IMPREGNATED WITH POVIDONE-IODINE IN VITRO

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Thursday, May 14, 2015

E-poster session: Devices & Intervention

Aim: A new polyurethane foam dressing impregnated with 3% povidone-iodine was recently developed based on the hypothesis that physical property including moist-retention ability and antimicrobial activity of the new dressing are at least as good as those achieved with the current silver-containing foam dressings but associated with reduced cost and cytotoxicity to host cells. The purpose of this in vitro study was to evaluate efficacy of the new polyurethane foam dressing by comparing physical property, antimicrobial activity, and cytotoxicity of the dressing with those of three world-renowned silver-containing foam dressings.

Method: Pore size, fluid absorption time, fluid absorption capacity, fluid retention capacity, antimicrobial activity against *Staphylococcus aureus* and *Pseudomonas aeruginosa*, and cytotoxicity to fibroblasts of each foam dressing were measured and compared.

Results / Discussion: The new polyurethane foam dressing had smallest pore size and showed fastest fluid absorption time, greatest fluid absorption and retention capacities among the tested foam dressings. Regarding antimicrobial activity, there were no significant differences among the dressings. However, the new polyurethane foam dressing demonstrated lowest cytotoxicity to the fibroblasts.

Conclusion: The new polyurethane foam dressing impregnated with 3% povidone-iodine may result not only in the desirable rapid regulation of exudation, but also antimicrobial activity with minimal cytotoxicity to host cells, which are key requirements for wound progression.

[EP174] AN INNOVATIVE EPIDERMAL HARVESTING DEVICE EASILY INTEGRATED INTO EVERYDAY PRACTICE

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²Galway University Hospital; Opd

Thursday, May 14, 2015

E-poster session: Devices & Intervention

Aim: Primary aim was to determine the safety and efficacy of this graft system in the management of refractory wounds.

Secondary endpoints, to measure epithelialization of wounds, recurrence rates, time to healing, quality of life and pain reduction.

Method:

- Inner upper thigh identified as appropriate donor site
- Shave donor site and clean with 70% isopropyl alcohol
- Position harvester with blue handle upwards
- Fit vacuum head to the harvester
- Set timer (55 min) and start
- Once microdomes are clear press pause on unit
- Unlatch vacuum head
- Place & gently press tegaderm film to microdomes
- Raise blue handle on harvester until a click is heard and return handle to position
- Remove tegaderm from harvester, fenestrate to allow exudate removal after graft placement
- Place tegaderm to recipient site & place absorbant layer over then bolster
- Remove harvester from thigh & dress with non adherent dressing
- Leave dressing for one week to allow graft to adhere

Results / Discussion: Of four patients treated to date one wound had fully healed at 5 weeks. One healed at 6 weeks except for a small area of slough present prior to application. A third patient is three weeks post application and expected to heal fully. A fourth patient was unsuccessful but was debrided immediately pre application, this may have affected the graft.

All donor sites were fully healed after one week.

Conclusion: This Epidermal harvesting system allowed epidermal skin grafts to be harvested easily in the out patient setting or at the patients bedside without anaesthesia.

[EP175] AUTOMATED ABI DEVICES: A REVIEW OF THE EVIDENCE

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Thursday, May 14, 2015

E-poster session: Devices & Intervention

Aim: To compare the validity of automated ABI devices

Method: Assessment of the ABI is pivotal for the management of lower limb wounds. Automated devices which potentially simplify this measurement could result in greater acceptability and utility of the procedure. A systematic review of the published evidence (12 studies) in relation to nine currently available automated ABI devices is presented.

Results / Discussion: Six devices used oscillometry to measure the ABI, two used photo-plethysmography and one used volume-plethysmography. Each study assessed validity by comparing the attained ABI with the manual Doppler ultrasound ABI*. Study comparisons were limited by differing statistical assessment methods and reporting techniques. Data omissions such as failure to present failed measurement rates, and a lack of manufacturer independent studies, were noted.

For oscillometric devices, the correlation co-efficient ranged from 0.21 – 0.95, with lower results appearing to be associated with those studies with a higher proportion of diseased participants (ABI < 0.9). For oscillometric devices, the failed measurement rate ranged from 1.6% to 25%. For photo-plethysmographic devices, the correlation co-efficient ranged from 0.6 – 0.69 (with no failed measurement rate reported). For the volume-plethysmographic device, the correlation co-efficient ranged from 0.74 – 0.89 (with a failed measurement rate of 5%).

Conclusion: The data suggest that oscillometric devices appear to lack diagnostic accuracy at the lower (diseased) end of the ABI spectrum. ABI devices which work on the principle of plethysmography appear to function more consistently across the ABI spectrum. Additional independent, high quality studies consisting of both diseased and healthy participants are required to further assess validity of such devices.

* Current Gold Standard for ABI measurement

[EP176] USING A NEW TISSUE ASSESSMENT DEVICE TO SUPPORT PRESSURE ULCER PREVENTION AND ROOT-CAUSE ANALYSIS PRACTICES IN A 750 BED ACUTE HOSPITAL IN THE UK: TISSUE VIABILITY NURSE EXPERIENCE FROM ASSESSING UP TO 50 PATIENS OVER A 28 DAY PERIOD IN AN ACUTE ORTHOPAEDIC TRAUMA UNIT.

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Thursday, May 14, 2015

E-poster session: Devices & Intervention

Aim: The aim of this study was to evaluate the use of a new skin and tissue assessment medical device¹ in enhancing existing pressure ulcer prevention and root-cause practices in a United Kingdom hospital.

Method: Up to 50 patients at risk of developing pressure ulcers were assessed using the device for up to 28-days, starting on the day of admission to the Acute Orthopaedic trauma unit. Patients with increased risk of tissue damage were placed on a SSKIN Bundle in line with Trust policy and preventative measures were initiated.. Evidence of tissue damage was captured using the device and captured in patients' files to support root cause analyses.

Results / Discussion: The study was undertaken to validate the measurements that, although this has been done in the United States, it was the first time it has been done in the United Kingdom. This should also validate the financial advantages. Preliminary results show early identification of pressure damage before visible identification can be seen therefore early interventions can be initiated.

Conclusion: Results suggest the device can readily be incorporated into existing clinical practices and provides evidence of skin and tissue damage earlier than available by visual and tactile methods alone. Introduction of the device appeared to affect the timing of and adherence to treatment decisions. Documentation of evidence of tissue damage provided additional information for use by TVN's in root cause analysis.

¹ Bruin Biometrics' SEM Scanner was the skin and tissue assessment medical device used in this evaluation

[EP177] TREATMENT OF INFECTED CHRONIC LEG ULCERS COMBINING INFECTION CONTROL, SURGICAL MODALITIES, HEMOGLOBIN SPRAY, WOUND DRESSING, AND COMPRESSION THERAPY

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Thursday, May 14, 2015

E-poster session: Devices & Intervention

Title: Treatment of burns with haemoglobin spray as adjunctive therapy to standard care.

Authors: Nesat Mustafi & Peter Engels

Aim: Burns affect the integrity of the skin and can ultimately result in skin scarring. Current therapeutic goals of wound treatment focus on the reduction of scar formation and severity. However, scar formation itself varies from patient to patient and within an individual based on the location of the wound. Therefore, the preparation of customized treatments for individual patients represents an important therapeutic goal in the fields of burns and wound healing. The objective of this study has been to evaluate the usefulness of haemoglobin spray in the treatment of burns and its impact on scar formation.

Method: Burn wounds were mechanically debrided or cleansed. After rinsing with an antimicrobial solution, a thin layer of haemoglobin spray was applied onto the wound area. Hydro polymer foams served as secondary wound dressing.

Results / Discussion: Burn wounds from ten different patients are shown and treatment results are highlighted. The wound severities range from grade 1 to grade 2B. In particular, for grade 2 wounds the scar formation was an important aspect of the evaluation. In all cases, we observed a fast healing of the burns. In addition, skin integrity and scar formation seemed to be improved.

Conclusion: Haemoglobin spray might be an adjunctive therapy option for severe burns (2A & B) to accelerate wound healing and improve skin integrity.