Figure 1. Annotated Venous Ulcer Algorithm

Page 1: Venous Ulcer Diagnosis

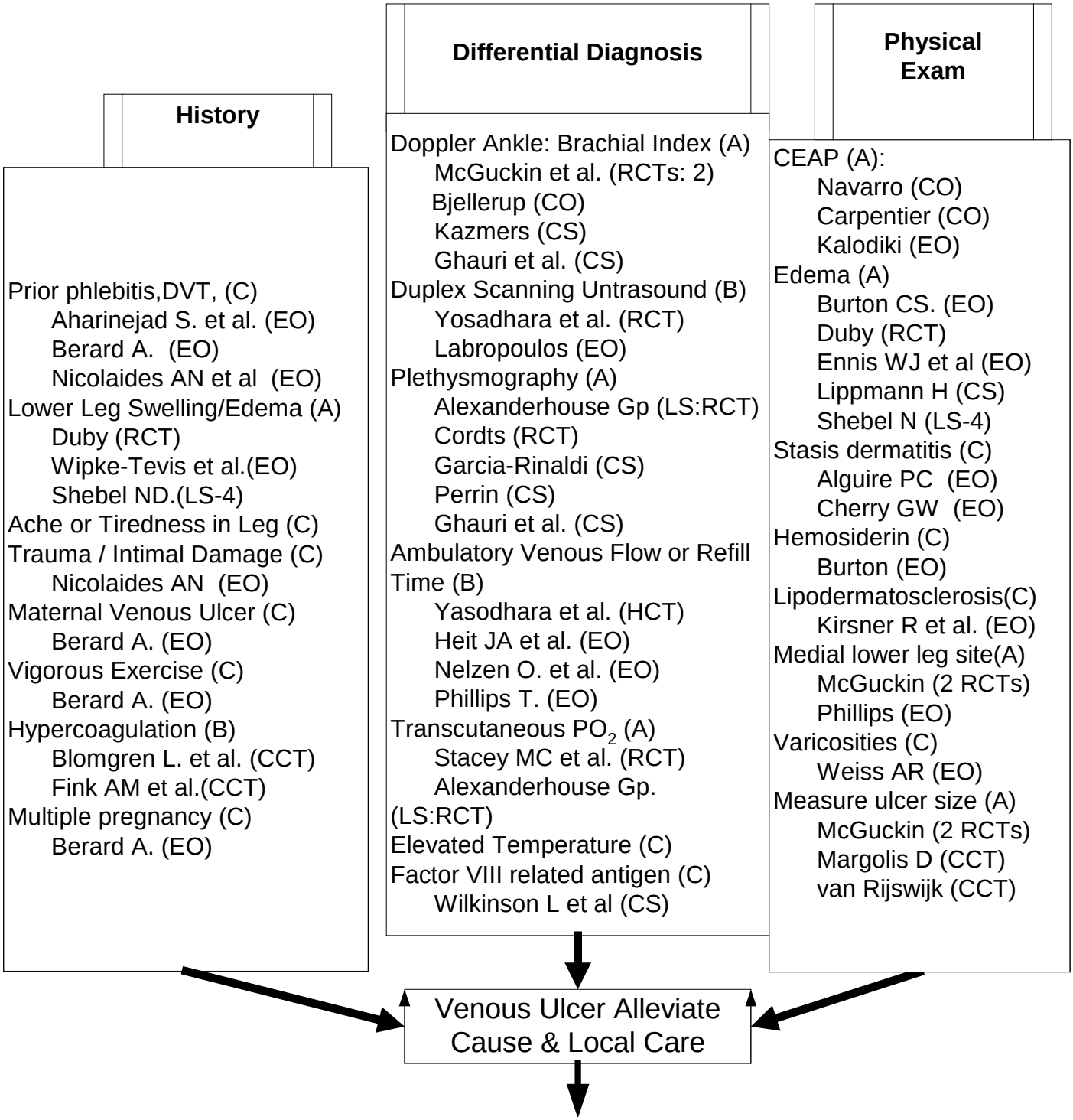


Figure 1. Annotated Venous Ulcer Algorithm
Page 2 Alleviate Cause: Aid Venous Return and Provide Skin Care

Patient Education (A)
McGuckin (2 RCTs: 1 US, 1 UK)
Shebel ND (LS-1)
Stacey et al. (EO)

Elevation (C)
Alexanderhouse Group (LS: 3 EO)
Kerstein MD (EO)

Ambulation/Exercise (C)
Alexanderhouse Group (LS: 3 EO)
Kerstein MD (EO)

Use a Multidisciplinary Team **(C)**
Lee (CS)

Compression Options:

Elastic compression bandage heals more than inelastic compression (A)
Blair SD et al. (RCT)
Cullum.N et al (RCT) Gould 1992 (RCT)
Callam et al.(RCT) Northeast 1990] (RCT)

Multi-layer (2,3 or 4 layers) Sustained, Elastic High compression bandage (A)
Cullum.N et al (RCT) Fletcher A et al;(RCT) Patel GK et al. (CCT)
Charles H.(RCT) Gould DJ et al. (RCT) Vowden KR et al. (RCT)
Callam et al.(RCT) Meyer et al. (RCT) Wilson JM et al (CS)

Elastic high compression stockings to heal venous ulcers (A)
Benigni (RCT) Partsch H (RCT) Morrell et al. (RCT)
Horakova M, Partsch H (RCT) Johnson Jr. G et al. (HCT): Custom no benefit over non-custom.
Korn P, Patel S. et al.(CCT) Veraart JCJM, Neumann HAM (RCT)

Elastic multple-layer high compression stockings to heal venous ulcers (A)
Mayberry JC (CO) Samson RH, Showalter DP (CS)
Polignano R (RCT) Samson RH (CS)

Duke Boot or UnnaBoot +Elastic Compression (A)
Arnold et al. (RCT) Eriksson G. (RCT)
Burton C. (EO) Eriksson G. et al. (RCT)
Lyon et al (RCT) Lipmann HI et al. (CS)

Gradient compression better than uniform compression (C)
Sigel (RCT)

Short stretch bandage (A)]
Duby et al.(RCT) Gould DJ (RCT)
Charles 1991 (RCT) Charles 2002 (RCT)

Unna boot zinc paste impregnated bandage (A)
Kitka, 1988 (RCT) Sikes, 1985 (CCT)
Rubin, 1990 (RCT) DePalma (RCT) No hea;omg difference from Circait.

Intermittent pneumatic compression (A)
Pekanmaki K et al. (CCT) Vowden & Nelson (MA: 45)
Coleridge-Smith PC et al. (RCT)

Non-elastic compression with Circaid (B),
Spence & Cahall (PCT) Villavicencio L. (RCT)

Sequential-gradient pneumatic compression (C)
Coleridge-Smith P. et al. (RCT)

Manage Peri-Wound Skin :
Moisturize (C)
Protect (C)
Manage peri-ulcer inflammaton, edema & circulation (B)
Meyers et al. 1975 (HCT)
Mayrovitz et al, 1994 (CCT)
Wilson et al. 1991 (CS)
Manage peri-wound skin infection (C)

Figure 1. Annotated Venous Ulcer Algorithms Page 3. Local Wound Care

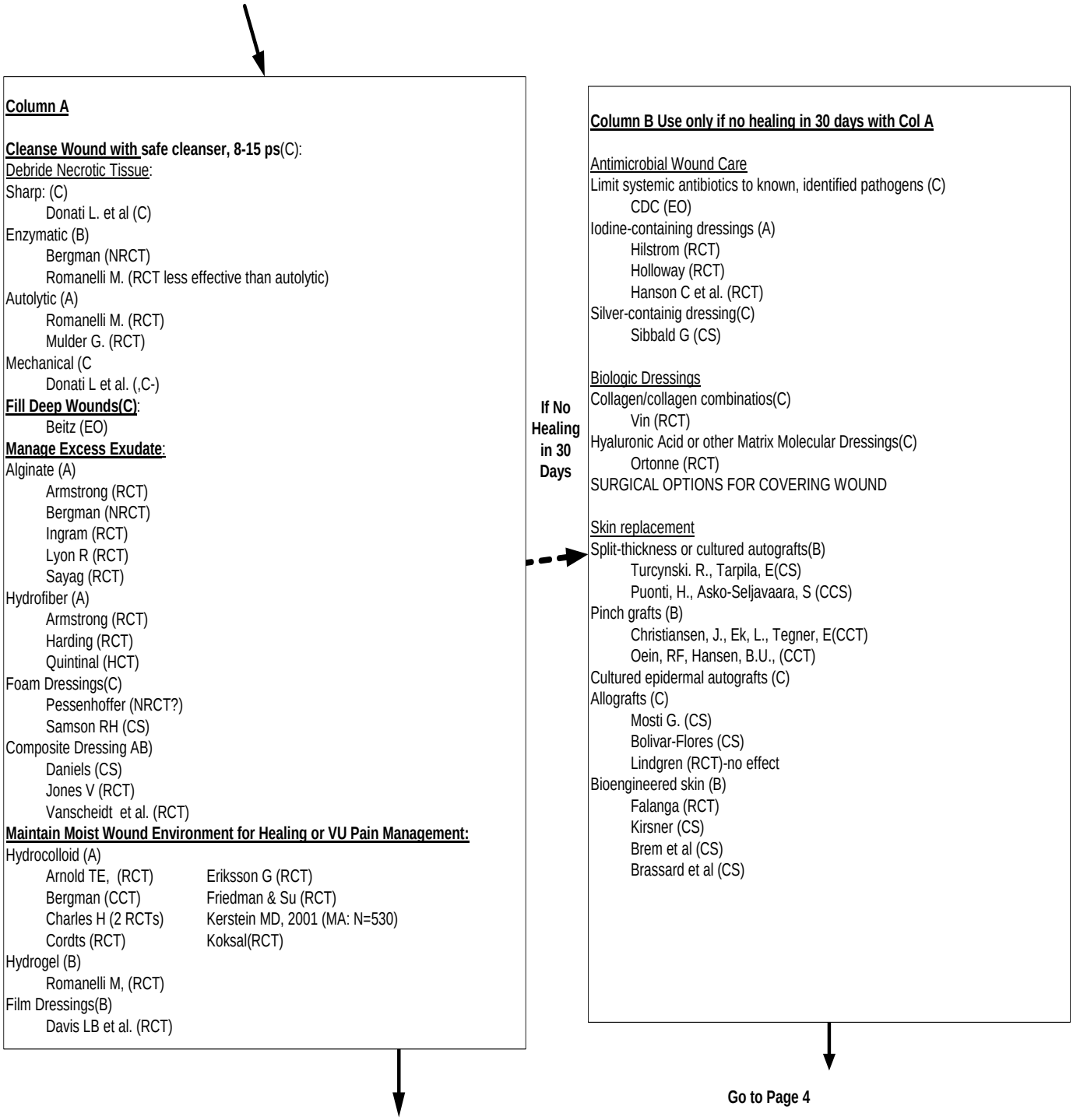
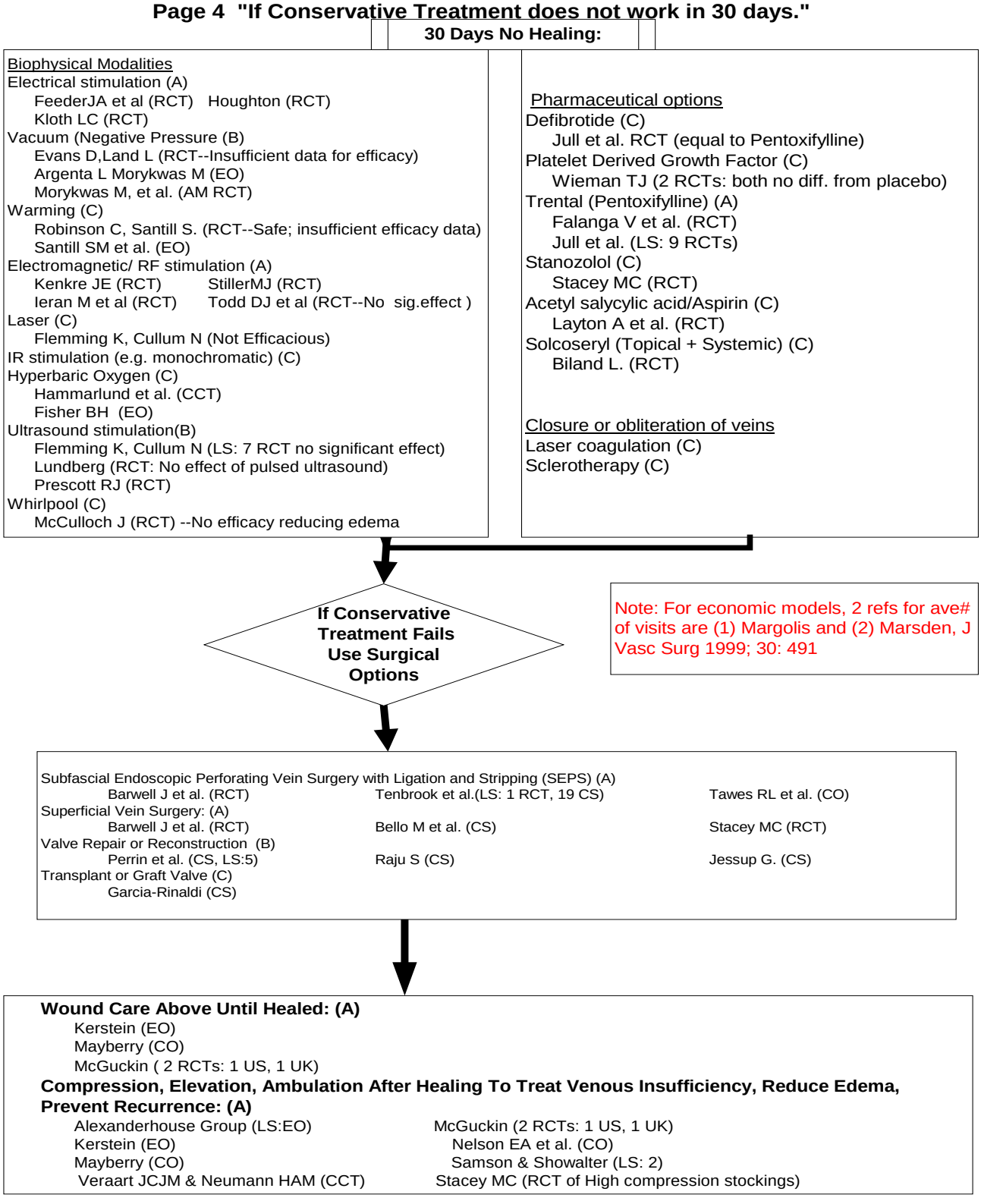


Figure 1. Annotated Venous Ulcer Algorithm
Page 4 "If Conservative Treatment does not work in 30 days."



APPENDIX I. References listed in Annotated Venous Ulcer Algorithm

Definitions and Levels or Strength of Evidence Ratings

AHRQ (Formerely AHCPR) Pressure Ulcer Treatment Guidelines (adapted for generality)

A. Results of two or more RCTs in humans provide support (or for diagnostics or risk analysis: cohort (CO) studies)
B. Results of two or more HCTs or CCTs or a CCT and a RCT in humans provide support or when appropriate, results of two or more controlled trials in an animal model provide indirect support.
C. This rating requires one or more of the following:
(1) Results of one controlled trial, e.g. RCT or CCT or HCT
(2) Results of at least two case series (CS) or descriptive studies or a cohort study in humans
(3) Expert opinion (EO)

Definitions and Abbreviations used in Evidence Table Below and Annotated Venous Ulcer Algorithm:
AM = Animal Model
CC = Case Controlled Epidemiology Study
CCT = Convenience Assignment or Non-randomized Controlled Trial
CO = Cohort study *e.g.* of all consecutive patients admitted to a facility studied prospectively
CS = Case series or descriptive uncontrolled study of performance of one modality
CVI = Chronic Venous Insufficiency
EO = Expert opinion, Content Validation Study or Consensus Statement
HCT = Historically Controlled Trial with successive measure on a series of patients
PCT = Within-patient Controlled Trial
LS: n = Literature Search: number of studies supporting the modality
MA = Meta-analysis: number of patients with data supporting the modality added if known
RCT = Randomized Controlled Trial: RCT = Human, ARCT = Animal
VU = Venous Insufficiency Ulcers

APPENDIX I. Reference Summary to Accompany Algorithms (References Are In Alphabetic Order)

Reference	Variables Studied (No. Subjects)	Study Design	Results (α<.0.05 if not specified)
Aharinejad S. et al. Valvular density alone cannot account for sites of chronic venous insufficiency and ulceration in the lower legs. *Microcirculation* 2001, Oct 8(5): 347-354.	Venous valves on 6 subjects with normal legs.	Anatomical examination of density of venous valves in lower leg.	Valvular density was higher over bones and tendons where VUs are common, than in muscular areas where VUs are rare. So valve quantity alone can't account for increased incidence of VUs.
Alexanderhouse Group Consensus Paper on Venous Leg Ulcers *Phlebology* 1992; 7:48-58	Literature search combined with expert opinion (EO)	Literature search with 203 references supporting aspects of VU diagnosis and care.	Best diagnostic tools: air and photo-plethysmography. Best microcircultion measure: $TCPO_{2.}$ Recommends Compression, elevation and walking
Alguire PC et al. Chronic venous insufficiency and venous ulceration. *J Gen Internal Med* 1997; 12:374-383.	Review of venous ulcer literature.	Literature search and EO	Stasis dermitiis is diagnostic for venous ulceration
Armstrong SH, Ruckley CV. Use of a fibrous dressing in exuding leg ulcers. *J Wound Care* 1997; 6(7):322-324.	Venous ulcers Aquacel (21) Calcium alginate (23)	Prospective, multi-center, randomized, controlled— *performance, comfort, safety, cost effectiveness*	Mean wear time in the Aquacel group was longer (mean difference 1.02 days, p < 0.05). Median decrease in ulcer area was 42% in Aquacel versus 26% in alginate group rendering Aquacel more cost effective. No significant differences in pain or adverse events were observed.
Argenta L, Morykwas MJ Vacuum-Assisted Closure: A new method for wound control and treatment: Clinical experience. *Ann Plas Surg* 1997; 38(8):563-576.	31 venous stasis or vasculitic ulcers among 300 wounds treated with VAC + split-thickness graft or allograft + pressure garment	CS with pressure garments applied ~10 days after grafting	90% of patients with "stasis" ulcers treated with VAC + graft + pressure garment "responded favorably" in unspecified time.

Arnold, T.E., Stanley, J.C. Prospective, Multicenter Study of Managing Lower Extremity Venous Ulcers. *Annals of Vascular Surgery* 1994;9(4):356-362.	Wound Dressings: 1.DuoDERM CGF (35) 2.Xeroform® Gauze (35)	Prospective, RCT, blind evaluation, 10 week comparison of dressings under compression on venous leg ulcers in US and European leg ulcer clinic settings	More pain relief with DuoDERM CGF ulcers, which healed 71% vs 43% for Xeroform during an average of 7.2 weeks for DuoDERM CGF vs. 9.2 weeks for Xeroform Gauze (α>0.05 for healing; α<0.05 for pain)
Barwell JR, Davies CE, Deacon J, Harvey K, Minor J, Sassano A, Taylor M, Usher J, Wakely C, Earnshaw JJ, Heather BP, Mitchell, DC, Shyman MR, Poskitt KR. Comparison of Surgery and compression with compression alone in chronic venous ulceration (ESCHAR study): Random Control Trial. *Lancet.* 2004, June 5(363):1854-1858.	500 patients from three centers received venous color duplex imaging of ulcerated or recently healed wounds. These were used to guide surgical decisions.	RCT.Multilayer compression with or without superficial vein surgery or deep vein stripping, avulsion of varicosities or junction disconnection. Comparison of recurrence rates at 24 weeks and 12 months.	Surgery with compression vs. compression alone: at 24 weeks no difference (65% vs65% recurrence. At 12 months surgical: 12% vs 28% for compression alone. Surgical correction of venous reflux with compression reduces 12 month venous recurrence.
Beitz J, van Rijswijk L. Using wound care algorithms: A content validation study. *JWOCN* 1999; 26:238-249.	42 registered nurse wound care experts	EO: Survey/interview at national wound care educational meetings. Reviewing and content validating each decision within *Solutions* ® algorithms of wound care	Content validity index was 0.86. On a scale of 1 to 4, the mean content validity score for the entire algorithm was 3.47 (SD 0.87).
Bello M, Scriven M, Hartshorne T, Bell,PRF, Naylor AR, London NJM Role of superficial venous surgery in the treatment of venous ulceration. *British Journal of Surgery* 1999; 86:755-759.	122 legs with VU and normal deep veins underwent superficial venous surgery	Prospective case series Post op treatment :non-adherent gauze and Tubigrip (8mm) Ulcers assessed q 8 weeks	VU post-op healing rates: Median time to healing 18 weeks, Cumulative 12 month healing rate 82% No recurrence data
Benigni, J.P., Sadoun. S, Allaert FA, Vin F. , Comparative Study of the Effectiveness of Class 1 Compression Stockings on the Symptomatology of Early Chronic Venous Disease *Phlebologie* 2003; 56:117-125.	125 subjects- Comparison of class 1 compression stockings with identically looking, non-active stockings (pressure < 7mmHg) in patients with early stages of venous disease	Randomized, multi-center cross-over study	Statistically highly significant differences in favor of the class 1 stockings were found for pain, for all other parameters of discomfort except parasthesia and for the QOL dimensions for mood and every day work. The relief of symptoms with the class 1 stockings was 2x that of the control.
Berard,A et al. Risk factors for the first-time development of venous ulcers of the lower limbs: the influence of heredity and physical activity.Angiology, 2002, Nov-Dec;53(6):647-57.	Clinical history risk factors 1. Previous phlebitis 2. Multiple pregnancy 3. Vigorous exercise 4. Family history	Prospective CCT	Significant predictors of VU are: 1. Family history of maternal VU 2. Vigorous exercise 3. History of DVT 4. Multiple pregnancy
Bergan, J and Sparks, S., Non-Elastic Compression: An Alternative in Management of Chronic Venous Insufficiency *JWOCN* 2000; 27:83-90.	Review of comparative efficacy of elastic stockings, short stretch bandages, Unna's Boot or Circaid inelastic compressoin	Retrospective literature review.	In patients with sufficient ankle flexibility for calf muscle pump function, inelastic compression reduces venous ulcer edema preparing legs for elastic stocking use.

Bergemann R, Lauterbach KW, Vanscheidt W, Neander KD, Engst R. Economic evaluation of the treatment of chronic wounds: hydroactive wound dressings in combination with enzymatic ointment versus gauze dressings in patients with pressure ulcer and venous leg ulcer in Germany. Pharmacoeconomics. 1999 Oct;16(4):367-77	Wound Dressings 4 hospitals and 120 patients * Gauze * Impregnated gauze * Calcium alginate * Hydroactive wound dressing with enzymatic ointment	Prospective, NRCT, outcome distributions were calculated using the Monte Carlo method 4 hospitals and 120 patients	The costs for treatment with gauze were the highest, whereas the costs for treatment with hydroactive wound dressings and enzymatic ointment were the lowest. Despite the higher material costs of the hydroactive wound dressings in combination with enzymatic wound cleaning compared with other wound dressings, they should be recommended for the treatment of pressure ulcers and venous leg ulcers. This therapy alternative brings about significant reductions in total costs for hospitals because of significant reductions in personnel costs and the duration of treatment.
Biland L, Hurlimann F, Goor W, Korner WF, Kundig A, Madar G.. Treatment of venous ulcers: A multiple-center randomized double blind study. *VASA* 1985 (4): 383-389.	210 subjects (197 were eligible for evaluation 152 (female), 58 (male)	RCT. Group 1 placebo i.v. and placebo ointment. Group 2 placebo i.v. and solcoseryl ointment. Group 3 solcoseryl i.v. and placebo ointment. Group 4 solcoseryl i.v. and solcoseryl ointment.	Comparison of percentage healing at 4 weeks and 6 weeks. Greater healing took place with Group 4 solcoseryl i.v. and solcoseryl ointment.
Bjellerup M. Does dorsal pedal pulse palpation predict hand-held Doppler measurement of Ankle-Brachial Index in leg ulcer patients? *Wounds* 2003; 15(7):237-240.	510 venous ulcer patients: 337 with palpable pedal pulse 137 without palpable pedal pulse	Prospective cohort study calculating predictive validity of pedal pulse versus ABI in predicting arterial disease	Palpable pedal pulse delivered a 40% false negative rate in predicting arterial disease as defined by ABI < 0.9. ABI was deemed mandatory in ruling out arterial disease.
Blair SD, Wright DDI, Backhouse CM, Riddle E, McCollum CN. Sustained compression and healing of chronic venous ulcers. *BMJ* 1988; 297:1159-1161.	Adhesive plaster control compression (20) 4-layer Elastic compression (20)	Compression was measured every 2 hours up to 8 hours after application, at 24 and 7 days after application as well as healing and recurrence	The 4 layer bandage maintained higher and more enduring compression, reduced edema more and healed a higher percent of ulcers at 12 weeks than the control
Blomgren L. *et al*. Coagulation and fibrinolysis in chronic venous insufficiency, *Vasa,* 2001; 30(3):184-7.	20 patients with CVI 20 matched controls	Blood samples were analyzed to correlate plasma markers with ulcer development.	Increased levels of PAI-I and tPA in patients with CVI compared to controls
Bolivar-Flores, X.Y., Kuri-Harcuch, W. Frozen Allogeneic Human Epidermal Cultured Sheets for the Cure of Complicated Leg Ulcers *Dermatological Surgery* 1999 Aug: 25 (8):610-617.	Frozen human allogenic epidermal cultures (10 patients)	Open, non-randomized	All ulcers healed. Range of healing time1-31 weeks after first application.
Brassard, A. A Prospective, Multi-Centre, Randomized, Controlled Clinical Investigation of Dermagraft in Patients with Venous Leg Ulcers: A Feasibility Study *Canadian Journal of Plastic Surgery* January-February: 10: 17A-22A.	Dermagraft + multilayer compression bandage, 13 patients Multilayer compression bandage, 13 patients	Prospective, multicentre, pilot Randomized, Controlled, feasibility study (not sufficiently powered for statistical significance).	38% (5/13) healed with Dermagraft + compression, 38% healed with intermittent Dermagraft + compression, 15% (2/13) healed with compression alone (control group).

Brem, H, Balledux, J, Sukkarieh, T, Carson, P, Falanga, V. Healing of Venous Ulcers of Long Duration with a Bilayered Living Skin Substitute: *Results from a General Surgery and Dermatology Department J Foot Ankle Surgery*: 1999 Nov.-Dec: 38 (6): 388-93.	33 patients with 54 VU >1 year duration at a general surgery department of a major medical center and a dermatology department of a university-based hospital during the study were treated with fenestrated living skin equivalent (LSE)	Retrospective review of healing results. Repeated surgical debridement and treatment with LSE after 7 days was practiced.	74% of Vus completely healed in 6 months, after a median of 2 LSE applications. Mean healing time was 55 to 61 days. Vus treated in the surgery and dermatology departments were similar in wound size and duration and patient population.
Burton CS. Treatment of leg ulcers. *Dermatol Clinics* 1993; 11(2):315-323.	Expert opinion	Expert opinion	Venous disease is associated with venous hypertension and responds poorly to diuretic therapy.
Canedo-Dorantes L, Garcia-cantu R, Barrera R, Mendez-Ramirez I, Navarro VH, Serrano G. Healing of chronic arterial and venous leg ulcers with systemic electromagnetic fields. *Arch Med Res* 2002, 33(3): 281-289.	Extremely low frequency electromagnetic fields (ELF) (26 patients with 42 chronic venous or arterial or mixed leg ulcers)	Prospective historically controlled case series on non-healing leg ulcers with a median duration of 639 days before ELF treatment	69% of ulcers healed. More than 50% healed in less than 4 months. Ulcers failed to heal if there was important arterial occlusion, uncontrolled arterial hypertension, severe lipodermatosclerosis, non-pitting edema, obesity or in patients with auto-immune disease.
Callam MJ, Harper DR, Dale JJ, Brown D, Gibson B, Prescott RJ, Ruckley CV. Lothian and forth valley leg ulcer healing trial .1. elastic versus nonelastic bandaging in the treatment of chronic leg ulceration. Phlebology 1992;7:136- 141.	Compression: 1. Elastic: orthopaedic wool (Soffban), Tensopress + Tensoshape (65) 2.Non-elastic: orthopaedic wool (Soffban), Elastocrepe + Tensoplus Forte; (67)	Prospective RCT for 12 weeks in leg ulcer clinics in Scotland UK	% completely healed at 12 weeks was 54% for elastic compression 28% for non-elastic compression
Carpentier PH, Cornu-Thenard A, Uhl JF, Partsch H, antignani PL; Societe Francaise de Medicine Vasculaire; European Working Group on the Clinical Characterization of Venous Disorders. *J Vasc Surg* 2003; 37(4):827-833.	872 full records of unselected patients were evaluated for Clinical, Etiologic, Anatomic and Physiologic variables of the CEAP.	Retrospective chart review of an unselected cohort of 872 patients with vascular disease were abstracted to determine validity of ascending severity and additivity of CEAP clinical scores.	CEAP clinical classes showed good ascending severity, but poorer additivity, as measured with the Cronbach alpha coefficient. Additivity was satisfactory in highest clinical severity cases, but poorer in the lower 3 classes.
CDC. Steps to Prevent Antimicrobial Resistance. www.cdc.gov/drugresistance/healthcare/ha/12steps_HA.htm	Campaign to prevent antimicrobial resistance in healthcare settings Fact Sheet; general guidelines	EO	Target definitive antibiotic therapy to known pathogens identified through C&S. Treat infection, not contaminants or colonization. Monitor response to treatment & adjust or stop when indicated.
Charles H. Compression healing of ulcers. Journal of District Nursing 1991;4:6-7.	Compression: 1.Short stretch bandage (Rosidal K) applied by project nurse (27) 2.'Usual treatment' applied by district nurse (26)	Prospective RCT, of 3 months duration in home care, London, UK	71% healed with Rosidal K 25% with usual treatment Ulcers increased in size 0% with Rosidal K versus 21% with usual treatment
Charles H. Venous leg ulcer pain and its characteristics. J. *Tissue Viability* 2002; 12(4):154-158.	Short-stretch bandage (67) + DuoDERM CGF (20) or + Cutinova Hydro (23) or + Comfeel (22)	Prospective RCT of VU pain using VAS or McGill Pain Questionnaire Present Pain Index over 12 weeks	VAS and Present Pain Index reduced from mean of 4.5 in 71% of patients on entry to 1.5 at 2 weeks then decreased to <1.
Charles H, Callicot C, Mathurin D, Ballard K, Hart J. Randomised, comparative study of three primary dressings for the treatment of venous ulcers. *Br J Community Nursing* 2002; 7(6):48-52.	Short-stretch bandage (91) randomized to 1 of 3 primary dressings: + DuoDERM CGF (31) or + Cutinova Foam (31) or + Comfeel (29)	Prospective RCT of VU pain and healing over 12 weeks.	67% of VU patients initially reported mean 0-10 VAS pain of 4.1, dropping to 1.4 during first 2 weeks of all dressings. No differences between pain or healing among the dressing groups.
Cherry GW et al. Blueprint for the treatment of leg ulcers and the prevention of recurrence. *Wounds* 1993; 3:2-5.		EO	Stasis dermititis is diagnositc for VU and CVI

Christiansen, J., Ek, L., Tegner, E. Pinch Grafting of Leg Ulcers. A Retrospective Study of 412 Treated Ulcers in 146 Patients *Acta Derm Venreol* 1997 Nov.; 77(6):471-473.	Pinch Grafts 412 leg ulcers in 146 patients	Retrospective uncontrolled study.	Overall healing rate was 38%. Mean duration of follow-up was 32 months. In ulcers stilled healed at the close of the study (27%), the remission time was > or = 26.6 months.
Coleridge-Smith P, Sarin S, Hasty J, Scurr JH. Sequential gradient pneumatic compression enhances venous ulcer healing: A randomized trial. Surgery 1990;108:871-5.	*VU treatment w/wo sequential compression device (SCD):* *Control(24): debrided, non-adherent dressing, compression stockings* *SCD (21): as above + SCD 3-4 hours/day*	*RCT* *Weekly wound assessments until healed or 3 months*	*Healed:* *Control 1/24 vs SCD 10/21 (p<0.009)* *Median rate of healing: (area/week)* *Control 2.1% vs SCD 19.8% (p<0.05)*
Cordts PR, Hanrahan LM, Rodriguez AA et al. A prospective, randomized trial of Unna's boot versus Duoderm CGF hydroactive dressing plus compression in the management of venous leg ulcers. Journal of Vascular Surgery 1992;15:480-6.	VU healing rates with 2 treatments: Duoderm CGF + Coban (16) vs. Unna's boot (14)	RCT Weekly assessments until healed or 12 weeks	Healing rates faster with Duoderm + Coban than Unna's boot (p<0.002
Cullum.N, Nelson EA, Fletcher AW The Cochrane library 2001,Compression for venous ulcers (Cochrane Review) In *The Cochrane Library*, Issue 3, 2002: Update Software	1. Compression vs dressings [Kitka, 1988; Rubin, 1990; Sikes, 1985] 2. Compression wraps vs noncompression wraps [Charles, 1991; Erikson, 1984; Taylor, 1998]	Analyses of literature for each numbered question investigated.	1. Compression heals more VU than dressings alone 2. Compression wraps heals more VU than noncompression 3. Multi-layer elastic compression is better than single layer elastic compression
Daniels S, Sibbald RG, Ennis W, Eager CA. Evaluation of a new composite dressing for the management of chronic leg ulcer wounds. J Wound Care. 2002 Sep;11(8):290-4.	Wound Dressings 75 dressing changes of 11 ulcers The study assessed the safety and performance, including weartime, absorption, dressing integrity, ease of use and wound progression, of Versiva	Prospective, non-randomised, open-label, multicentre, phase II study Up to 10 dressing changes were assessed within a five-week study period of patients with venous leg ulcers	*Healing or marked improvement was observed in 82% of leg ulcers within the five-week study. *93%, the dressing was 'very easy' to remove, with no trauma to surrounding skin *Minimal to no leakage was observed in 81% of changes * Most changes (77%) were painless
Davis LB, McCulloch JM, Neal MB. The effectiveness of Unna Boot and semipermeable film vs. Unna Boot alone in the healing of venous ulcers. A pilot report. Ostomy Wound Manage. 1992 Jan-Feb;38(1):19-21.	11 patients with 12 Vus Unna's Boot Medicopaste Bandage covered with Tensoplast wrap(6 ulcers) Above wrapping procedure + occlusive film dressing (6 ulcers)	RCT continued for 6 months or until the ulcer(s) were healed. Healing rate was measured as cm^2 per day reduction in wound area	With addition of the film dressing mean healing rate was 0.30 cm^2 per day compared with 0.12 cm^2 per day for ulcers dressed with Unna's boot without the film dressing.
DePalma, R., , et al., Comparison of Costs and Healing Rates of Two Forms of Compression in Treating Venous Ulcers *Vascular Surgery* 1999.	Compare healing rates and costs of Unna boots and CircAid- time to healing, rate of healing area decrease, rate of percent area decrease, linear healing rate, costs of labor, materials and overhead-38 enrolled, 7 withdrawn (5 UB, 2 TB)	Multi-center, prospective, randomized, parallel-group study	Treatment of venous ulcers with CircAid Thera-Boots is significantly less costly than treatment with Unna's Boots. No significant difference in time to healing (weeks) 9.69± 3.28, 7.98 ± 4.41, p=0.41

Donati L, Magliano E, Colonna M et al. Surgical versus enzymatic debridement in: Westerhof W, Vanscheidt W. editors. Proteolytic enzymes and wound healing. New York: Springer Verlag; 1994. Pp:38-9	Surgical debridement, mechanical debridement and enzymatic debridement	Advantages and disadvantages of each described	Expert opinion regarding value of each therapy.
Duby T, Cherry G, Hoffman D, Cameron J, Dobloff-Brown D, Ryan T. A randomized trial in the treatment of venous leg ulcers comparing short stretch banages, four layer bandage system, and a long stretch-paste bandage system.. *Wounds* 1993;5(6):276-9.	Short stretch bandage (20) Zinc paste bandage (24) 4-Layer compression bandage (23)	Treatment for 1-12 weeks, Measurements: • % change in leg volume • % of legs changing volume • % of V.Ulcers healed • Mean % change in area	Reduction in leg volume (edema reduction) strongly correlated with % reduction in ulcer area and % of ulcers healed, with 4-Layer compression 44% of ulcers healed (mean area reduction 76%); short stretch 40% (60% mean area reduction) and zinc paste bandage 23% healed (43% mean area reduction.
Ennis WJ et al. Leg ulcers: a practical approach to the leg ulcer patient. *Ost/Wound Mgmt* 1995; 41(Suppl 7A):52S-63S.)	Compression plus moist wound healing.	Expert opinion validated by clinical healing outcomes.	VU associated with non-pitting, tender, tight edema of lower extremity.
Eriksson G. Comparison of two occlusive bandages in the treatment of venous leg ulceration. *British Journal of Dermatology*. 1986 (II4): 227-230.	34 patients with venous ulcers. 17 patients treated with hydrocolloid dressing and compression and 17 patients treated with double layered bandage.	RCT. Objective evaluation with stereophotogrammetric measurement of ulcer area and volume and bacterial count.	No difference between hydrocolloid dressing plus compression and the, double-layered bandage, both providing compression and a moist wound environment.
Eriksson G, Eklund AE, Liden S, Zetterquist S. Comparison of different treatments of venous leg ulcers: a controlled study using stereophotogrammetry. *Current Therapeutic Research* 1984;35: 4:678-684.	1. Metallina aluminium foil dressing (20) 2. Two layer bandage: ACO paste bandage +Tensoplast (13)	Multicenter 8-week study in Sweden, setting unclear. A third group crossed over during study from porcine skin dressing to 2-layer compression (not included)	% Area reduction at 8 weeks: 10% with aluminum foil 80% with 2-layer bandage % volume reduction 8 weeks: 0% with aluminum foil 90% with 2-layer bandage
Evans D, Land L. Topical negative pressure (TNP) for treating chronic wounds (Cochrane Review) *The Cochrane Library*, Issue 2, 2002, Oxford: Update Sottware Ltd. Accessed 3 July 2002.	2 RCTs evaluated TNP on lower extremity ulcer patients (34)	Ulcer volume reduction was measured at 6 weeks, reduction in wound area and days to healing were evaluated though no statistical analysis was reported.	Reduction in wound volume at 6 weeks in favor of TNP. Reduction in number of days to healing and in wound surface area at 2 weeks was reported, but without statistical analysis. Reviewers' conclusion: weak evidence of efficacy.
Falanga, V. Margolis D,Alvarez O, Auletta M, Maggiacomo F, Altman M, Jensen J, Sabolinski M, Hardin-Young J, and the Human Skin Equivalent Investigators Group. Rapid healing of venous ulcers and lack of clinical rejection with an allogeneic cultured human skin equivalent. *Arch Dermatol, 1998; 134:293-300.*	Unna's Boot + Coban + Apligraf (n=146) Unna's Boot + Coban alone (n = 129)	Prospective, randomized, multi-center study of wounds to healing or for a 6-month period using 1-5 (median 3.3) applications of Apligraft	In hard-to-heal wounds (>1 year's duration), Apligraf was more effective than compression alone in achieving wound closure at 6 months (63% vs. 48.8%, p=.02 Apligraf-ttreated wounds healed in a mean of 181 days vs 231 days for large ulcers (p=.02); 56 days for Apligraf vs 98 days control for small ulcers (p=.04)
Feedar JA, Kloth LC, Gentzkow GD. Chronic Dermal Ulcer Enhanced with Monophasic, Pulsed Electric Stimulation. Physical Therapy 1991;71(9):639-648	Electric Stimulation (47 participants with 50 ulcers) Treatment Group (26) Control Group (24)	Prospective, HRCT, Double blind 16 weeks in US and pressure ulcers clinic settings	Healing Rate per week: Control group 8.25% Treatment Group 14%
Fink AM *et al.* Lupus anticoagulant and venous leg ulceration. *B J Dermatol* 2002; 146(2): 308-310.	27 patients with Vus 27 matched controls	Measured presence of lupus anticoagulant in patients with and without Vus	Significant difference (more?) in presence of lupus anticoagulant in patients with Vu than controls

Fisher BH. Treatment of Ulcers on Legs with Hyperbaric Oxygen. Journal of Dermatologic Surgery 1975; 1(3):55-58	Hyperbaric Treatment (30 Participants) Burns (5) Pressure Ulcers (16) CVI (3) Infectied PO surgeries (2) Rheumatoid Arthritis (3) HGG (1)	Prospective, CS, 3 wounds in a 7 week study	Patients with CVI: Prompt arrest of inflammatory reaction; Elimination of edema Stimulation of granulated tissue 3 wounds with 100% closure in 2-7 weeks
Flemming K, Cullum N. Therapeutic ultrasound for venous leg lcers.) *The Cochrane Library*, Issue 2, 2002, Oxford: Update Sottware Ltd. Accessed 3 July 2002.	Of 7 small RCTs found, 4 compared ultrasound (US) with sham US and 3 compared US with standard therapy.	Healing rates of VU were compared at various time points.	While no single study reached statistical significance, "available evidence does suggest a possible benefit of US therapy in the healing of venous leg ulcers."
Flemming K, Cullum N. Laser therapy for venous leg ulcers (Cochrane Review) *The Cochrane Library*, Issue 2, 2002, Oxford: Update Sottware Ltd. Accessed 3 July 2002.	2 RCTs compared laser with sham therapy (88). 1 RCT compared laser with ultraviolet therapy (45) and one with non-coherent unpolarized light (6)	Three trials were pooled for a meta analysis. The fourth trial compared laser and UV light.	The three-arm analysis found significantly more ulcers competely healed in the laser + IR group compared with non-coherent unpolarized light. No differences were significant in the fourth trial. Reviewer conclusion: no evidence of laser light efficacy by itself.
Garcia-Rinaldi R, Soltero E, Gavira J *et al.* Implantation of cryopreserved allograft pulmonary monocusp patch. *Texas Heart Inst J* 2002; 29:92-99.	38 patients with 40 >3 year duration VU resulting from non-thrombotic venous insufficiency of common femoral vein received patch	Ulcer healing and competence of monocusp patches implanted using Duplex scans at 30 days, 6 months and 1 yr post-op	23 ulcers remained healed at the end of 1 year with competent valves at patch sites. 27 of 36 evaluable ulcers eventually healed. 9 had monocusp insufficiency.
Ghauri ASK, Nyamekye I, Grabs AJ, Frandon JR, Whyman MR, Poskitt,KR. Influence of a specialized leg ulcer service and venous surgery on the outcome of venous leg ulcers. *Eur J Vasc Endovasc Surg* 1998;16:238-244	VU outcome: Community (149)= home care nurses 1994 Vs. Specialized Clinics (200)= Includes duplex, ABPI, surgery 1996	CS Retrospective chart review before and after study Description of VU outcome treated in community (before) and specialized clinics (after) . Random selection of records during 3 months each group	In specialized vascular clinics, patients received improved diagnostics, surgical correction and specialized care. 12 week healing rates increased from 12 to 53% and 6 mos. recurrence rate decreased from 43 to 21% ($p<0.01$)
Gould DJ, Campbell S, Newton H, Duffelen P, Griffin M, Hardig EF. Setopress vs Elastocrepe in chronic venous ulceration. *Br J Nursing* 1998; 7(2):66-73.	Elastic compression: Setopress+ elastic (20) Non-elastic Elastocrepe (20) Both with medicated paste + elastic viscose stockinette	RCT of patients in a UK outpatient clinic with venous ulcers less than 2 months duration	11/19 (58%) Setopress patients completely healed in 15 weeks versus 7/20 (35%) healed with Elastocrepe. No significant difference.
Hammarlund C. Sundberg T. Hyperbaric oxygen reduced size of chronic leg ulcers: a randomized double-blind study. *Plast Reconst. Surg* 1994;93:829-833.	HBO (9) Control (8)	CCT measuring wound surface area decreased during 6 weeks of care.	HBO mean 35.7% reduction in wound surface area $\pm$ 17% versus control 2.7% mean reduction in wound surface area $\pm$ 11%. ($p<0.001$)
Hansson,C and the Cadexomer Iodine study group. The effects of cadexomer iodine paste in the treatment of venous leg ulcers compared with hydrocolloid dressing and paraffin gauze dressing. International J of Derm 1998;37:390-396	153 VU patients randomized to: Iodosorb paste (56) Hydrocolloid (48) Parrafin gauze (49) + Comprilan short stretch compression bandage for all	HRCT,(multicenter, multinational) parallel group design. 12 weeks	% mean reduction in ulcer size (NS): Iodosorb 61% Hydrocolloid 41% Paraffin gauze 24% Days to stop exudate (NS): Iodosorb 55 Hydrocolloid 63 Paraffin gauze 85 Reduction in slough($p<0.05$) at 4 weeks: Iodosorb and Hydrocolloid > Paraffin gauze

Harding KG, Price P, Robinson B, Thomas S, Hofman D. Cost and dressing evaluation of hydrofiber and alginate dressings in the management of community-based patients with chronic leg ulceration. *Wounds,* 2001; 13(6):229-236.	Leg ulcers--moderately to heavily exuding; various etiologies Aquacel (66) Sorbsan (65)	Prospective, 12-week multi-center, randomized, controlled--wear time, cost effectiveness, time to healing, reduction in ulcer size, ease of application and removal, exudate management, pain on dressing removal	Wear time for AQUACEL was 3.63 days, for Sorbsan 3.27 days (α<0.001). 17 AQUACEL-dressed wounds healed in a mean of 42 days vs 57 days for the 17 dressed with Sorbsan (α=0.053), with superior ease of removal (α=0.006), exudate management (α=0.002), and less pain (α=0.001) and adhesion to the wound bed (α=α=0.001) for AQUACEL. Though costs were less for healing outcomes with AQUACEL, these differences were not significant.
Heit JA *et al.* Trends in the incidence of venous stasis syndrome and venous ulcer:: a 25 year population-based study: *J Vasc Surgery 2001; 33(5):* 1022-7	25-year study of medical records of a county in Minnesota	Retrospective review of all medical records to describe incidence of venous stasis (now called insufficiency) and venous ulcers	Venous stasis 76/100,000 person years, VU 18/100,000 person years, with no change in 25 years.Incidence higher in women than men and increases with age for both.
Hilstrom L. Iodosorb compared to standard treatment in chronic venous leg ulcers—a multicenter study. Acta Chir Scand Suppl 1988; 544:53-56.	Iodosorb cadexomer iodine Standard treatment	Percent decrease in ulcer size was measured	Iodosorb-dressed wounds decreased in size 34% while Standard treatment resulted iin an increase in wound size.
Holloway GA, Johansen KH, Barnes RW, Pierce GE. Multicenter trial of cadexomer iodine to treat venous stasis ulcers. West J Med. 1989;151:35-38.	Cadexomer iodine Standard care control group	Rate of healing was measured	Twice the rate of healing with cadexomer iodine than with the control group.
Horakova M, Partsch H Venous leg ulcers are compression bandages indicated? *Phleologie* 1994; 47:53-57	Short stretch compression (25) Elastic high compression stockings (25)	RCT of 3 month duration	In the elastic high compression stocking group, 94% healed versus 52% in the short stretch bandage group.
Houghton PE, Kincaid CB, Lovell M, Campbell KE, Keast DH, Woodbury MG, Harris KA. Effect of electrical stimulation on chronic leg ulcer size and appearance. *Physical Therapy* 2003; 83(1):17-28.	High voltage pulsed current (HVPC) 100 us, 150 V, 100 Hz (n = 14) 3 times per week versus Sham (n = 13) All patients had chronic leg ulcers, not all of venous insufficiency origin some arterial or diabetes.	RCT prospective, double-blind measured healing with EZ-Graph, wound appearance with modified PSST (PWAT) 4 weeks stimulation after 2 weeks with conventional therapy. 7 patients had bilateral VU compared.	Wound appearance and % decrease in wound area improved (p<0.05) during treatment, but difference disappeared at 4 week follow up.
Ieran M, Zaffuto S, Bagnacani M, Annovi M, Moratti A. Cadossi R. Effect of low frequency pulsing electromagnetic fields on skin ulcers of venous origin in humans: a double-blind study. *J Orthop Res* 1990; 8(2):276-282.	Electromagnetic Low Frequency Pulsed Stim. (ELF) Active (22) Placebo (22)	Double-blind RCT studying healing at 90 days and recurrence.	Significantly more healed in the active group than in the placebo group (α < 0.02). 25% recurred during 90 days in the active group; 50% in the placebo group.
Ingram M, Wright TA, Ingoldby CJ. A prospective randomized study of calcium alginate (Sorbsan) versus standard gauze packing following haemorrhoidectomy. J R Coll Surg Edinb. 1998 Oct;43(5):308-9.	*Paraffin gauze on calcium alginate (Sorbsan) roll as a post-operative pack *Cotton gauze roll on calcium alginate (Sorbsan) roll as a post-operative pack	Prospective RCT of 50 patients undergoing haemorrhoidectomy	Calcium alginate dressings following haemorrhoidectomy effectively reduce post-operative pain compared to more bulky anal packs.
Jessup G, Lane RL. Repair of incompetent venous valves: A new technique. *J Vasc Surg* 1988; 8:569-575.	VU patients	Description of technique in venous insufficiency patients	Repairing incompetent venous valves using cuff support or constriction at the site of the valves is effective
Johnson Jr. G, Kupper C, Farrar DJ, Swallow RT. Graded compression stockings. Custom vs noncustom. *Arch Surg* 1982; 117(1):69-72.	5 VU patients	Prospective, convenience sample, femoral venous velocity tested with custom and non-custom gradient elastic stockings	Venous velocity reduced by 24% after removal of custom versus 22% after removal of non-custom gradient elastic stockings, with no difference in effects on venous velocity.

Jones V., Comparison of the new composite dressing Versiva® with Tielle® Plus for managing venous leg ulcers: Results of an international multi-centre randomised trial. Proceedings European Wound Management Association; 2003; Pisa, Italy; 2003	Moderate to high compression plus : Versiva foam composite (53) Tielle Plus (48)	Prospective multicenter RCT comparint dressing performance, patient-reported pain and healing of venous ulcers during 12 weeks of care.	Composite foam was easier to apply (p=0.027) and remove (p<0.0001), with less trauma (p=0.0074) and was less sensitizing (p = 0.0036) All other differences were not statistically significant.
Jull AB, Waters J, Arroll B. Pentoxifylline for treating venous leg ulcers (Cochrane Review). The Cochrane Library, Issue 4,2002. Oxford:Update Software Ltd.	9 trials; 572 adults 8 pentoxifylline Vs placebo; 5 with compression therapy 1 pentoxifylline Vs defibrotide; with compression	RCT	Pentoxifylline more effective than placebo r/t heal/significant improve in 8 trials. Pentoxifyliine + compression more effective then placebo + compression No healing variance between pentoxifylline Vs defibrotide.
Kalodiki E, Nicolaides AN. Out of a recent CVI consensus: some features of a basic statement. *Int Angiol* 2002 21(Suppl 1):2-11.	Description of application of the CEAP	Description of the method based on the consensus statement published in Circulation, Nov 2000	A uniform method of rating clinical, etiologic, anatomic and physiologic correlates of venous disease is provided.
Kazmers A, Koski MF, Groehn H, Outs G, Meeker C et al. Assessment of noninvasive lower extremity arterial testing versus pulse exam. *Amer Surgeon* 1996; 62:315-319	100 consecutive patients referred to vascular lab for Doppler lower extremity evaluation:	Right *doraslis pedis* pulse and Doppler pressure ABI assessed in all patients	Range of ankle pressures with non-palpable pulse was 42-300 mmHg versus 64-220 mmHg with palpable pulse. Nonnvasive Doppler is a more accurate assessment of vascular status of the leg.
Kenkre JE, Hobbs FD, Carter YH, Holder RL, Holmes EP. A randomized controlled trial of electromagnetic therapy in the primary care management of venous leg ulceration *Jam Pract* 1996; 13(3):236-241.	Electromagnetic stimulation (EM) 30 minutes/day on weekdays for 30 days Total of 19 patients 800 Hz Active (5 patients) 600 Hz Active (5 patients) Placebo (9 patients)	Prospective RCT measuring effects of EM on VU healing, patient-reported pain, quality of life and side effects during a 50 day study time (30 days stim + 4 weeks follow up..	4 of the 5 healed using 800 Hz stimulation. By day 50 the 800 Hz treated ulcers had healed more (α<0.05) and had less pain than those treated with placebo or 600 Hz therapy.
Kirsner, R, Fastenau, J, Falabella, A, Valencia, Isabel, Long, Rachel, Eaglstein, W. Clinical and Economic Outcomes with Graftskin for Hard-to-Heal Venous Leg Ulcers: A Single-Center Experience *Dermatological Surgery* January 2002: 28:81-82.	Graftskin (Apligraf)-16 patients with 24 VUs of a mean duration of 42 months	Retrospective, open, non-randomized	A mean number of 2.25 graftskins were applied per patient. All 16 patients responded to the device, with 8 patients and 13 of the 24 ulcers experiencing complete healing over a mean period of 13 weeks. Mean weekly closure was 9.5% during the post graftskin group while there was an increase in ulcer size of 5.9% per week in the pregraftskin period.
Kerstein MD, Gemmen E, vanRijswijk L, Lyder CH, Phillips T, Xakellis G, Golden K, Harrington C. Cost and cost effectiveness of venous and pressure ulcer protocols of care. *Disease Management and Health Outcomes, 2001,* 9(11):651-636.	Hydrodolloid (DuoDERM: 12 studies: 530 ulcers) Human skin construct (Apligraf 1 study; 130 ulcers) Impregnated gauze (5 studies; 223 ulcers)	Retrospective literature review and summary with analysis of healing times and costs to heal venous ulcers studied to healing or treatment failure.	Significantly more hydrodolloid-dressed VU healed by 12 weeks (51%) than those dressed with gauze (39%) lower cost to heal each wound. Human skin construct had intermediate healing time and higher costs.
Kerstein MD. The non-healing leg ulcer: Peripheral vascular disease, chronic venous insufficiency and ischemic vasculitis. *Ostomy/Wound Management*; 1996; 42(10A Suppl): 19S-35S.	Review with algorithms.	Referenced review of the literature on diagnosing and treating venous and ischemic leg ulcers.	Algorithms for diagnosis and treatment of venous or ischemic ulcers and those arising from arteritis or suspected blood dyscrasias are presented.
Kirsner RS et al. The clinical spectrum of lipodermatosclerosis. *J Amer Acad of Dermatol* 1993; 28(4):723-727.		EO	Description of the clinical spectrum of lipodermatosclerosis.

Kikta MJ Schuler JJ, Meyer *JP et al*;a prospective randomized trial of Unna's boots vs hydroactive dressings in the treatment of venous stasis ulcers. .J.Vasc.Surg 1988;7;478-83	Unna Boot (42) DuoDERM (45) (compared dressings to compression alone)	Prospective, RCT 6 month comparison of VU healing in a US vascular surgery clinic.	70% healed withUnna's Boot 38% healed with DuoDERM dressing without compression (p = 0.01). A dressing could not compensate for the lack of compression in VU patients..
Kloth LC, Feedar JA. Acceleration of Wund Healing with High Voltage Monophasic, Pulsed Current. JOAPTA 1988; 68 (4):503-508	Electric Stimulation (16 Participants) Treatment Group (9) Control Group (7)	Prospective RCT for 16 week comparison of wound healing with HVPC with pressure ulcers in the US clinic setting	**Treatment Group** with a mean healing of 44.8% per week and 100% over a mean rate of 7.3 weeks. **Control Group** with increase in area at an average of 11.6% per week and aincrease of 28.9% over a mean rate of 7.4 weeks
Koksal C, Bozkurt AK. Combination of hydrocolloid dressing and medical compression stocking versus Unna's boot for the treatment of venous leg ulcers. *Swiss Med Wkly* 2003; 133:364-368.	Unna's boot (30 VU patients) Comfeel Ulcer Dressing plus 30-40 mmHg Class II elastic compression stockings (30 VU patients)	Prospective RCT measuring healing of VU ulcers duration 16 .6 weeks and ease of use and patient reported pain	Healing rates and times not different for the two groups, but hydrocolloid plus stocking was easier to use ($p < 0.0001$). More pain with Unna's boot ($p< 0.0001$) both during application and at home. 150 min to apply Unna's Boot vs 134 to apply hydrocolloid plus elastic stocking (p >0,05).
Korn P, Patel, S., Heller, JA et al. Why insurers should reimburse for compression stockings in patients with chronic venous stasis. *J Vasc Surg.* 2002; 35:950-7.	Hypothetical 55-yr-old patients with prior VU receiving vs not receiving compression stockings and education (CS+Ed),	Markov decision tree analysis was conducted based on published probabilities of venous ulcer recurrence, 4.6 mo heal time, 12% chance of hospitalization and 0.4% chance of amputation after VU development.	With CS+Ed the mean time to VU recurrence was 53 months vs 18.7 mo to recurrence without CS+Ed.. CS+Ed saved costs of $5094 while saving 0.37 QALY. If considering only medical treatments, CS+Ed would save $6326 during the lifetime of each patient.
Labropoulos N, Landon P, Jay T. The impact of duplex scanning in phlebology. *Dermatologic Surg* 2002; 28(1): 1-5	Case series of venous ulcer patients	Literature review and case series illustrating how duplex scanning ultrasound diagnoses venous reflux	Duplex scanning ultrasonography has become the god standard for diagnosing the location and extent of venous insufficiency.
Layton,AM, Ibbotson SH, Davies JA, Goodfield,MJD. Randomised trial of oral aspirin for chronic venous leg ulcers. Lancet 1994;344:164-165.	*20 subjects with VU : QD Oral enteric ASA300mg (10) or placebo(10) Standard compression bandage for both*	*HRCT ; double blinded 4 months duration*	*Healing rates at 4 months: ASA 38% vs Placebo 0%(p<0.007) Reduction in ulcer size at 4 months: ASA 52% vs 26% Placebo(p<0.007)*
Lee, B.B., et.al, Management of arteriovenous malformations: A multidisciplinary approach. *J Vascular Surgery* 2004; 39(3): 590-600.	797 subjects with congenital vascular malformations- evaluation of a multi-disciplinary treatment	Retrospective study.	Diagnosis and management of AVMs by a multidisciplinary approach that integrates surgical therapy with embolism and sclerotherapy appears to improve the results and management with limited morbidity and no recurrence during early follow-up.
Lingren C, Marcusson JA, Toftgard R. Treatment of venous leg ulcers with cryopreserved cultured allogeneic keratinocytes: a prospective open controlled study. *Br J Dermatol* 1998; 139:271-275	Cryopreserved allogeneic keratinocyte sheets + compression bandages (CAK +C, 15 chronic VU patients Compression bandages alone (C, 12 chronic VU patients	Prospective open controlled study applying CAK + C or C alone, once weekly for 8 weeks	Mean 8-week reduction in VU area was 35 with CAK + C vs 14% with C alone (α >0.05, not significant) attributed to cell-weakening by cryopreservation.

Lippman HI, Fishman LM, Farrar RH et al. Edema control in the management of disabling chronic venous insufficiency. Arch Phys Med Rehabil 1994;75:436-441	762 patients with 1-8 VU 4" Unna's boot weekly covered with tubular bandages or elastic bandages (similar to the "Duke Boot").	Retrospective survey	73.7% healing rate Significant predictors of healing: 1. # weeks to heal one ulcer predicts time to heal next 2. Age not correlated with weeks to healing 3. Frequency of visits strongest predictor of healing
Lundberg, T, et al. Pulsed Untrasound Does Not Improve Healing of Venous Ulcers	44 subjects, 12 withdrawn (subjects refused to continue, allergic to treatment, excessive pain, intervening illness) Comparison of healed ulcers and ulcer area	Controlled, randomized	There were no significant differences in the proportion of healed ulcers or ulcer area in the pulsed ultrasound sound group when compared to the placebo group.
Lyon RT, Veith FJ, Bolton L, Machado F and the Venous Ulcer Study Collaborators. Clinical Benchmark for healing of chronic venous ulcers. *Am. J. Surg.* 1998; 176:172-175.	Oral 250 mg/day Ifetroban TxA2 inhibitor (83) or Placebo (81) . Dressings: DuoDERM CGF + Unna Flex (boot) +elastic compression (CoFlex) + Kaltostat if high exudate	Multicenter, prospective blind RCT for 12 weeks of long duration (27 month average) venous ulcers in outpatient clinics	At 12 weeks 55% of Ifetroban and 54% of placebo patients healed. Median time to healing 9.6 weeks for Ifetroban patients, 11.0 weeks for placebo.
Mayrovitz HN, Larsen PB Periwound skin microcirculation of venous leg ulcers. *Microvasc Res* 1994; 48: 114-123.	16 Consecutive venous ulcer patients	Prospective, same-patient non-ulcerated leg control. Measured peri-wound vascular perfusion, blood velocity, skin temperature and $TCPO_2$.	Peri-ulcer skin had elevated blood perfusion, blood velocity, but lower $TCPO_2$ than non-ulcerated leg on same patient.. Concludes peri-ulcer number of microvessels is reduced and each carries more blood.
Mayberry JC, Moneta GL, Taylor LM Jr, Porter JM. Fifteen-year results of ambulatory compression therapy for chronic venous ulcers. *Surgery* 1991; 109:575-581.	113 venous ulcer patients with class III severe chronic venous insufficiency and prescribed initial bed rest , ulcer cleansing, dressing changes + ambulatory elastic compression stocking therapy	Prospective 15-year study measuring complete ulcer healing and recurrence with logistic regression analysis of risk factors for non-healing: ulcer size, patient age, gender, diabetic status, smoking and PPG VRefillT	105 (93%) healed in a mean of 5.3 months. Of the 102 who adhered to the stocking therapy 97% healed vs 55% of the 11 non-adherent patients (p<.0001). Only adherence (p=.0001) and less pretreatment ulcer duration (p=0.02) predicted healing. In the 73 patients with post-healing follow-up (mean 30 months) 16% recurrence occurred in adherent patients (5-yr life table estimate of recurrence = 29%). Of non-adherent patients 100% recurred by 36 months.
McCulloch J., Boyd VB. The effects of whirlpool and the dependent positionon lower extremity volume. JOBST 1992; 16(4):169-173	Whirlpool (40 Participants) All subjects were healthy PTs and PT students. All participants had LE volume assess prior to treatment and after treatment in positions of supine, dependent position with extremity in tank and with 20 min whirlpool treatment	Prospective over a 3 week time period.	Limb Volume Supine x = -16ml (+/- 15.2) Dependent x = 20.5 ml (+/- 32.5) Whirlpool x = 44ml (+/- 30.5)
McGuckin M, Waterman R, Brooks J, Cherry G, Porten L, Hurley S, Kerstein M. Validation of venous leg ulcer guidelines in the United States and United Kingdom. *Amer J Surgery* 2002; 183:132-137.	80 Retrospective pre-guideline(pre April, 1997) 80 Prospective with guideline Half from US Philadelphia Home Health Care Assns. Half from UK Oxfordshire general practice.	Outcomes and costs of venous ulcer care were compared pre-guideline via chart abstraction versus prospective diagnosis and treatment using the content-validated guideline	Ankle to brachial index was performed on 8-36% of patients in US-UK pre-guideline and 93-96% with the guideline. % healed in <12 weeks increased from 23% to 70% in the US and from 40% to 65% in UK, while median cost to heal an ulcer decreased from $825 to $113 in the US and from £136 to £78 in the UK.

Meyer FJ. et al. Randomized clinical trial of 3-layer paste and four layer bandages for venous ulcers. *British Journal of Surgery*. 2003 (90): 934-940.	113 patients. 64 patients treated with 3 layered bandage and 69 treated with 4 layered bandage.	RCT. Comparing the efficiency of 3 layered bandage and 4 layered bandage.	3 layered bandage 80% of wounds healed completely at 12 weeks 4 layered bandage 65% healed completely at 16 weeks.
Meyers MB, Rithtor M, Cherry G. Relationship between edema and the healing rate of stasis ulcers of the leg. *American J Surg.* 1972; 124:686-688.	9 post phlebitic VU patients unresponsive to ligation and stripping were successively subjected to Adaptic wound dressing, Adaptic with elastic bandage, Adaptic with Unna's Boot or Adaptic + Unna's Boot + Elevation	Leg edema was measured as volume by immersion and healing rate was measured as percent contraction per week.	Healing progressed most rapidly in patients with edema reduction responses, with evidence suggesting that both ulcer and edema are due to the same cause.
Morrell CJ, Walters J, Dixon S, Collins KA, Brereton ML, Peters, J, Brooker CGD. Cost effectiveness of community leg ulcer clinics: randomized controlled trial. *BMJ* 1998; 316: 1487-1491.	233 patients with venous leg ulcers allocated at random to care with 4-layer bandage in one of 8 community leg ulcer clinics (n = 120) or to control care in the home (n = 113)	Measures included percent healed during 12 weeks and 12-month follow-up	During 12 weeks of care, 34% healed in community clinic versus 24% in home care (p = 0.03).
Morykwas MJ Argenta L *et al.* Vacuum-assisted closure: A new method for wound control and treatment: Animal studies and basic foundation. *Ann Plas Surg* 1997; 38 (8):553-562.	5 swine partial-thickness excisions for each level of vacuum from 0.004 to 125 in 25 mmHg increments	Measured blood flow, granulation, bacterial clearance, and random-pattern flap survival	Blood flow increased four-fold at 125 mmHg. Granulation tissue increased with both continuous and intermittent application. Bacteria decreased after 4 days. Random pattern flap survival increased 21%.
Mosti, G., Mattaliano, V., Iabichella, M.L., Piperni, P., Polignano, R. Cryo and Glycerolate-Preserved Allografts in the Treatment of Chronic Non-Healing Leg Ulcers *Conference of the European Wound Management Association* May 2002	Cryo-preserved skin graft in 20 cases- cadaveric allograft in 18 cases and taken from a living donor in 2 cases, a glycerolate-preserved skin in 6 cases, Total 26 patients	Prospective case series	21 patients –quick disappearance of pain, 3 patients observed a considerable reduction of pain within a few days, 2 cases where the result was unchanged (both arterial ulcers).Healing time decreased drastically, no infections
Mulder, G., Jones, R., Cederholm-Williams, S., Cherry, G., Ryan, T. Fibrin Cuff Lysis in Chronic Venous Ulcers Treated with a Hydrocolloid Dressing. *International Journal of Dermatology* 1993;32(4):304-306.	DuoDERM under Unna Boot + Compression with Coban (9) Unna Boot + Compression with Coban (10)	Randomized blind evaluated, prospective controlled study of venous ulcers evaluated before and after one dressing in place for one week, in an outpatient clinic	Reduction of deep and shallow pericapillary fibrin cuffs in 40% of the group without DuoDERM vs 89% of the group with DuoDERM ; no other histological differences.
Navarro TP, Konstantinos TD, Ribeiro AP. Clinical and hemodynamic Significance of the greater saphenous vein diameter in chronic venous insuficiency. *Arch Surg. 2002; 137:1233-1237.*	85 consecutive patients with 112 lower limbs with compromised veinous return were examined to test validity of CEAP and great saphenous vein diameter	Prospective cohort study investigating validity of CEAP and great sapenous vein diameter as measures of hemodynamic impairment	CEAP score and GSV diameter were well correlated with venous filling index, venous volume and residual volume fraction and with each other, validating both measures.
Nelson EA, Bell-Syer SEM, Cullum NA. Compression for preventing recurrence of venous ulcers. *The Cochrane Library* 2003; 4. John Wiley & Sons Ltd, Chichester UK.	Systematic review of the literature on venous ulcer recurrence.	No RCTs compared recurrence rates with vs without compression. Two prospective cohort studies, 1 comparing moderate to high compression hosiery and one (n=166) two types of moderate compression hose	5 yr follow up: relative risk of recurrence = 82% with both high and moderate compression hose More compliance with moderate. 74% recurrence with moderate. Not wearing compression hose was strongly associated with ulcer recurrence.
Nelzen O *et al.* Leg ulcer etiology: A cross-sectional population study. *J Vasc Surgery* 1999; 14(4): 555-64.	Populational epidemiology study	Retrospective cohort study	Venous stasis is an important diagnostic cue for VU.
Nicolaides AN et al. Investigation of chronic venous insufficiency: A consensus statement. Circulation,2000,Nov 14;102(20):E126-63.	Clinical history risk factors	Consensus document	Most frequent causes of CVI are abnormalities of venous wall and valves and secondary changes due to previous DVT

Northeast ADR, Layer GT, Wilson NM, Browse NL, Burnand KG. Increased compression expedites venous ulcer healing. *Royal Society of Med Venous Forum* 1990 (Published + unpublished data cited in Cullum et al.)	3-layers including nonelastic Elastocrepe (54) same 3-layers replacing Elastocrepe with elastic Tensopress (52)	RCT of UK outpatients excluding arterials disease until 3 months or healing whichever came first.	51% healed in 3 months with non-elastic Elastocrepe. 64% healed in 3 months with Tensopress elastic layer replacing the Elastocrepe.
Oein, RF, Hansen, B.U., Hakansson, A. Pinch Grafting of Leg Ulcers in Primary Care Acta Derm Venereol 1998 Nov.; 78 (6): 348-9.	Pinch Grafts (45 patients with 55 ulcerated limbs and 84 skin transplantations	Open, non-randomized	Healing rate after 12 weeks for venous ulcers was 45% and 44% for neuropathic ulcers. One year postoperatively, 47% (19/40) of examined ulcers remained healed. Venous ulcers represented of all ulcers.
Ortonne JP. A controlled study of the activity of hyaluronic acid in the treatment of venous leg ulcers. *J Dermatol Treatment* 1996; 7:75-81.	Hyaluronic acid as once daily 4 g of 0.05% sodium hyaluronate cream in a 10 cm x 10 cm gauze pad (27) Dextranomer as once daily sachet of 6.4 g dextranomer paste (24)	Prospective, RCT of patients with venous ulcers 3-12 cm diameter treated for 21 days with day 0 and weekly wound tracings and wound edge, bed, pain and oozing assessments	HA treated ulcers decreased in size as early as day 7 ($p<0.001$) and maintained that level of significance. Dextranomer-treated ulcers decrease in size was not significant. HA ulcers also significantly decreased in oozing by day 14, as the Dextranomer ulcers did by day 21
Partsch H. [Compression stockings in treatment of lower leg venous ulcer (German)] *Wien Med Wochenschr.* 1994; 144(10-11):242-249.	Short stretch bandage (25) High compression elastic stockings (25)	RCT duration 3 months.	High compression stockings healed 84% in 3 months versus 52% in the short-stretch bandage group.
Patel GK, Llewellyn M, Melhuish J, Harding K. 3 Layer tubular pressure support bandages is an alternative and effective form of compression in the management of venous leg ulceration. *J Am Acad Dermatol.* 2004; 50(3): P169: 656.	50 successive venous leg ulcer patients entering Welsh clinic during one 12-month period with median ulcer duration 8 months. managed with tubular bandages.	Managed with 1 (n=2),2 (n=6) or 3 (n=29) layers of tubular (TubiPress) bandages or Pro-Fore 4-layer bandage (n=6)	19 of 29 (66%) of VU managed with 3 layers of tubular support bandages healed in a median of 4 months, results comparing "favourably" with those of the 4-layer bandage.
Pekanmaki K *et al.* Laser doppler vasomotion among patients with post-thrombotic venous insufficiency: effect of intermittent pneumatic compression. *Vasa* 1991; 20(4):394-7.	19 patients with venous insufficiency 8 healthy control subjects	CCT	Intermittent pneumatic compression increased skin blood flux and vasomotion in all venous patients
Perrin M, Hiltbrand B Bayott J, Results of valvuloplasty in patients presnting deep venous insufficiency and recurring ulceration. *Ann Vasc Surg* 1999; 13:524-532.	33 lower extremities in 28 patients treated with valvuloplasty	Retrospective case series of patients with primary deep venous insufficiency confirmed by clinical observation and Dupplex scan with PPT to 2-7.6 years	Results best for superficial vein insufficiency and ligation of perforators. Less consistent if post-thrombotic syndrome was involved.
Pessenhofer H, Stangl M. [The effect on wound healing of venous leg ulcers of a two-layered polyurethane foam wound dressing] Arzneimittelforschung. 1989 Sep;39(9):1173-7.	Wound Dressings 41 patients (24 treated, 17 standard of care controls)	Prospective, CCT comparative study of 41 patients (24 treated, 17 controls) Measure: relative change in % healing as an indicator	Wound healing ($p < 0.001$) promotion by the synthetic foam dressing and a significant ($p < 0.05$) increase in acceleration of healing.
Phillips T. Successful methods of treating leg ulcers. *Postgraduate Medicine* 1999; 105(5):1-13	Review of causes, diagnosis, history and treatment of leg ulcers	Continuing Medical Education article . (EO)	Venous stasis (insufficiency) is a diagnostic cue for development of VU, and duplex ultrasound is helpful to confirm its site and extent. In patients with edema, a hand-held Doppler flowmeter can help measure the ABI if arterial pulses are not palpable due to the edema.

Polignano R, Guarnera G, Bonadeo P. Evaluation of SurePress Comfort™: A new compression system for the management of venous leg ulcers. *J Wound Care 2004;*13(1):21-24.	SurePress combined 2-layer high compression stocking (27) Comprilan short-stretch bandage (29)	Prospective open-label RCT measuring healing, local pain and compliance to compression wear during 12 weeks, evaluated week 0, 4, 8 and 12.	Percent healed at 12 weeks: SurePress 44%, Comprilan 17% p=0.027. Mean days to healing SP: 72, C: 101; p=0.0265). Pain reduction greater for SP: p=0.017.
Prescott RJ, Callam MJ, Harper DR, Dale JJ, Ruckley CV. A controlled trial of weekly Ultrasound therapy in Chronic Leg Ulceration. The Lancet July 25, 1987; pages 204-206	Ultrasound (108 participants) Control Group (56) Treatment Group (52)	Prospective, RCT, VU for a two year period of time	Treatment group 100% closure in 61% o f the patients in a 12 week period of time Control group 100% closure in 41% of the patient s in a 12 week period of time
Puonti, H., Asko-Seljavaara, S. Excision and Skin Grafting of Leg Ulcers *Annales Chirurgiae Et Gynacologiae* 1998: 87 (3): 219-23.	Split-ThicknessSkin Grafts SSG (65)	Open, non-randomized study	90% of all ulcers cured in an average hospital stay of 11 days and with post-operative wound care of 4.5 months. Ulcers reoccurred in 17% of patients during follow-up.
Quintanal, Vigil-Escalera. Measurement of quality of life in patients with leg ulcers treated with a new hydrofiber dressing using the Nottingham Health Profile. *Proc. European Tissue Repair Society,* Bordeaux, 1999	Leg ulcers AQUACEL (111) Historical control	Prospective multicenter 8 week study—*wound or exudate improvement, pain and sleeplessness in Nottingham Health Profile to assess quality of life.*	Improvements in wound status, reduced exudate, pain ($p<0.005$) and sleeplessness ($p<0.001$) improving quality of life during the first and second months of AQUACEL use.
Raju S, Fredericks R. Valve reconstruction procedures for non-obstructive venous insufficiency: Rationale technique and results in 107 procedures with two to eight year follow up. *J Vasc Surg* 1988; 7:301-9.	107 venous insufficiency patients	CS with 2 to 8 yr follow up.	Surgical valve leaflet pliction/ tightening procedure works but has not been compared to compression in efficacy
Robinson C, Santill S. Warm-up Active Wound Therapy: A novel approach to the management of chronic venous stasis ulcers. *J Vasc Nurs* 1998; 16(2):38-42	Total of 13 VU patients assigned to either: Warm-up (8 ulcers) therapy for 1 hour 4 times daily or conventional gauze therapy (5 ulcers) followed by crossover to Warm-up	Pilot prospective RCT of inpatients for 2 weeks. Control wounds mean 64.4 cm^2 initial area. Warm-up wounds mean 29.4 cm^2 initial area.	32% decrease in wound size and 39% decrease in pain score for Warm-up patients. 25% decrease in wound size and 27% decrease in pain score for controls. Pain decreased over time for both treatments.
Romanelli M. Objective measurement of venous ulcer debridement and granulation with a skin color reflectance analyzer. *Wounds* 1997; 9(4): 122-126.	Film (Opsite) dressing + elastic compression covering: • Enzymatic debridement : *Elase* (16) • Autolytic debridement: DuoDERM Hydroactive Gel (16)	VU covered with fibrin were rated clinically for fibrin or granulation tissue, and red or yellow colorimetry assessed on days 3, 6, 9, 14 of treatment, using a Chroma Meter CR 200 Minolta camera	Both groups were similar initially in fibrin and granulation measures. Both decreased in fibrin and increased in red granulation tissue over time. The Hydroactive Gel-dressed VUs had more granulation tissue than enzyme debrided ones from days 6-14.
Rubin JR, Alexander J, Plecha EJ, Marman C. Unna's boot vs polyurethane foam dressings for the treatment of venous ulceration. A randomized prospective study. Archives of Surgery 1990;125: 4:489-90.	Unna's Boot (19) SynthaDerm (17) foam dressing	Prospective, RCT unclear duration in US hospital setting	94.7% healed with Unna's Boot 41.2% healed with SynthaDerm Increase rate of healing with Unna's boot of .5 cm/day vs foam of .07 cm/day.

Samson,RH. Compression stockings and non-continuous use of polyurethane foam dressings for the treatment of venous ulceraton: A pilot study. J.Derm Surg Oncol. 1993;19:68-72.	20 ambulatory patients with 30 lower extremity stasis ulcers over 24 months The study assessed * A hydrophilic polyurethane sponge covered by a hydrophobic membrane changed daily or every other day * A inner liner stocking that applies 10 mmHg pressure and is worn 24 hours a day *A surgical stocking with a posterior zipper that applies 30 mmHg graduated pressure and is removed at night	*CS - Descriptive uncontrolled study* Prospective NRCT of 20 ambulatory patients with 30 lower extremity stasis ulcers over 24 months	*All ulcers healed after 2 to 30 weeks (mean 8.3 weeks) including 15 previously treated by Unna's boot or hydrocolloid dressings and 3 infected ulcers*
Samson RH, Showalter DP. Stockings and the prevention of recurrent venous ulcers. *Dermatol Surg* 1996; 22:373-376.	2-Layer compression stockings Jobst UlcerCare (56 VU patients with deep vein insufficiency)	After color venous duplex evaluation and PPT to determine venous reflux time healing & recurrence were measured	53 of 56 VU patients healed using the compression stockings. Recurrence occurred in 23 patients in a median of 12 months, primarily in patients who did not regularly use the stockings.
Santill SM *et al.* Use of a non-contact radiant heat bandage for the treatment of chronic venous stasis ulcers. *Adv Wound Care; 1999;* 12(2):89-92.	Warm-up Therapy (17 patients with 31 wounds)	Prospective case series in a university-affiliated VA medical center, with 18-month follow up	8/17 (44%) healed completely after discharge; 14/17 (82%) improved. One recurrence in 18 months.
Sayag J, Meaume S, Bohbot S. Healing properties of calcium alginate dressings. J Wound Care. 1996 Sep;5(8):357-62	*Calcium alginate *Established local treatment with dextranomer paste	Prospective RCT of 92 patients withfull thickness wounds	*Alginate Mean surface area reduction: 2.39 cm2 *Dextranimer paste Mean surface area reduction 0.27 cm2
Shebel ND An early intervention plan for identification and control of chronic lower extremity edema *J Vasc Nursiingl 2002 20(2)*:45-50	Clinical experience with patients in practice.	Evidence-based and expert opinion-based early intervention plan to identify and control lower extremity edema	Identification and control plan for chronic lower extremity edema reduces 70-90% recurrence rate for VU
Sibbald, GS, Browne, AC, Coutts, PC, Queen D. Screening evaluation of an ionized nanocrystalline silver dressing in chronic wound care. *Ostomy Wound Management* 2001; 47(10):38-43.	29 patients studied, 6 venous ulceration.	Uncontrolled, open label, prospective case study.	4/6 vu patients demonstrated decreased wound size and exudate.
Sigel B. Edelstein AL, Savitch L, Hasty JH, Felix R, Jr. Type of compression for reducing venous stasis.. *Arch Surg* 1975; 110:171-175	6 healthy volunteers and 1 volunteer with history of thrombophlebitis.	Common femoral vein flow was measured while subjecting supine volunteers to gradient or uniform compression.	Gradient compression descending centrally provided the greatest increment in venous flow.
Sikes E. Evaluation of a transparent dressing in the treatment of stasis ulcers of the lower limb. Journal of Enterostomal Therapy 1985;12:116-20.	Unna's boot; (7) Opsite film dressing (6)	Convenience controlled trial for 1 year in a vascular clinic setting in the USA	81% healed with Unna's Boot 71% healed with Opsite

Spence, R, and Cahall, E Inelastic versus elastic leg compression in chronic venous insufficiency: A comparison of limb size and venous hemodynamics. *J Vasc Surg* 1996; 24:783-787.	10 patients and 18 limbs all with Class III chronic venous insufficiency and ankles of sufficient flexibility to exercise the calf muscle pump	Patients' limb size, venous filling rate and ejection fraction was measured with no compression, with a 30 to 40 mm Hg below knee stocking and with Circaid inelastic compression 2 and 6 hours after application.Therapies were compared with baseline and over time	Inelastic compression has a significant effect on deep venous hemodynamics by decreasing venous reflux and improving calf muscle pump function (ankle circumference-at 2 vs. 6 hours:baseline,24.7± 7 cm vs 26.1± 1.1 cm, stocking 23.9± 1.1cm vs 26.2± 1.2cm when compared with compression stockings
Stacey MC, Burnand,KG, Layer GT, Pattison M. Transcutaneous oxygen tensions in assessing the treatment of healed venous ulcers. British J. Surg 1990;77:1050-1054	*TCPO2 as a reulceration predictor in healed VU patients. 2 groups:* *1. Elastic stockings and stanozolol 5mg bid x 9 mos or* *2. Elastic stockings and surgical ligation of superficial veins*	*RCT with reassessment of legs with tcO2 measurement TCPO2 was compared for patients who refused surgery or stanozolol, who received elastic stockings alone*	*Confirms low tcO2 over lipodermatosclerotic skin and healed ulcers* *Improved tcO2 in both treatment groups over elastic stockings alone (p<0.5)*
Stacey M, Falanga V, Marston W,Moffat C, Phillips T, Sibbald RG, Vanscheidt W, Lindholm C. The use of compression therapy in the treatment of venous leg ulcers: A recommended management pathway. *EWMA Journal* 2002; 2(1):3-7.	Algorithm developed by consensus	MEDLINE Literature Search 1966 to 2002 EMBASE Literature Search 1974-2002 on compression therapy/treatment of venous ulcers	Algorithm or pathway published for venous ulcer compression if ABPI > 0.8; 15-25 mm Hg compression for Mixed Arterial-Venous Ulcers if ABPI = 0.5 to 0.8; or referral to specialist with no compression if severe Arterial disease exists as defined by ABPI <0.5.
Stacy MC. Investigation and treatment of chronic venous ulcer disease. *ANZ J. Surg* 2001; 71:226-229.	Literature review of techniques of preventing ulcer recurrence.	Summary of effects of stockings in RCT or various surgeries to prevent ulcer recurrence	Class 3 stockings (35-45 mmHg at ankle) reduce ulcer recurrence. Primary source is ref#30 in this review. (ordered)
Stiller MJ, Pak GH, Shupack JL, Thaler S, Kenny C, Jondreau L. A portable pulsed electromagnetic field (PEMF) device to enhance healing of recalcitrant venous ulcers: a double-bline, placebo controlled clinical trial *Br J Dermatol* 1992; 127(2):147-154.	PEMF 3 hours daily at home Active (18) Placebo (13)	Prospective double-blind RCT measuring wound surface area, ulcer depth and pain intensity at weeks 0, 4, and 8	By week 8, active group had a 48% decrease in wound surface area vs an increase in area of 42% for placebo (α<0.0002). 50% of active ulcers healed by week 8 vs 0% in the placebo group. (α<0.01)
Taylor AD, Taylor RJ, Marcuson RW. Prospective comparison of healing rates and therapy costs for conventional and four layer high compression bandaging treatments of venous leg ulcers Phlebology 1998;13:20-4.	4 layer bandage (orthopaedic wool, crepe, Elset, Coban); (18) Conventional treatment (range of preparations, possibly including some compression (18)	RCT for 12 weeks in a UK leg ulcer clinic	Healing of all ulcers on cared for limb in 12 weeks: 66.7% with 4-layer compression 22.2% with Conventional care
Tawes RL, Barron ML, Coello AA, Joyce DH, Kolvenbach R. Optimal therapy for advanced chronic venous insufficiency. *J Vasc Surg* 2003; 37:545-551.	Balloon dissection, subfascial endoscopic perforating vein surgery (SEPS) with routine posterior deep compartment fasciotomy, including ligation and stripping of the superficial system	Retrospective multicenter cohort study reviewing clinical efficacy and safety outcomes for 832 patients receiving the procedure for venous reflux documented at duplex ultrasound scanning and stratified by CEAP classification.	The technique interrupted 3-14 (mean 7) incompetent perforating veins per patient., with 55% of patients receiving SEPS plus ligation and stripping in the same operation. Ulcers healed or were improved in 4-14 weeks in 92% of patients. In the 4% with recurrent ulcers or skin breakdown at 6-24 months, repeat SEPS was successful in 25%. In a subset of 51 C4 patients consenting to ambulatory venous pressure (APV) measurement, the 25 with SEPS had significantly decreased AVP..

TenBrook, J, et. al., Systemic review of outcomes after surgical management of venous disease incorporating subfascial endoscopic perforator surgery. *J Vasc Surg* 2004; 39:583-589.	1140 treated limbs- 1 randomized trial and 19 case studies	Retrospective analysis of 20 studies	Results suggest that surgical management oaf venous ulcers including SEPS, with or without saphenous ablation, leads to an 88% chance of ulcer healing and a 13% chance of recurrence over the short term
Todd DJ, Heylings DJ, Allen GE, McMillin WP Treatment of chronic varicose ulcers with pulsed electromagnetic fields: a controlled pilot study. *Ir Med J* 1991; 84(2):54-55.	Pulsed electromagnetic field 19 total patients Active twice weekly Placebo twice weekly	RCT for 5 weeks measuring leg girth, pain, infection rates and healing.	Trends favored decrease in ulcer size and lower leg girth with Active, but there were no significant difference in % healed possibly due to short duration of trial or small "N".
Turcynski. R., Tarpila, E. Treatment of Leg Ulcers with Split Skin Grafts: Early and Late Results *Scandinavian Journal Plastic and Reconstructive Hand Surgery* 1999:33:301-305. C1	Split Skin Grafts SSG (60)	Case series, four months follow-up	88 leg ulcers were treated in 60 patients. 82% healed after a mean of 15 days and 36% reoccurred after a mean of 6 months in the SSG group
van Rijswijk, L.The multi-center Multi- Leg Ulcer Study Group. Full-Thickness Leg Ulcers: Patient Demographics and Predictors of Healing. *Journal of Family Practice* 1993; 36(6): 625-632.	DuoDERM CGF DuoDERM (total of 72 leg ulcers)	Retrospective analysis of ConvaTec data on 72 full-thickness leg ulcers of venous, diabetic, arterial or mixed etiology	54% healed in average of 56 days. Risk factors for non-healing included male gender or diabetes. >30% area reduction after 2 weeks of treatment predicted that the ulcer would progress to healing
Vanscheidt W, Sibbald G, Eager C. Management of venous leg ulcers: Versiva™: A new foam composite dressing, compared with a foam dressing. *Ostomy/Wound Management* 2004; In press	With moderate to high compression bandaging: Versiva™ composite foam (55) Allevyn Adhesive (52)	Prospective RCT of dressing performance, patient-reported pain and healing during 12 weeks of care.	Composite foam was more conformable (p=0.05), less sensitizing (p=0.02) and easier to apply (p=0.01). Other variables showed no statistically significant differences.
Veraart JCJM, Neumann HAM, Effects of medical elastic compression stockings on interface pressure and edema prevention. *Dermatol Surg,* 1996; 22:867-871.	Part 1: 18 legs on 10 patients, of these, 14 legs on 8 recurrent VU patients confirmed with Doppler ultrasound. Part 2:11 legs on 6 recurrent VU patients	CCT: Part 1: Interface pressure measurements for 5 different low, medium or high compression stockings. Part 2: Leg volume measured lower leg edema	Part 1. Compression levels ranged from 18 mmHg to 40 mmHg at the ankle. Part 2. The higher > 30 mmHg compression stockings reduced edema more than those providing <30 mmHg compression.
Villavicencio, J.L. Prospective comparative trial between the conventional Four-layer elastic compression treatment and a semi-rigid orthotic compression treatment and a semi-rigid orthotic compression system in patients with bilateral venous leg ulcers. American Venous Forum 21st Annual Symposium: Current Critical Problems in Vascular Surgery VI, 6.1. 1994	Twelve patients with 24 contralateral paired extremities each with avenous ulcers, one each receiving 12 weeks treatment with: Circaid (12) (CA) Profore (12) (ECT)	Prospective, controlled, randomized 12-week study comparing CircAid to the Profore four layer elastic treatment, measuring mean ulcer healing rate Limb circumference reduction rate, microbial burden and patient satisfaction index	Ulcer area healing rate was greater with CA than ECT (4.65+ 1.36 versus 0.90 + 0.44 cm^2/week; P= .0114.) Limb circumference reduction rate was more significant with CA than with ECT (0.32+0.14 versus 0.10+ 0.14 cm/week: P=0.0385) No significant difference in patient satisfaction index

Vin F, Teot L, Meaume S. The Healing properties of Promogran in venous leg ulcers. J. Wound Care. 2002 Oct;11(9):335-41.	73 Patients .37 Promogran .36 Adaptic	RCT clinical trial, multi-center study, randomized controlled trial 12 wk comparison of dressings under short- stress compression. France	29 completed the 12 wk trial. 25 healed before 12 weeks. 19 stopped for reason unrelated to healing. Significantly more pt in Adaptic group switched to another dressing 22.2% versus 5.4%. No other differences in healing were significant. -31% (11) Healed w/ Adaptic -41% (15) Healed w/ Promogran -42% (15) Ulcers Imp. w. Adaptic -62% (23) Ulcers imp. W/ Prom
Vowden KR, Mason A, Wilkinson D, Vowden P. Comparison of the healing rates and complications of three four-layer bandage regimens. *J Wound Care* 2000; 9(6): 269-272.	Charing Cross 4-layer bandage (n=50) Parema a4-layer bandage (n=50) Robinson 4-layer bandage (n=49)	Wound healing was measured at 12 and 20 weeks. Ulcers were mean of 4.9 to 6.76 cm^2 in area.	Overall healing rate of ulcers was 65% at 12 weeks, 80% at 20 weeks with no healing difference statistically significant among the 3 bandages.
Vowden, M and Nelson, EA, Intermittent Pneumatic Compression for treating venous leg ulcers. Cochrane review.	To determine if IPC increases the healing of venous leg ulcers and limb swelling due to lymphodema-)- 4 trials-45, 75 for a combination of 2, 16	Randomized control study comparing IPC with control (sham IPC or no IPC	45 subjects in trial found increased ulcer healing with IPC plus compression than with compression alone 1.4, 95% CI 1.6 to82 2 small trials with 75 subjects found no evidence of a benefit for IPC plus compression compared with compression alone, another small trials found no difference
Weiss AR (Ed) *Bull North Amer Soc Phlebol Proc* 1995; 21:642-647.		EO	Varicose veins defined as dilated subcutaneous veins >4mm are common finding with VU
Wieman TJ. Efficacy and safety of recombinant human Platelet-Derived Growth Factor-BB (Becaplermin) in patients with chronic venous ulcers: A pilot study. *Wounds* 2003; 15(8):257-264.	2 RCTs Dose: 100 ug/g PDGF-BB Study 1: PDGF-BB (35) Placebo Gel (36) Study 2: PDGF-BB (32) Placebo Gel (32)	RCTs measuring wound healing and adverse events during 16 weeks of treatment or until healing whichever came first.	In Study 1, 36% healed by 16 weeks when treated with PDGF-BB, 34% healed with Placebo Gel. In Study 2, the ulcers were smaller. 56% healed by 16 weeks with PDGF-BB and 44% healed with Placebo Gel. There were no significant differences in healing .
Wilkinson L, Emery P, Palmer R. Immunological abnormalities in patients with leg ulcers. *Br J. Rheumatology* 1991; 29(6):490-1	Pilot study of 21 patients attending a leg ulcer clinic over a 6-week period, 10 with venous insufficiency.	Prospective case series exploring laboratory tests (CBC, ESR, C-reactive protein, rheumatoid factor, ANCA and Factor Viii diagnostic of leg ulcers	In 13 of 17 patients measured for Factor VIII related antigen it was elevated. 5 had ANCA (antinuclear antibody antineutrophil cytoplasmic antibody)
Wilson CL, Cameron J, Powell SM, Cherry G, Ryan TJ. High incidence of contact dermatitis in leg-ulcer patients--implications for management. Clin Exp Dermatol, 1991 Jul;16(4):250-3.	81 VU patients; retrospective review of patch test results performed on all new VU patients in preceding 11 months	CS	67% positive for contact allergy inclusive of lanolin, topical antibiotics &/or cetearyl alcohol. Multiple allergies in 58%.
Wilson JM, Arseculeratne YM, Yang Y, Cherry GW. Healing venous ulcers with cycloidal multidirectional vibration therapy. *J Wound Care* 2002; 11(10):395-8	21 VU patients ABI >0/8 Setopress + Vibro-Pulse gentle cyclic vibration 3 x /d for 30 min each. 2x/ week NA gauze dressing changes.	Prospective CS for 12 weeks during which healing and pain were measured weekly	13 (62%) healed completely in mean of 7 weeks. Pain reduced in 17 of 18 patients completing the study, accompanied by mean 15% reduction in leg volume.
Wipke-Tevis, D. *et al.* Prevalence, incidence, management and predictors of venous ulcers in the long-term care population. *Adv Skin Wound Care* 2000, 13(5):218-224.	venous ulcer development in 32,221 patients in long term care in Missouri 1 Jan 96 to 30 Oct 98	Retrospective cohort study from Minimum Data Set	Venous ulcer development during first year post admission was associated with lower extremity edema, peripheral vascular disease or diabetes mellitus.

Yasodhara M, Walton J, Hofman D, Cherry G. A comparison of light reflection rheography and duplex scanning in the diagnosis of chronic venous insufficiency. *Wounds* 2003; 15(8):246-249.	42 patients with venous insufficiency who had light reflection rheography (LRR) and were subsequently given duplex scans (DS)	LRR was used to measure venous refilling time. DS was used to measure venous reflux subsequently on the same 42 patients in a historically controlled trial	All 42 patients had shortened venous refilling time of less than 25 seconds as measured using LRR. Of these, 41 had abnormal DS confirming venous reflux, and 1 had a normal DS: 2.3% false negatives with DS.