

Programme and abstracts

8TH ANNUAL CONFERENCE OF THE
**International Association of
Diabetic Foot Surgeons (IADFS)**

**14-16 September 2022
Bratislava · Slovakia**



**International
Association
of Diabetic
Foot Surgeons**

Read more on www.iadfs.org



**International
Association
of Diabetic
Foot Surgeons**

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Welcome

Dear participant

On behalf of the board of the International Association of Diabetic Foot Surgeons it is our great pleasure to welcome you to Bratislava for the 8th annual conference of the IADFS.

During the three exciting conference days you will get the opportunity to meet with leading diabetic foot surgeons and to be updated on the diabetic foot surgical research happening across the world.

We sincerely hope you will enjoy the high-quality programme featuring sessions on Infection & Osteomyelitis, Amputations & Rehabilitation, Prophylactic surgery, Charcot, Surgical management of the infected foot, The ischemic foot and deformed foot, Offloading and much more. Additionally, the programme consists of excellent poster presentations, oral presentations from abstracts and satellite symposia.

We hope all participants will benefit from the unique opportunity to meet with leading diabetic foot experts from around the world.

We wish you an enjoyable and fulfilling conference!

On behalf of the IADFS Board



Venu Kavarthapu
IADFS President



Robert Frykberg
IADFS Scientific Officer



General information

Contact

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Nordre Fasanvej 113, 2nd floor
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Conference venue

Crowne Plaza, Bratislava, Slovakia.
Podchod Hodžovo námestie 2, 816 25
Bratislava, Slovakia

Badges

All participants and exhibitors should wear the name badge in the conference area at all times. The badge must be visible.

Certificates of Attendance

Certificates of attendance will be available on 16th September at the registration desk. The certificate will also be available as self-print after the conference. A link will be provided by e-mail to all participants.

Lunch and coffee

Lunch and coffee are available in the exhibition area. See programme for exact time of breaks.

Wifi

Wifi name: CrownePlaza
No password required.

Speaker Information

Please bring your presentation to the Session Room before your session starts. We recommend you upload your presentation at least 2 Hours before our session. A technician will be present to assist in the upload if necessary. Please bring your presentation on a USB. Use of personal laptops is not allowed. Unless otherwise agreed all presentations will be deleted after the conference in order to secure that no copyright issues will arise at the end of the conference.

Mobile phones

All mobile phones must be on silent mode during the sessions.

Language

The language for the IADFS 2022 conference is English.

Lost and Found

Found items should be returned to the registration desk. If you lose something, please report to this desk for assistance.

No smoking policy

Smoking is prohibited in the venue. There are dedicated outdoor smoking areas available.

Posters

Posters can be mounted from Wednesday 14th September 2022, 12.00 and must be removed by the end of the conference on Friday 16th September 2022, 12.00

The posters will be affixed to the poster boards with adhesive which will be provided to you by the conference staff.

Photographing

Photographing is prohibited during sessions: Please respect the intellectual property right of the presenter.

Welcome reception

Date Wednesday 14th September
Time 18.30-19.30
Place Exhibition area

Join your colleagues for snacks and wine/soft drinks. Please note that the event is not a dinner.

The event is included in the registration fee, no pre-registration necessary.

Conference Hours

Wednesday 14th September	11:30- 19:00	Registration desk open
	13:00-18:30	Scientific sessions
	12:00-19:30	Exhibition
	18:30-19:30	Welcome reception (open to all delegates)
Thursday 15th September	08:30-18:15	Registration desk open
	09:00-17:45	Scientific sessions
	18:00-18:45	AGM (for members of IADFS only)
	08:30-16:15	Exhibition
Friday 16th September	08:30-11:30	Registration desk open
	09:00-14:30	Scientific sessions

About IADFS

The International Association of Diabetic Foot Surgeons (IADFS) is an international not-for-profit organisation for surgeons working with the diabetic foot syndrome. Our work is to support cooperation and best practice in research, education and clinical interventions between foot surgeons working with or having an interest in the diabetic foot.

The aim of IADFS is to create a professional forum that will attract different groups of specialists which throughout the world are doing surgery on the diabetic foot.

IADFS is a membership based organisation with board members who have an extensive network of leading experts on the aspects of surgery on the diabetic foot. The overall purpose of IADFS is to create a forum for strengthening the position of surgery on diabetic foot care. We want to enhance awareness of the surgeons role in a multidisciplinary care organisation and develop the quality and knowledge about diabetic foot surgery globally.

➤ [Read more on iadfs.org/about-iadfs](http://iadfs.org/about-iadfs)



IADFS Board



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Arun Bal

Secretary
India



Rajesh Kesavan

Board member
India



Robert Frykberg

Scientific Officer
USA



Luuk Smeets

Board member
The Netherlands

IADFS 2022 Faculty

Christopher Attinger USA	Consultant Plastic Surgeon, MedStar Georgetown University Hospital, Washington, District of Columbia, USA
Arun Bal India	Consultant Diabetic Foot Surgeon, S. L. Raheja Hospital, Mumbai. Ex President of the Diabetic Foot Society of India.
Peter Blume USA	Podiatric Service Line Physician Executive/Podiatric Physician and Surgeon Codirector: Chronic Limb Ischemia , Heart & Vascular Service Medical Director, NOS/HVC/Ambulatory Surgery Yale New Haven Health Systems. Assistant Clinical Professor Of Surgery, Anesthesia and Cardiology ,Yale School of Medicine
Andrea Casini Italy	Vascular surgeon Chief Diabetic Foot Unit Clinica Polispecialistica San Carlo Paderno Dugnano Milano
Giacomo Clerici Italy	Diabetic Foot surgeon. Ospedale San Carlo Paderno Dugnano, Milano, and Policlinico di Abano Terme, Padova, Italy.
Luca Dalla Paola Italy	Chief, Diabetic Foot Department, Maria Cecilia Hospital, GVM Care&Research, Cotignola, Italy
Robert Frykberg USA	Adjunct Professor, Midwestern University Glendale, AZ, USA

Miki Fujii Japan	Associate professor, Division of Regenerative Therapy, Juntendo University Graduate School of Medicine, Department of Plastic and Reconstructive Surgery, Juntendo University School of Medicine, Tokyo, Japan
Frances Game UK	Clinical Director R&D, University Hospitals of Derby and Burton NHS Foundation Trust, United Kingdom
Venu Kavarthapu UK	Consultant Orthopaedic Surgeon, King's College Hospital, London, UK. President IADFS.
Rajesh Kesavan India	Consultant Podiatric Surgeon, Apollo Hospitals (Main), Chennai, India
Klaus Kirketerp-Møller Denmark	Consultant Orthopaedic Surgeon, Copenhagen Wound Healing Center, Bispebjerg University Hospital and Steno Diabetes Center Copenhagen, Denmark
Armin Koller Germany	Consultant Orthopaedic Surgeon, Chief of Division of Technical Orthopaedics, Dr. Guth Hospital, Hamburg, Germany
Fermin Martinez Mexico	Surgeon, Chairman DF Unit, San Elian Medical Center Founder President of the Latinamerican Diabetic Foot Society
Nina Petrova UK	Clinical Reseacher, Diabetic Foot Clinic, King's College Hospital, London, UK
Luuk Smeets Netherlands	Vascular surgeon, Rijnstate Hospital, Arnhem, Netherlands
Dane Wukich USA	Professor & Chairman, Orthopaedic Surgery, UT Southwestern Medical Center, Dallas, USA

Programme

Wednesday 14 September

Time	Title	Speaker
11:30	Registration desk opens London Foyer	
13:00 - 13:10	Welcome to the 8th annual conference of the IADFS Session room: London	IADFS President, Venu Kavarthapu, United Kingdom
13:10 - 14:45	SCIENTIFIC SESSION Session room: London	Moderator: Venu Kavarthapu, UK
13:10 - 13:30	Diabetic Foot Complications: Morbidity and Mortality	Robert Frykberg, IADFS Science Officer, USA
13:30 - 13:55	The Neuroischemic Foot - Implications for Limb Salvage	Giacomo Clerici, Italy
13:55 - 14:20	Vascular Assessment for the Non-vascular specialist	Luuk Smeets, Netherlands
14:20 - 14:45	Primary Amputation for the Diabetic Patient - When and Why?	Dane Wukich, USA
14.45 - 15.15	Coffee break Exhibition area: Rome	
15:15 - 16:05	SCIENTIFIC SESSION Session room: London	Moderator: Giacomo Clerici, Italy
15:15 - 15:40	Angiosomes: Guidance for Clinicians	Christopher Attinger, USA
15:40 - 16:05	Small Artery Disease and Microcirculation - Current Concepts	Andrea Casini, Italy
16.05 - 16.25	Industry symposium: Polynovo Session room: London For details see page 40	
16:25 - 17:05	Industry symposium: AOTI Session room: London For details see page 40	
17:05 - 17:10	Short break	
17:10 - 18:30	SCIENTIFIC SESSION Session room: London	Moderator: Luuk Smeets, NL
17:10 - 17:35	Endovascular Revascularization: Current Concepts and Issues	Luuk Smeets, Netherlands
17:35 - 18:00	A Unique Approach to the "No options" Patient- Lessons from Lengua	Andrea Casini, Italy
18:00 - 18:30	Endovascular or Open Bypass - Making the Right Choice	Jeff van Baal, Netherlands
18:30 - 19:30	Welcome Reception Exhibition area: Rome Included in the registration fee. Please note that the event is not a dinner.	

Thursday 15 September

Time	Title	Speaker
09:00 – 10:15	SCIENTIFIC SESSION Session room: London	Moderator: Robert Frykberg, USA
09:00 - 09:10	Welcome and Announcements	
09:10 - 09:35	Managing Diabetic Foot Infections - A Surgical Perspective	Fermin Martinez, Mexico
09:35 - 10:00	Necrotizing Soft Tissue Infections - No Time for Antibiotics Alone	Rajesh Kesavan, India
10:00 - 10:25	Local Antibiotic Elution and Ulcer Debridement - When and How	Arun Bal, India
10:25 - 10:55	Coffee break Exhibition area: Rome	
10:55 - 12:05	SCIENTIFIC SESSION Session room: London	Moderator: Arun Bal, India
10:55 - 11:20	Biofilms: What you Need to Know	Klaus Kirketerp-Møller, Denmark
11:20 - 11:45	Soft Tissue Coverage of Complex Open Wounds	Miki Fujii, Japan
11:45 - 12:05	Wound Dressings- What I Chose When	Rajesh Kesavan, India
12:05 - 12:45	Lunch break Exhibition area: Rome	
12.45 - 13.45	Industry Symposium: Integra Session room: London For details see page 40	
13.45 - 15.25	SCIENTIFIC SESSION Session room: London	Moderator: Venu Kavarthapu, UK
13:45 - 14:10	Neuropathic Ankle Fractures - The Rule of Doubles	Dane Wukich, USA
14:10 - 14:35	External Fixation in Infected Charcot Foot	Luca Dalla Paola, Italy
14:35 - 15:00	Midfoot Charcot with Ulcers -Approaches and Pitfalls	Armin Koller, Germany
15:00 - 15:25	Rearfoot Charcot - Is Internal Fixation the Best Option?	Venu Kavarthapu, UK
15:25 - 16:05	Coffee break Exhibition area: Rome	
16:05 - 17:45	SCIENTIFIC SESSION Session room: London	Moderator: Robert Frykberg, USA
16:05 - 16:25	Italian Model for Amputation Prevention Team	Giacomo Clerici, Italy
16:25 - 16:45	Diabetic Limb Salvage Team - Lessons from America	Peter Blume, USA
16:45 - 17:45	Ask the Experts - Panel Discussion on Selected Cases	Robert Frykberg, Giacomo Clerici, Dane Wukich, Luca Dalla Paola, Luke Smeets, Arun Bal, Peter Blume, Venu Kavarthapu
18:00-18:45	AGM Session room: London For members of IADFS only	

Programme

Friday 16 September

Time	Title	Speaker
09:00 - 10:20	SCIENTIFIC SESSION- Abstract Presentations Session room: London	Moderator: Arun Bal, India
09:00 - 09:10	OP1 Midfoot Charcot Deformity- Treatment strategy based on stages of disease progression and ideal combination of superconstruct	Madhu Tiruveedhula, United Kingdom
09:10 - 09:20	OP2 Combined Charcot Hindfoot and Midfoot Reconstruction Using Internal Fixation Method -Single Surgeon Series	Venugopal Guduri, United Kingdom
09:20 - 09:30	OP3 Transcutaneous gaseous CO2 therapy as adjuvant therapy in Charcot foot surgery	Igor Frangež, Slovenia
09:30 - 09:40	OP4 An evidence-based decision-making tool for conservative surgical options in managing diabetic forefoot ulcers and osteomyelitis.	Kaissar Yammine, Lebanon
09:40 - 09:50	OP5 The latest adjuvant therapy for chronic limb threatening ischemia	Miki Fujii, Japan
09:50 - 10:00	OP6 The Efficacy of ActiGraft, An Autologous Whole Blood Clot, in the Treatment of Diabetic Foot Ulcers - A Registry Study	Maxim Gurevich, Israel
10:00 - 10:10	OP7 Limb Salvage Surgery in Diabetic Foot Infections - Encouraging early results with a local antibiotic Carrier	Nijil Vasukutty, United Kingdom
10:10 - 10:20	OP8 Insertion of antibiotic loaded calcium sulfate beads in one step surgical closure of infected DFU with underlying osteomyelitis. Retrospective analysis of 56 consecutive cases.	Marcin Tusinski, Poland
10:20 - 11:15	Panel Discussion with Cases from Attendees Session room: London	Moderator: Dane Wukich, USA
11:15 - 11:25	Closing of IADFS Session room: London	

11:25 - 13:00	Lunch	
13:00 - 14:30	IADFS-DFSG JOINT SESSION Closing session of IADFS – Opening session of DFSG	Chairs: Nikolaos Papanas, Greece; Venu Kavarthapu, United Kingdom
	Recent Trials and New Therapies for DFUs	Frances Game, United Kingdom
	Preventing Amputations by Preventing DFU: LEAP Back to the Future	Robert Frykberg, USA
	The Charcot Foot - Is there Consensus on Underlying Pathophysiology?	Nina Petrova, United Kingdom
	Surgical management of diabetic foot infections	Venu Kavarthapu, United Kingdom
14:30	End of IADFS 2022	





International
Association
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Become a Member of IADFS

Membership benefits:

- ✓ Become a part of an international network of surgeons working with diabetic foot syndrome
- ✓ Get a discount on the registration to IADFS organized events
- ✓ Receive a membership certificate confirming your involvement in IADFS

See more on www.IADFS.org

Apply for Membership

To apply for membership please visit IADFS website:
www.iadfs.org/membership

MEMBERSHIP CRITERIA

IADFS membership is open to diabetic foot surgeons who actively work with the diabetic foot or for other reasons have an interest in surgery on the diabetic foot.

To meet the membership criteria, you must have a degree in a surgical discipline and either currently be, or have been, performing surgery on the diabetic foot.

Foot surgeons without diabetic foot experience must motivate their interest when applying for membership.

Representatives from the industry may be member of the association but are not allowed to stand for or vote in elections for the IADFS Board.

Oral Abstracts

Oral Abstracts

OP1 MIDFOOT CHARCOT DEFORMITY- TREATMENT STRATEGY BASED ON STAGES OF DISEASE PROGRESSION AND IDEAL COMBINATION OF SUPERCONSTRUCT

Madhu Tiruveedhula¹, Ankur Thapar¹, Shiva Dindyal¹, Anna Graham¹, Michael Mulcahy¹

¹Southend University Hospital, Mid and South Essex NHS Foundation Trust, Southend-on-Sea, United Kingdom

Aim: Midfoot Charcot deformity is a result of progressive tightness of gastroc-soleus-tendo-Achilles complex with secondary tightness of tibialis anterior +/- posterior tendons. Early lengthening of these tendons can alter progression of this deformity.

The aim is to - 1. Describe a validated classification system which is sensitive to detect progression of midfoot deformity.

2. Describe treatment plan such as out-patient tendo-Achilles lengthening (TAL) + weight bearing total contact casts (TCC) for early Charcot disease; medial column stabilisation in moderate disease and bi-column reconstruction in late collapse of lateral column.

3. Describe an ideal combination of Superconstruct

Method: Consecutive patients operated by a single surgeon and had minimum follow-up of 6m were analysed clinically and radiologically.

Results / Discussion: The outcomes of 86 feet in 72 patients are presented. TAL+ TCC was carried out in 42 feet, single column reconstruction in 29 feet and bi-column reconstruction in 15 feet.

1. 5-stages of midfoot deformity were described based on disease progression

2. In 39 patients with stage 1 and 2a, the deformity did not progress following TAL + TCC

3. Intramedullary beams provide axial and rotational stability however unstable in coronal plane. Combination of beam + plate for the medial column and plate for the lateral column provides a stable construct.

Conclusion: The proposed classification is easy to use and sensitive to detect disease progression. Out-patient TAL + TCC is a safe out-patient procedure, effective in preventing disease progression and is well tolerated by the patients.

Combination of beams and plate provide more stability than beams alone.

OP2 COMBINED CHARCOT HINDFOOT AND MIDFOOT RECONSTRUCTION USING INTERNAL FIXATION METHOD-SINGLE SURGEON SERIES

Venugopal Guduri¹, Venu Kavarthapu¹, Thomas Hester¹

¹King's College Hospital, United Kingdom

Aim: A third of Charcot deformities that require surgical reconstruction to achieve functional limb salvage present with the involvement of both midfoot and hindfoot. Surgical reconstruction of a combined hindfoot and midfoot deformity is an evolving technique and technically challenging. We present our results and outcomes of a deformity correction and stabilisation using internal fixation, developed by the senior author.

Method: All patients that had undergone combined hindfoot and midfoot reconstruction to address a limb threatening deformity due to Charcot neuroarthropathy, by the senior author, with a minimum follow-up of 12 months, have been included in this study. The principles of surgical reconstruction included adequate pre-operative optimisation of the patient, sequential deformity correction and stabilisation of the hindfoot followed by midfoot using the principle of long-segment rigid internal fixation with optimal bone opposition. Standard post-operative regime, including offloading, has been used in all patients.

Results / Discussion: A total of 34 patients (35 feet) had undergone combined midfoot and hindfoot Charcot reconstruction between January 2009 and December 2019. Active ulcers were noted in 13 feet at the time of the procedure. 11 reconstructions were performed as two-stage procedures due to the presence of active infection. At a mean follow-up of 53 months, 11/13 ulcers healed, and 32 patients (33 feet) were full weightbearing in surgical shoes or a brace at the latest follow up. Bone fusion was noted in 28 feet in the hindfoot region and 32 in the midfoot. Metal work failure was noted in 5 feet requiring removal in 3. Revision procedures were required in 4 patients.

Conclusion: Our novel technique of combined hindfoot and midfoot Charcot has provided functional limb salvage in majority of presentations, with an acceptable level of complications, at a medium-term follow-up of 53 months.

OP3 TRANSCUTANEOUS GASEOUS CO₂ THERAPY AS ADJUVANT THERAPY IN CHARCOT FOOT SURGERY

Igor Frangež¹

¹University Medical Center Ljubljana, Slovenia

Aim: Our previous studies confirmed important benefit of transcutaneous gaseous CO₂ therapy as faster healing of chronic wounds, improved microcirculation and neuropathy in diabetic patients. The acting mechanism of gaseous CO₂ application includes vasodilatation, increased O₂ delivery to the local tissues via Bohr effect and as the therapy is repeated daily, neoangiogenesis is induced. Considering observed benefits in previous studies we added CO₂ therapy postoperatively after surgical treatment of Charcot foot to verify possible benefits to enhanced healing.

Method: Patients with Charcot neuroarthropathy and clinically unstable foot with a major dislocation in Lisfranc joint, stadius Eichenholz II, were operated after initial conservative treatment - until edema, increased local temperature and redness were gone. Operative treatment was performed and open reduction and internal or external fixation were performed. Transcutaneous gaseous CO₂ therapy was added to standard postoperative treatment 2 days after surgery. Lower extremities of the subjects were isolated in a therapeutic wrap (single use, low-density, made from biocompatible polyethylene), sealed at the waist and connected to the PVR system. After this, air was first pumped out of the therapeutic wrap, then the wrap was filled with 99.9% CO₂ gas. Therapy was performed every working day, from Monday to Friday for 4 weeks and lasted 45 minutes per session.

Results / Discussion: Successful recovery was obtained in all cases, achieving stable foot. None of the patients needed amputation. Adjuvant therapy with CO₂ showed to be beneficial for postoperative healing as well as for improvement of sensation in lower limbs.

Conclusion: Considering our observations, transcutaneous application of gaseous CO₂ treatment is an effective adjuvant therapy in postoperative treatment of Charcot foot.

OP4 AN EVIDENCE-BASED DECISION-MAKING TOOL FOR CONSERVATIVE SURGICAL OPTIONS IN MANAGING DIABETIC FOREFOOT ULCERS AND OSTEOMYELITIS.

Kaissar Yammine¹, Chahine Assi¹

¹*Orthopedic Surgery, Diabetic Foot Clinic, Lebanese American University Medical Center-Rizk Hospital, Lebanese American University School of Medicine, Beirut, Lebanon*

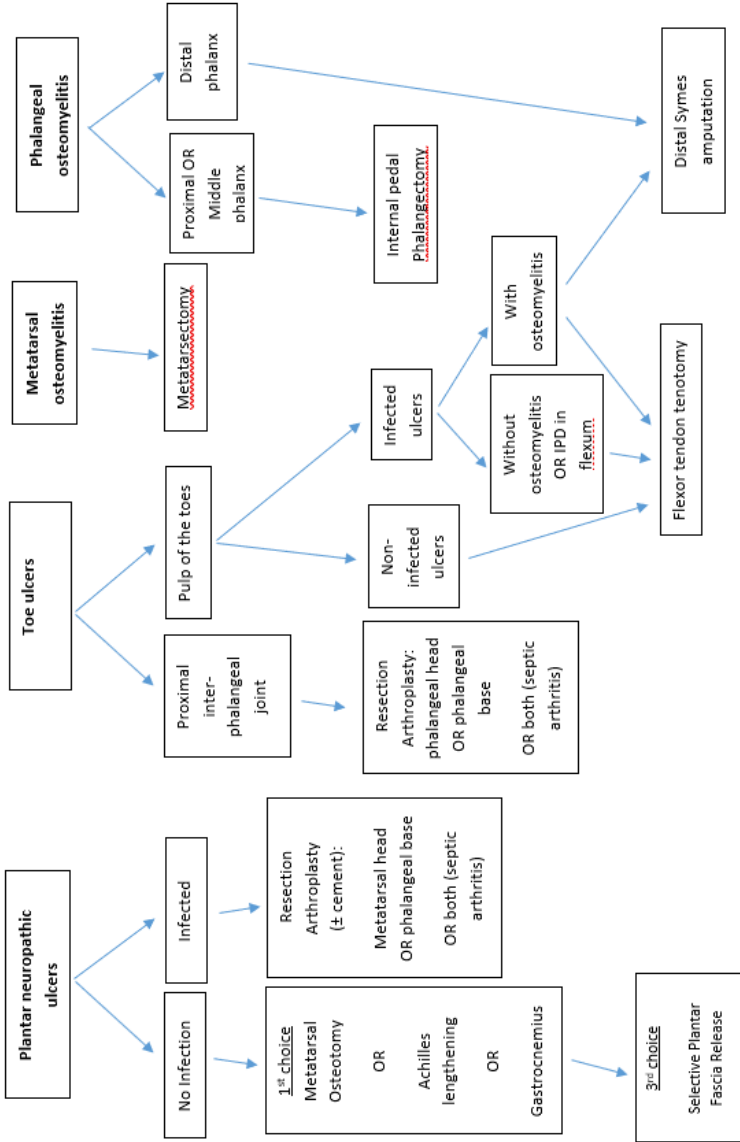
Aim: despite the good to excellent reported outcomes, the available conservative surgeries to treat diabetic forefoot ulcers and toe osteomyelitis are often underused with no clear indication. The aim of this study is to establish an evidence-based user-friendly decision making tool for which conservative surgical technique and when to use in managing diabetic forefoot ulcers.

Method: A systematic review on the type of the available toe-sparing conservative surgical techniques was conducted to treat diabetic forefoot ulcers and infection were located. The MOOSE checklist was used for data collection and extraction. A narrative data analysis scoping specifically the technical aspects and indications was performed.

Results / Discussion: In total, 14 types of conservative surgery were located: 9 bone and 5 soft tissue procedures. Besides the vital ulcer resection, often associated with loose bone excision, specific surgical techniques for corresponding specific indications were found to yield the best outcomes as shown in the algorithm (Figure 1).

Conclusion: Based on the location and the presence/absence of infection, a decision tree was generated for 4 clinical categories: plantar neuropathic ulcers, toe ulcers, metatarsal osteomyelitis and phalangeal osteomyelitis. This evidence-based algorithm could assist surgeons in decision making when treating diabetic forefoot ulcers.

Figure 1. Surgical decision tool for diabetic forefoot ulcers and infections



OP5 THE LATEST ADJUVANT THERAPY FOR CHRONIC LIMB THREATENING ISCHEMIA

Miki Fujii¹, R Tanaka¹, H Mizuno¹

¹*Juntendo University Graduate school of Medicine, Division of Regenerative Therapy/ School of Medicine, Department of Plastic and Reconstructive Surgery, Tokyo, Japan*

Aim: For some patients with chronic limb-threatening ischemia (CLTI), revascularization procedures are not enough to induce wound healing, so to speak no-option CLTI. I'd like to introduce the latest adjuvant therapies for no-option CLTI.

The first is Rheocarna. This is a novel therapeutic apheresis that has recently been developed in Japan as an adjuvant therapy for patients with CLTI. Rheocarna is an adsorption type blood purification device. It selectively removes LDL-cholesterol and fibrinogen, which are substances causing CLTI. This leads to a reduction in plasma viscosity and improves hemorheology and finally improves the circulation. The second is Collatogene. Collatogene is the first gene therapy product that received time-limited and conditional approval in Japan in 2019 for the treatment of ulcers in patients with peripheral artery disease and Buerger's disease. Collatogene is a DNA plasmid that expresses hepatocyte growth factor (HGF). Following an intramuscular injection into lower limb cells, Collatogene is transcribed and translated, leading to the production and secretion of HGF. Angiogenesis, induced by HGF, improves the ischemic status. The third is cell therapy. There are cell therapies under clinical trials for future use. Among them, we are developing Quality and Quantity-cultured peripheral blood mononuclear cell (MNC-QQ) therapy. MNC-QQ therapy is a new generation ex vivo cultured peripheral blood MNC therapy using the QQ culture system, which is a serum free ex vivo expansion system which may be possible to generate large number of functional MNCs from a very small number of blood.

OP6 THE EFFICACY OF ACTIGRAFT, AN AUTOLOGOUS WHOLE BLOOD CLOT, IN THE TREATMENT OF DIABETIC FOOT ULCERS - A REGISTRY STUDY

Maxim Gurevich¹, Marie Williams², David Davidson³, Naz Wahab⁴, Jessie Hawkins⁵, Robert Snyder⁶

¹Hillel Yaffe Hospital, Hadera, Israel, ²Aventura Hospital and Medical Center, Aventura, United States, ³Buffalo General Medical Center, Buffalo, United States, ⁴Wound Care Experts, Las Vegas, United States, ⁵Franklin Health Research & Education Center, Franklin, United States, ⁶Barry University School of Podiatric Medicine, Miami, United States

Aim: ActiGraft, an autologous blood clot is a safe and effective treatment, created at a point-of-care, to treat coetaneous wounds. In this study, the efficacy of ActiGraft in treating hard-to-heal diabetic foot ulcers (DFU) was evaluated, as part of a Registry study.

Method: 29 patients, 18 years or older, with chronic DFUs, signed informed consent as part of a registry study (NCT04699305). ActiGraft was created by using the patient's own peripheral blood at a point of care. The blood was withdrawn into Acid Citrate Dextrose adenine (ACDA) vacuum tubes and was gently mixed with calcium gluconate and kaolin in a coagulation mold, to create a blood clot. ActiGraft efficacy and superiority in percent area reduction (PAR) on weeks 4 and 12, over the standard of care (SOC) treatment, was established by using an Agresti-Coull confidence interval.

Results / Discussion: A total of 39 patients were evaluated and 29 had sufficient data for inclusion. All the patients suffered from multiple comorbidities and mean wound size at baseline was 9.36 cm² (D=12.02; range 0.5, 38.5). ActiGraft treatment resulted in 75.86% mean percent area reduction (PAR) on week 4 with 9 patients (31.03%) achieving a complete wound closure. On week 12 ActiGraft treatment resulted in 95% of the patients achieving complete healing (p=0.001). In comparison to the SOC treatment, ActiGraft was found to be superior in both weeks 4 and 12 (p=.001).

Conclusion: ActiGraft was found to be a superior treatment in DFUs over the SOC in hard-to-heal wounds. ActiGraft has an effect in reconstructing the extracellular matrix, protects the wound area from further destruction while it incorporates into the ulcer, promoting granulation over exposed vital structures. ActiGraft stimulates and activates the migration of growth factors to the wound area and promotes the secretion of cytokines necessary to progress the wound towards healing.

OP7 LIMB SALVAGE SURGERY IN DIABETIC FOOT INFECTIONS - ENCOURAGING EARLY RESULTS WITH A LOCAL ANTIBIOTIC CARRIER

Nijil Vasukutty¹, Simon Mordecai², Ammar Tarik³, Bala Srinivasan³

¹Pilgrim Hospital, United Kingdom, ²Lister Hospital, United Kingdom, ³Lincoln County Hospital, United Kingdom

Aim: Diabetic foot disease is associated with high morbidity and is one of the leading causes of lower limb amputation. The use of local antibiotic carrier to augment debridement and reconstructive procedures is presented.

Method: We present early results of 48 feet in 47 patients from 2 centres in the UK. Our multidisciplinary protocol involved pre op assessment, debridement, culture specific antibiotics and local antimicrobial management with antibiotic loaded bio composite (Cerament G, Bone Support, Lund, Sweden). 22 out of 48 feet had various foot reconstructive procedures. 6 patients had pre-operative revascularisation procedures. All patients were graded as either Texas 3B or 3D.

Results / Discussion: At a mean follow up of 33 months (13-49) 42 feet (88%) were infection free and 39 patients (83%) were mobilizing. 28 wounds healed by secondary intention, 17 had primary closure and 3 had skin grafting. Three patients had non healing and persisting ulcers at the time of most recent follow-up. 3 patients had below knee amputation. The average time to wound healing was 16 weeks (Range 3 to 24) We achieved a limb salvage rate of 94%.

Conclusion: We report encouraging early results with a cohort of diabetic foot patients where we used cerament G as a local antibiotic vehicle in conjunction with other aspects of multidisciplinary care. This is effective in preventing re infection and avoiding multiple theatre visits.

OP8 INSERTION OF ANTIBIOTIC LOADED CALCIUM SULFATE BEADS IN ONE STEP SURGICAL CLOSURE OF INFECTED DFU WITH UNDERLYING OSTEOMYELITIS. RETROSPECTIVE ANALYSIS OF 56 CONSECUTIVE CASES

Marcin Tusinski¹, Katarzyna Kolodziejaska²

¹Celeris Wound Care Center , Krakow, Poland, ²University Hospital in Krakow, Department of General, Metabolic, Endoscopic and Trauma Surgery, Krakow, Poland

Aim: We report a case series of patients suffering from DFU with bone involvement. The aim of the study was to evaluate the safety and efficacy of using calcium sulfate beads containing antibiotics in one step surgical closure of infected DFU with associated osteomyelitis. Commercially available sterile calcium sulfate was loaded with gentamycin and vancomycin (Stimulan™; Biocomposites, Keele, UK). Treatment principles included prior systemic antibiotic therapy to control infection in the surrounding tissues, precise surgical debridement, removal of bone damaged due to osteomyelitis and soft tissue coverage combined with insertion of calcium sulfate into the dead space.

Method: It was a retrospective review of patients implanted with antibiotic beads at outpatient Wound Care Center from October 2020 to April 2022. The study included 51 patients (56 wounds) with a mean age of 61,4 years. 27 patients presented with neuropathic etiology. 24 patients underwent PTA due to ischemia. Ulcerations were located in the following areas: metatarsal heads – 25 (44,6%), toes – 23 (41%), hindfoot– 5 (8,9%) and midfoot – 3 (5,3%).

Results / Discussion: 37,5% (21/56) of wounds healed dry without discharge. 35,7% (20/56) of wounds healed with insignificant discharge. 21,4% (12/56) of wounds healed with significant discharge. After 1 month follow-up 73,2% (41/56) of wounds fully healed. 21,4% (12/56) of wounds healed within the next month. 5,3% (3/56) of wounds did not benefit the treatment and required prolonged healing. 33,9% (19/56) of surgical closures were not followed with any systemic antibiotics. Systemic antibiotics with an average duration of 10,7 days were administered after 66.1% (37/56) of cases.

Conclusion: The study recorded the clinical efficacy of antibiotic loaded beads in one-step surgical closure of infected DFU with associated osteomyelitis. Surgical closure with antibiotic loaded calcium sulfate beads could be considered as an alternative treatment for conservative management of DFU with bone involvement.

Poster Abstracts

P01 USE OF EXTERNAL CIRCULAR FIXATION AS ADJUVANT SURGICAL PROCEDURE IN TREATMENT OF CHARCOT MIDFOOT OSTEOMYELITIS: A RANDOMIZED PROSPECTIVE STUDY

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Aim: In the surgical approach of Charcot osteoarthropathy complicated by midfoot osteomyelitis the postoperative offloading is mandatory to obtain the protection of plantar surgical site. The use of fiberglass cast or splint is considered the standard care associated with total non-weightbearing for the postoperative follow up. We have studied a new model of total offloading treatment using circular frames that obtain a complete non-weightbearing of the plantar aspect of the foot.

Method: From January 2020 to December 2021 we have enrolled 71 consecutive diabetic patients affected by Charcot foot complicated by plantar ulceration and midfoot osteomyelitis. All the patients were stage 2 using Frykberg/Sanders classification of Charcot foot. The stage of the wounds were W2 I0 FI2 in 43/71 pts and W2 I2 FI2 in 28/71 pts. We carried out endovascular procedure to obtain patency in at least one of the tibial arteries. Osteomyelitis localization was studied with MRI and the degree of deformities with plain X-rays and CT scan. We addressed the osteomyelitis through the ulceration and we carried out localized ostectomy associated with fasciocutaneous flap to cover the surgical site. The donor site was treated with dermal substitute and/or skin graft. 36 patients were randomized in the exfix+ arm and 35 patients in the exfix- arm. In the group exfix- the offloading was obtained with fiberglass cast. In the group exfix+ the offloading was obtained with intraoperative positioning of circular frame.

Results / Discussion: We obtained a complete healing of the surgical site in 36/36 patients in the exfix+ arm and in 22/35 in the exfix- arm ($p < 0.02$). The healing time was 68 ± 28 days in exfix+ and 102 ± 88 days in exfix- ($p > 0.05$)

Conclusion: The use of circular frame should be considered an effective offloading method that enhance the healing rate in surgical treatment of midfoot Charcot osteomyelitis

P02 SURGICAL OFFLOADING FOR CHARCOT FOOT IN JAPAN

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Aim: The number of patients with diabetes continues to explode in Japan. This has been accompanied by an increase in the number of patients with diabetic foot ulcers. The treatment of diabetic feet requires knowledge of wound management, revascularization, infection control, footwear, and surgical offloading. However, surgical treatment of foot deformities is not widely available in Japan due to the lack of podiatrists. Surgery for foot fractures is performed by orthopedic surgeons, but orthopedic surgeons tend to avoid operating on patients at risk of infection or ischemia. Therefore, at our hospital, plastic surgeons have been performing surgical offloading for patients with diabetic foot deformities since 2009.

Method: The number of surgeries performed for Charcot foot between 2009 and 2021 was reviewed.

Results / Discussion: A total of 33 surgeries were performed, and the number has been increasing in recent years. Tendon lengthening, tendon transfer, arthrodesis, and osteotomy were performed.

Conclusion: Since the number of patients with diabetic foot deformities is expected to increase in Japan, plastic surgeons with expertise in wound management should actively participate in the treatment of Charcot foot.

Poster Abstracts

P03 SPINAL CORD STIMULATION IS EFFICACY FOR PAIN CONTROL OF CHRONIC LIMB-THREATENING ISCHEMIA

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Aim: Chronic limb-threatening ischemia (CLTI) is hard-to-heal ulcer having several factors. Pain control of CLTI, especially blue toe syndrome, vasculitis, and Berger disease is difficult. Spinal cord stimulation (SCS) is efficacy in this case.

Method: 3 cases, blue toe syndrome, vasculitis and Berger's disease underwent SCS. 2 men and 1 woman are average 60-70 year old. They feel uncontrol pain, although they used painkiller included a narcotic. Thus, they underwent SCS.

Results / Discussion: One underwent puncture trial and two cases underwent permanent implantation. All cases were given a local anesthesia for SCS. Their feeling pain were improvement (NRS is reduction: average 9 → 3.7). There was no adverse event, bleeding, infection and pulling the lead out in post operation turn.

SCS is possible for pain control quickly. Pain control is important for treatment of hard-to-heal foot ulcer included CLTI. Wound treatment is performed smooth because of good pain control.

Conclusion: SCS is simple procedure and effective for CLTI pain control. There is a possibility of SCS being important pain control treatment method.

P04 TOPICAL CONTROLLED WARM OXYGEN THERAPY DELIVERED THROUGH A NOVEL DEVICE TO TREAT DIABETIC FOOT ULCERS

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Aim: Evaluate the effectiveness of topical warm oxygen therapy in the management of Diabetic Foot Ulcers

Method: Adjunctive topical oxygen therapy offers promise in accelerating diabetic foot ulcer healing. We hypothesize that topical warm oxygen delivered at a controlled temperature (42°C) through a proprietary device (KADAM™) will improve ulcer healing and be well-tolerated among patients with type 2 diabetes mellitus and with foot ulcers of Wagner-Meggitt grades 2 and 3.

This trial employed a randomized controlled, open label design, with the outcome assessor blinded to allocation. We randomized 20 patients to intervention and control (standard of care) arms. The intervention arm received in-hospital topical warm oxygen at 42°C for 90min/session. This was repeated on alternate days for 6weeks (18 sessions). Patients in the control group got standard care, and all received standard wound care.

Results / Discussion: The primary outcome was a change in the ulcer area from baseline visit to follow-up at 6weeks, day 5. There was a significant reduction in the area of the ulcer in the intervention group between baseline and week 6, day 5. Between-group ulcer area at week 6, day 5, was also significantly with the difference favouring the intervention group. There were no adverse reactions in the intervention arm.

Conclusion: Topical controlled, warm oxygen delivered through the KADAM device was well-tolerated and reduced ulcer size at 6 weeks in patients with lower limb ulcers and moderately well-controlled type 2 diabetes.

Poster Abstracts

P05 PROMPT IDENTIFICATION, SURGERY AND ANTIBIOTIC THERAPY (PISA) PROTOCOL FOR NECROTIZING FASCIITIS IN PATIENTS WITH DIABETIC FOOT SYNDROME

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Aim: To analyze the short-term outcomes of the patients who were treated for necrotizing fasciitis with a diabetic foot syndrome. All patients were treated according to a Prompt Identification, Surgical debridement and systemic Antibiotic therapy (P.I.S.A. Protocol).

Method: We assessed the type of surgical procedures and healing rates in the patients who were diagnosed to have necrotizing fasciitis in tertiary referral hospital.

Results / Discussion: In the duration of eight months (Nov 2021-June 2022) 15 patients were diagnosed to have necrotizing fasciitis. The mean age was 66.7 years (range: 44-96 years), 14 were male and 1 was female. The mean LRINEC score was 9.4. Five patients underwent a major amputation (above knee-2; below knee-3) 3 patients underwent fasciotomy followed by skin grafting in stages, 7 patients underwent extensive debridement and skin grafting in stages. Wound was healed in all the patients at the time of last follow up. Three patients (20%) died in the perioperative period.

Conclusion: In patients with early presentation a prompt identification and treatment of necrotizing fasciitis is associated with lesser major amputation and perioperative mortality. A study with a larger sample size would be needed to prove statistically.

P06 OUTCOMES OF OUT-PATIENT TENDO-ACHILLES LENGTHENING AND WEIGHT-BEARING TOTAL CONTACT CASTS FOR PATIENTS WITH DIABETIC FOREFOOT ULCERS

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Aim: Diabetic forefoot ulcers are a result of sensory and motor neuropathy, the later resulting in atrophy of intrinsic muscles and contracture of gastroc-soleus-tendo-Achilles complex which increases the forefoot plantar pressures. Tendo-Achilles lengthening (TAL) is shown to reduce the plantar pressures but has an ulcer recurrence rate of 38% at 2 years.

The aim is to describe safety and efficacy of out-patient percutaneous TAL+weight bearing total contact casts (TCC) for the management of forefoot ulcers.

Method: Consecutive patients, who presented with forefoot ulcers since 2018 and underwent TAL+TCC and followed for a minimum 12m were analysed.

All procedures were carried out in out-patient clinic with percutaneous Hoke hemisection followed by weight-bearing plaster cast for 6-weeks.

Results / Discussion: 142 feet in 126 patients underwent this procedure and 86 feet had minimum follow-up of 12m (12-36m). None had wound related problems and complete transection of the tendon was noted in 3 patients and one-patient developed callosity under the heel.

Ulcers healed in 82 feet (96%) within 10 weeks however in 12 feet (10%), the ulcer recurred or failed to heal. MRI scan in these patients showed plantar flexed metatarsals secondary to intrinsic atrophy. The ulcer in this subgroup healed following proximal dorsal closing wedge osteotomy.

Conclusion: Tightness of gastroc-soleus-Achilles complex and subluxed MTP joint are primary mechanical cause of increased forefoot plantar pressures. A 2-stage approach as described result in long-term healing of forefoot ulcers, and in 96% of patients, the ulcer healed following TAL alone.

P07 PARTIAL CALCANECTOMY AND SILO TECHNIQUE IN A SINGLE STAGE TREATMENT FOR CALCANEAL OSTEOMYELITIS

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Aim: Heel ulcers with calcaneal infection are difficult to treat, with frequent relapses and are most prone for major amputations. We present our experience with partial calcanectomy and silo technique in a small series of cases

Method: After a pre-operative evaluation by the multidisciplinary team, surgery was planned as a single-stage procedure with debridement, partial calcanectomy and injection of Cerament G as local antibiotic carrier. Cerament G[®] (Bone support AB, Lund, Sweden) is a bio-composite of calcium sulphate and hydroxyapatite. This is injected into multiple drill holes into the residual bone using the Silo technique. A primary closure of the residual healthy bleeding skin flap was made as the bone resection de-tensions the skin.

Results / Discussion: Three out of 4 cases achieved wound healing in an average of 14.7 weeks. The fourth patient was a heavy smoker and noncompliant with offloading; and due to repeated wound infection and breakdown ended up having a below knee amputation.

Conclusion: The results show that, a single stage treatment with partial resection of calcaneum, primary wound closure and an antibiotic bio composite injection is a viable and useful technique in managing calcaneal osteomyelitis.

P08 AN UNDERESTIMATED MODIFIABLE RISK FACTOR FOR DIABETIC FOOT ULCER: LATE PRESENTATION IS HIGHLY ASSOCIATED WITH AMPUTATION AS A FIRST TREATMENT

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Aim: Several risk factors for lower extremity amputation in diabetic patients have been identified; however, late presentation has been poorly investigated. Very few research looked at the impact of such risk factor. The aim was to study the link between admission for amputation and late presentation in this population.

Method: This is a retrospective cohort of continuous series of patients admitted for amputation as a first treatment for diabetic foot ulcer (DFU). A late presentation was defined as a period of 3 weeks or more from the onset of the ulcer. Forty-six patients were admitted for amputation. All wounds were infected and were classified as PEDIS grade 3 or 4. In all cases, MRI scans were suggestive or suspicious of osteomyelitis. Bone culture was positive in all cases.

Results / Discussion: Forty-six patients were admitted for amputation. The wounds were located on the plantar forefoot in 32 cases (69.5%), on the toes in 10 cases (21.7%) and in the heel area in 4 cases (8.8%). The mean duration to admission was 5.2 ± 1.8 weeks (range 4-10 weeks). All 46 surgeries were minor amputations. Late presentation was recorded in 42 (91.3%) patients. More than half (55%) of these presentations were delayed referral from healthcare providers.

Conclusion: This early report demonstrates that amputation due to DFU is highly associated with late presentation. Educational campaigns targeting patient and first-line healthcare providers and highlighting the urgency of diabetic ulcers are needed to impact this major modifiable risk factor.

Poster Abstracts

P09 COVID-19 AND THE IMPACT ON LOWER LIMB AMPUTATION, A PANDEMIC WITHIN THE PODIATRIC COMMUNITY: A RETROSPECTIVE COMPARATIVE STUDY

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Aim: The purpose of this study is to compare the number of foot amputations before and after the COVID-19 pandemic.

Method: A retrospective study of amputations by two podiatric surgeons from one institution (KH, TW) was performed. A CPT search for foot amputations was performed between March 2019 through March 2021. CPT codes included in our search are as follows: 28800, 28805, 28810, 28820, and 28825. Patients with osteomyelitis, gas gangrene, wet gangrene, and ulceration with infection were included in the study. Elective amputations, amputations due to gout and amputations due to crush injuries or trauma were excluded from the study. The two groups were divided using March 1, 2020 as the Covid date.

Results / Discussion: Fifty-nine amputations due to infection were performed from March 2019 until March 2020 prior to the COVID-19 pandemic, and eighty amputations were performed from March 2020 until March 2021 during the height of the pandemic. This was quantified as a 26.25% increase. The statistical significance was calculated using a two sample t-test, resulting in a T distribution (two-tailed) and the p-value was 0.261. Furthermore, the time between the patient's initial presentation to either the Emergency room or clinic and time of amputation was calculated for each patient who underwent an amputation. The average time to amputation for the pre-COVID group was calculated to be 131.52, whereas the average for the post-COVID group was calculated to be 10.16 with a p-value of 0.00086.

Conclusion: With the lack of routine wound care during the pandemic, a statistically significant increase in amputations were performed. It was also found that there was a significant increase in the number of patients who presented to the Emergency room or clinic requiring emergent amputation due to a lack of foot examinations and wound care.

P10 OPTIMIZATION FOR THE IMPROVEMENT IN THE OUTCOME OF AUTODERMOPLASTY IN PATIENTS WITH DIABETIC FOOT SYNDROME

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Aim: To increase the efficiency of skin grafts and reduce chances of failure, in patients with diabetic foot syndrome (DFS) with postoperative wound defects of the feet by optimizing the stages of autodermoplasty using ultrasonic cavitation and VAC therapy.

Method: Autodermoplasty was performed in patients with DFS with extensive, long term non-healing postoperative wounds ranging from 50 to 350 cm². 246 patients with type 2 diabetes were enrolled in the study, they were divided into 2 groups. Patients in both the groups were of comparable age and severity of destructive changes in the foot. The control group consisted of 68 patients. In the control group, standard autodermoplasty was performed. In the study group (176 patients), to improve the efficiency of the skin graft, as a preparatory stage before autodermoplasty, debridement of the wound bed was performed by ultrasonic cavitation. Then immediately autodermoplasty was performed and thereafter, VAC was applied to the transplanted skin graft, with constant negative pressure of 60-80 mmHg for 1-2 days.

Results / Discussion: In patients from the study group the proposed method of preparing the wound for autodermoplasty using ultrasonic cavitation in combination with VAC therapy lead to successful engraftment of the skin graft in 98% of the patients, whereas in the control group, positive outcome was noted in 66-72% patients.

Conclusion: The sequence of surgical procedures, using ultrasonic cavitation for the treatment of extensive postoperative wounds as a preparatory stage before autodermoplasty in combination with immediate VAC therapy, significantly increased the success rate of engraftment of the skin graft in patients with DFS.

P11 DIABETIC ULCERS VERSUS TRAUMATIC SOFT TISSUE DEFECTS OF THE FOOT AND ANKLE AREA: A COMPARATIVE STUDY OF THE REVERSE SURAL FASCIO-CUTANEOUS FLAP

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Aim: The reverse sural fascio-cutaneous flap (RSFCF) is commonly used to cover soft tissue defects of the ankle/foot region but large variation in complication frequency has been reported. Some authors reported higher complications when treating diabetic wounds. The aim of this study is to report comparative outcomes on the reliability of the RSFCF when treating diabetic ulcers versus traumatic wounds.

Method: This is a retrospective comparative study of 24 patients (11 with diabetic ulcers and 13 with traumatic wounds). Six out of the 11 diabetic ulcers were infected. A standard surgical technique was applied for all patients. During dissection, an area of 2cm of surrounding soft tissues on both sides of the presumed track of the pedicle was always respected. The pedicle was always tunneled and never exteriorized. The mean follow-up was 32 months.

Results / Discussion: Diabetic group versus trauma group respectively resulted in: mean flap healing time of 24 vs. 22 days, donor site healing time of 14 vs. 16 days, one total flap necrosis in both groups, 3 vs. 2 cases of skin edge necrosis, 2 cases of temporary venous congestion in both groups, and 8 vs. 10 cases of transient hypoesthesia of the lateral border of the foot. No statistically significant difference ($p > 0.05$) between both groups was found and that for each outcome. No infection in both groups and no recurrence of infection in the primary infected diabetic patients was recorded.

Conclusion: The RSFCF was found to be a reliable option for ankle/hind-foot soft tissue defects with a very low frequency of serious complications. No outcome differences were found between patients with diabetic ulcers and those with traumatic wounds. Soft tissue coverage with RCFCF presented similar flap healing with no higher complications in diabetic patients compared to the young population of traumatic wounds.

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