

PIEDE DIABETICO: VERSO UNA RETE ASSISTENZIALE CONDIVISA DALLA PREVENZIONE PRIMARIA ALLA TERZIARIA

GESTIONE PRE E POSTCHIRURGICA

DEL PIEDE DIABETICO

Vincenzo Stoico (Verona)

CONVEGNO REGIONALE AMD – SID VENETO
Padova, 24 novembre 2018

Il dr. Vincenzo Stoico dichiara di non aver ricevuto negli ultimi due anni compensi o finanziamenti dalle Aziende Farmaceutiche e/o Diagnostiche:

Dichiara altresì il proprio impegno ad astenersi, nell'ambito dell'evento, dal nominare, in qualsivoglia modo o forma, aziende farmaceutiche e/o denominazione commerciale e di non fare pubblicità di qualsiasi tipo relativamente a specifici prodotti di interesse sanitario (farmaci, strumenti, dispositivi medico-chirurgici, ecc.).

In fede
Vincenzo Stoico

The NEW ENGLAND JOURNAL of MEDICINE

REVIEW ARTICLE

Julie R. Ingelfinger, M.D., *Editor*

Diabetic Foot Ulcers and Their Recurrence

David G. Armstrong, D.P.M., M.D., Ph.D., Andrew J.M. Boulton, M.D., and Sicco A. Bus, Ph.D.

N ENGL J MED 376;24 NEJM.ORG JUNE 15, 2017

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The natural history of a diabetes-related foot ulcer is sobering. The risk of death at 5 years for a patient with a diabetic foot ulcer is 2.5 times as high as the risk for a patient with diabetes who does not have a foot ulcer.[9] More than half of diabetic ulcers become infected.[10] Approximately 20% of moderate or severe diabetic foot infections lead to some level of amputation.[11,12] Peripheral artery disease independently increases the risk of nonhealing ulcers, infection, and amputation.[13,14] Mortality after diabetes-related amputation exceeds 70% at 5 years for all patients with diabetes and 74% at 2 years for those receiving renal-replacement therapy.[15] Whether such a high mortality is due to a combination of coexisting conditions (including the risk from an amputation procedure), lack of activity, and deconditioning or to other factors is not clear. The risk of death at 10 years for a patient with diabetes who has had a foot ulcer is twice as high as the risk for a patient who has not had a foot ulcer.[16]

A recent assessment of 785 million outpatient visits by people with diabetes in the United States between 2007 and 2013 suggested that diabetic foot ulcers and associated infections constitute a powerful risk factor for emergency department visits and hospital admission.[17] The rate exceeds the rates for congestive heart

THE LANCET

Vol 366 Number 9498 1673-750 November 12-18,2005

" Every 30 seconds a lower limb

is lost somewhere in the world as a consequence of diabetes"



Iversen MM, Tell GS, Riise T, et al. History of foot ulcer increases mortality among individuals with diabetes: ten-year follow-up of the Nord-Trøndelag Health Study, Norway.

Diabetes Care . 2017; 33: 2365-9

EMERGENZA PIEDE DIABETICO

A VOLTE IL PIEDE DIABETICO E’

UNA VERA E PROPRIA EMERGENZA MEDICA

Pz anni 69

Amputazione Maggiore



Luglio 2013

Pz anni 69







Luglio 2013

Intervento chirurgico
Antibiotico terapia
Rivascolarizzazione
Medicazioni avanzate
Terapia a pressione negativa
Innesto di derma artificiale
Innesto di cute autologa

Pz anni 69

Pz anni 69




01/10/2013


01/10/2013

Le Amputazioni in Italia

OPEN ACCESS Freely available online

PLOS ONE

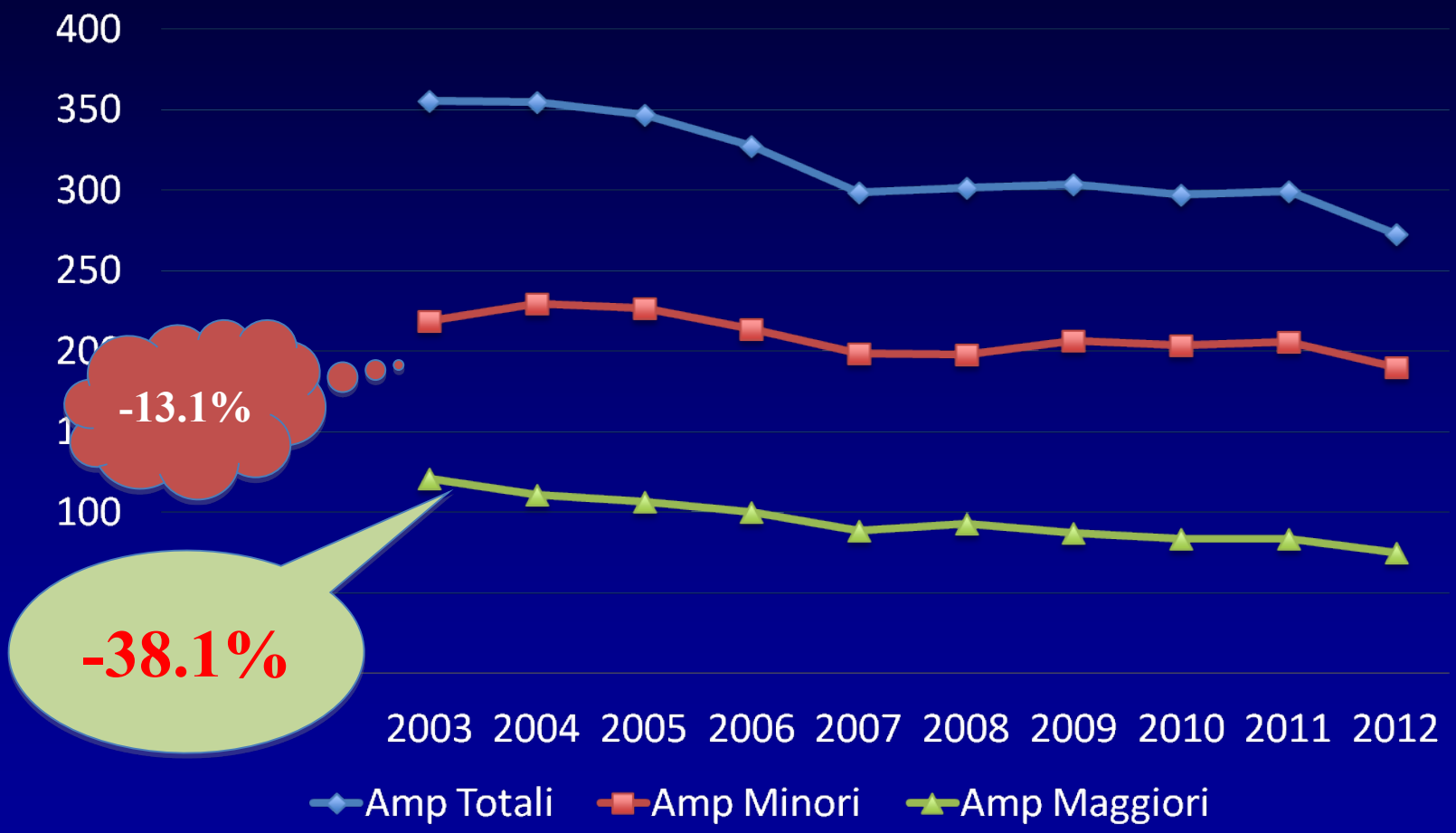
Lower Extremity Amputations in Persons with and without Diabetes in Italy: 2001–2010

Flavia L. Lombardo[1], Marina Maggini[1], Alessandra De Bellis[2], Giuseppe Seghieri[2], Roberto Anichini[2]*

1 National Centre for Epidemiology, Surveillance and Health Promotion, National Institute of Health, Roma, Italy, **2** Diabetes Unit and Diabetic Foot Unit, Department of Internal Medicine General Hospital Pistoia, Pistoia, Italy

January 2014 | Volume 9 | Issue 1 | e86405

Tassi di dimissione per amputazione nelle persone con diabete 2003-2012



Tassi x 100.000 pazienti con diabete mellito

per età sulla popolazione italiana del 2001standardizzati

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ULCER RECURRENCE AND REMISSION

Unfortunately, even after the resolution of a foot ulcer, recurrence is common. By reviewing 19 compatible studies on incidence rates for ulcer recurrence,[28-46] we estimate that roughly 40% of patients have a recurrence within 1 year after ulcer healing, almost 60% within 3 years, and 65% within 5 years (Fig. 2). Thus, it may be more useful to think of patients who have achieved wound closure as being in remission rather than being healed. The concept of remission may also provide a better framework for allocating resources, organizing care, and communicating information about risk.[47] The number of patients in remission is, by definition, far greater than the number of patients who have active diabetes-related foot complications.[1,7,10,12]

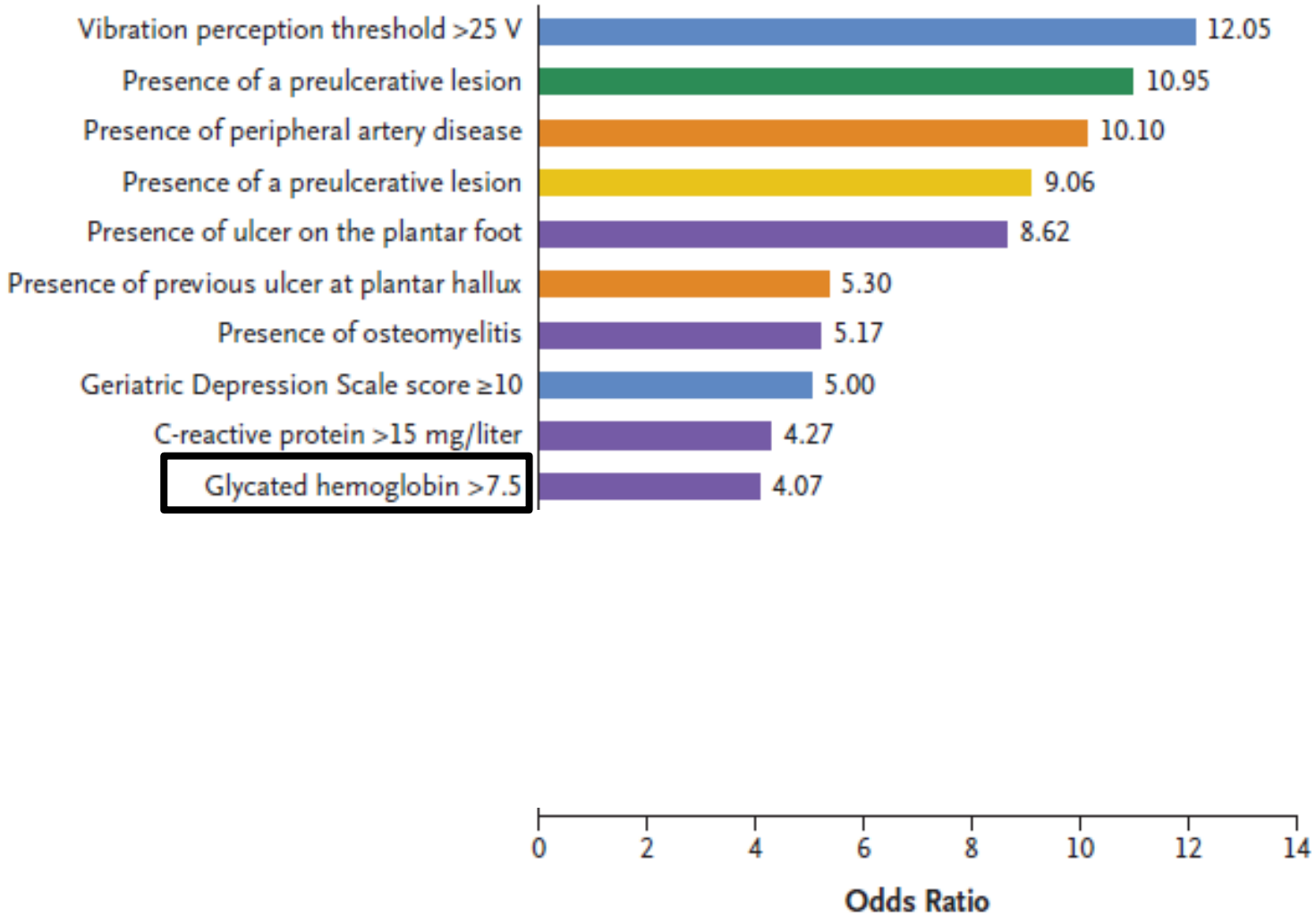


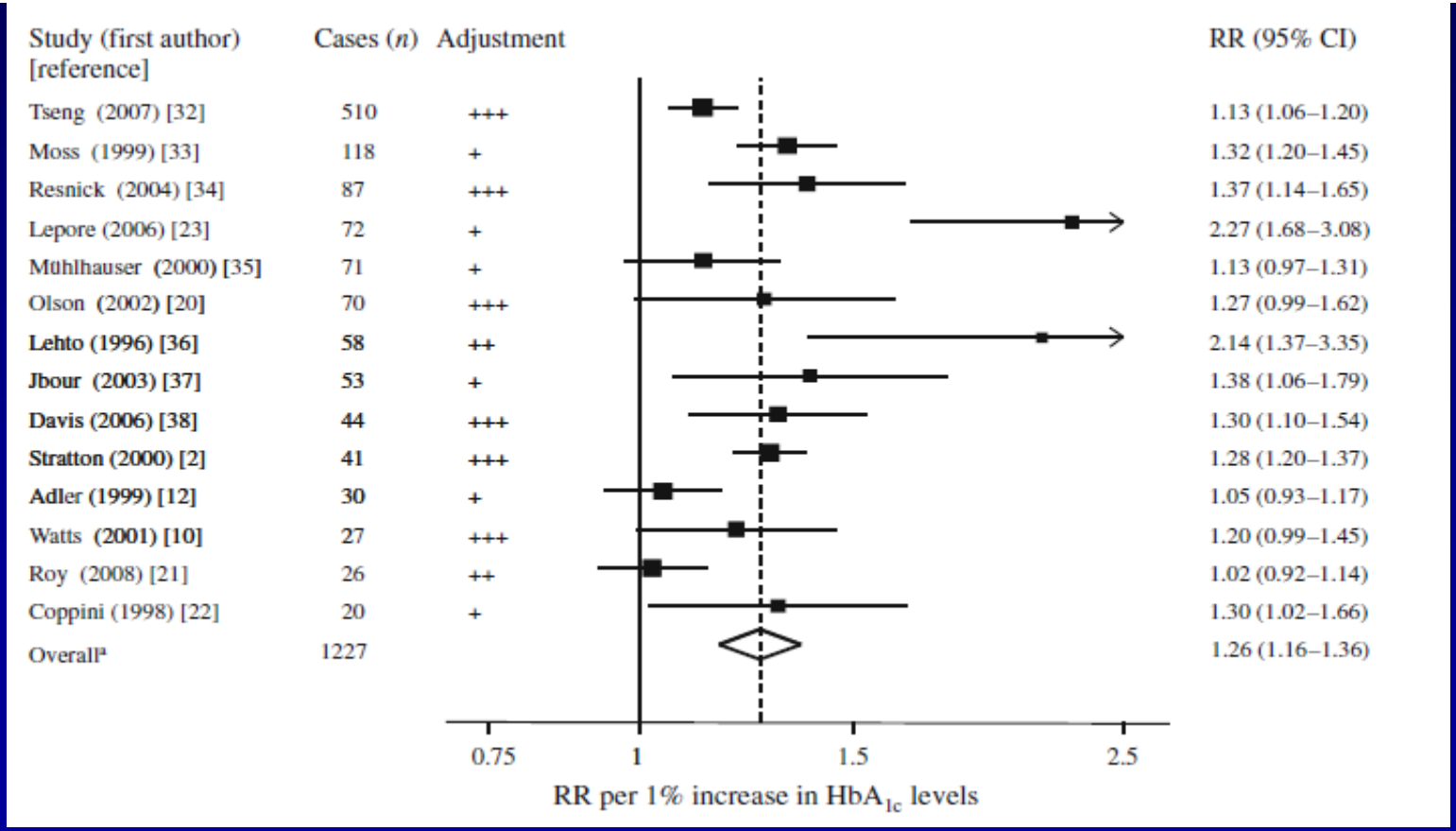
Figure 3. Risk Factors Independently Associated with Ulcer Recurrence.

Diabetologia (2010) 53:840–849
DOI 10.1007/s00125-009-1638-7

ARTICLE

Association between glycated haemoglobin and the risk of lower extremity amputation in patients with diabetes mellitus—review and meta-analysis

A. I. Adler · S. Erqou · T. A. S. Lima · A. H. N. Robinson



Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy Dovepress
open access to scientific and medical research
Open Access Full Text Article
ORIGINAL RESEARCH

Predictors of major lower limb amputation in type 2 diabetic patients referred for hospital care with diabetic foot syndrome

Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy 2018:11

Table 3 Multivariate analysis of factors associated with major amputation

Risk variable	OR	95% CI	*P*-value
Antidiabetic medication (insulin vs oral hypoglycemic agents)	6.9	1.9–25.4	0.004
HbA1c (≥8% vs <8%)	4.0	1.3–12.4	0.015
Duration of diabetes (≥15 years vs <15 years)	6.0	1.8–20.9	0.004
Renal impairment (yes vs no)	3.5	6–10.2	0.023
Gangrene (yes vs no)	4.2	1.561–11.5	0.005

Abbreviations: HbA1c, glycated hemoglobin level; OR, odds ratio.

ARTICLE IN PRESS

Journal of Diabetes and Its Complications xxx (2015) xxx–xxx

Contents lists available at ScienceDirect

Journal of Diabetes and Its Complications

journal homepage: WWW.JDCJOURNAL.COM



Diabetes Medications: Impact on Inflammation and Wound Healing

Jay J. Salazar [a], William J. Ennis [b,c], Timothy J. Koh [a,c,*]

[a] Department of Kinesiology and Nutrition, University of Illinois at Chicago, Chicago, IL, USA
[b] Department of Surgery, University of Illinois at Chicago, Chicago, IL, USA
[c] Center for Tissue Repair and Regeneration, University of Illinois at Chicago, Chicago, IL, USA

Journal of Diabetes and Its Complications xxx (2015) xxx–xxx

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Diabetes Medications: Impact on Inflammation and Wound Healing

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Journal of Diabetes and Its Complications xxx (2015) xxx–xxx

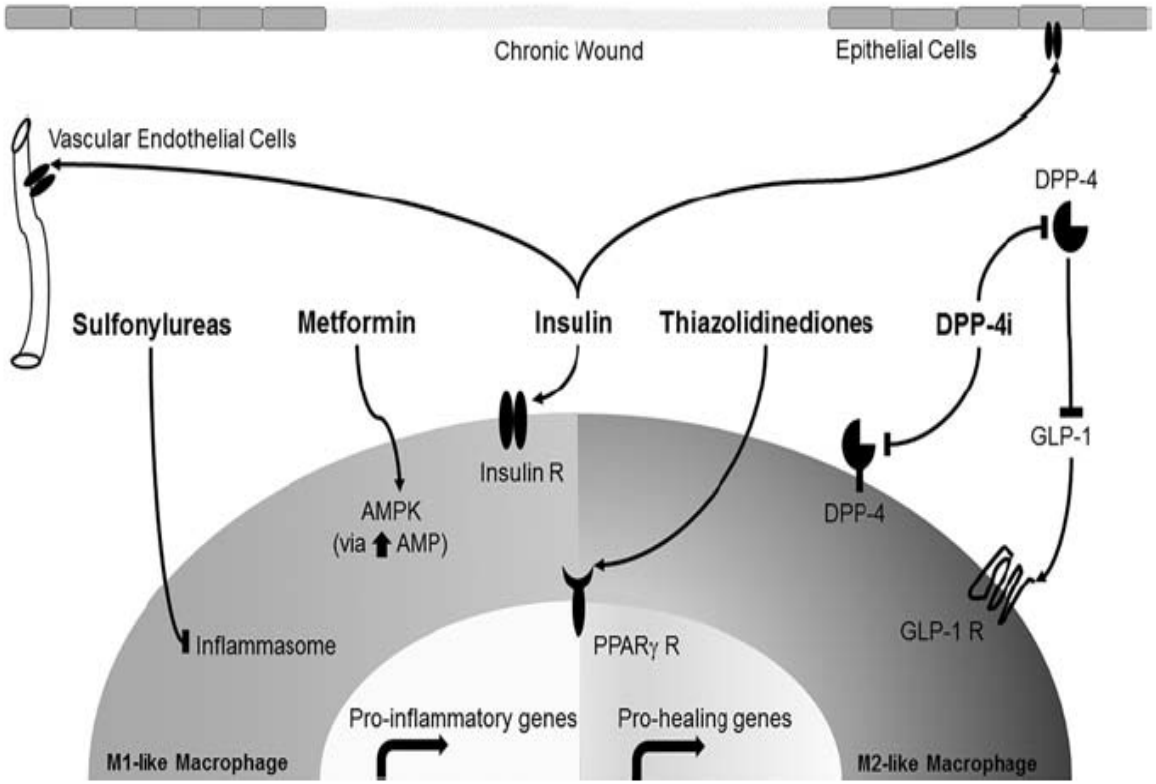


Fig. 1. Diabetes medications associated mechanisms of action involved in wound healing. The figure shows signaling pathway that may be targeted by diabetic medications on epithelial cells (keratinocytes), vascular endothelial cells, "classically activated" M1-like macrophages, and "alternative activated" M2-like macrophages present in chronic wounds. Classically activated M1-like macrophages produce pro-inflammatory gene products that maintain wounds on a persistent inflammatory state. Alternative activated M2-like macrophages produce more pro-healing gene products that allow wound to resolve the inflammatory state and proceed to healing. All receptors (Insulin R, PPARγ R and GLP-1 R) and cell targets are present in both types of macrophages.

PERIODO

PRE E

INTRAOPERATORIO

"goals" del perioperatorio nel diabetico

- *Mantenimento dell'equilibrio idro-elettrolitico*
- *Prevenzione della chetoacidosi*
- *Evitare importanti squilibri glicemici:*
  - ***marcata iperglicemia***
  - ***ipoglicemia***

Perioperative management of diabetes mellitus Khan NA, e al. UpToDate 2013

A.S.P.E.N. Clinical Guidelines - 2013
Nutrition Support of Adult Patients With Hyperglycemia

Question: What is the desired blood glucose goal range in adult hospitalized patients receiving nutrition support ?

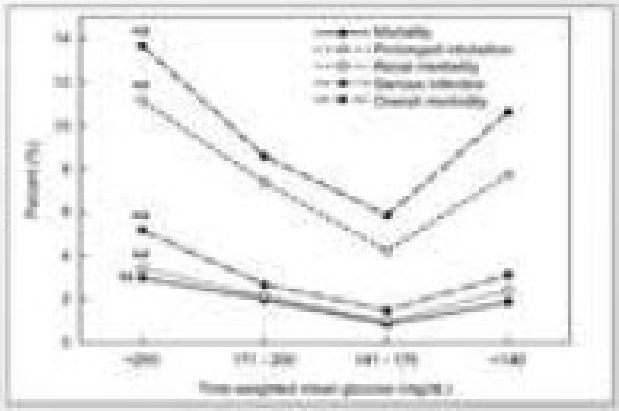
Recommendation: We recommend a target blood glucose goal range **of 140–180 mg/dL (7.8–10 mmol/L).**

Grade: **Strong**

Rationale: Hyperglycemia is associated with increased mortality in hospitalized patients..... Earlier studies showed .... a reduction in mortality.... blood glucose .... below 110 mg/dL (6.1 mmol/L)

.....However, more recent large clinical trials .....found a **higher mortality** in patients treated with intensive treatment compared with those treated to a target blood glucose range of 140–180 mg/dL (7.8–10 mmol/L)..... **hypoglycemia associated with aggressive treatment** in the more recent studies is one likely explanation.....

Hyperglycemia and Perioperative Glucose Management
Duncan AE. - Curr Pharm Des. 2012




AMD
1974
ASSOCIAZIONE MEDICI DIABETOLOGI
SID
Società Italiana di Diabetologia
STANDARD ITALIANI PER LA CURA DEL DIABETE MELLITO
2018

Trattamento perioperatorio

Circa il 10% dei pazienti sottoposti a intervento chirurgico è affetto da diabete e questa percentuale è destinata ad aumentare anche solo per il previsto aumento del numero dei diabetici (Giorda CB, Manicardi V. 2012).

Se si considerano i pazienti ospedalizzati con iperglicemia indipendentemente da una precedente diagnosi di diabete, gli studi osservazionali riportano una percentuale complessiva del 32-38% (Cook CB, Kongable GL, 2009), e fino all'80% nei pazienti ricoverati per chirurgia cardiaca (Schmeltz LR, De Santis AJ, 2007).

Nei pazienti chirurgici con diabete la durata media della degenza risulta superiore a quella dei pazienti chirurgici senza diabete e la mortalità peri-operatoria è del 50% superiore rispetto alla popolazione non diabetica (Moghissi ES, Korytkowski MT,2009); il controllo glicemico influenza significativamente l'evoluzione della degenza (Schmeltz LR, De Santis AJ, 2007; Frisch A, Chandra P, 2010; Buchleitner AM, Martınez-Alonso M, 2012) e l'intervento di un team diabetologico può ridurre la degenza media dei ricoveri di pazienti chirurgici in elezione (Flanagan D, Ellis J, 2010.)

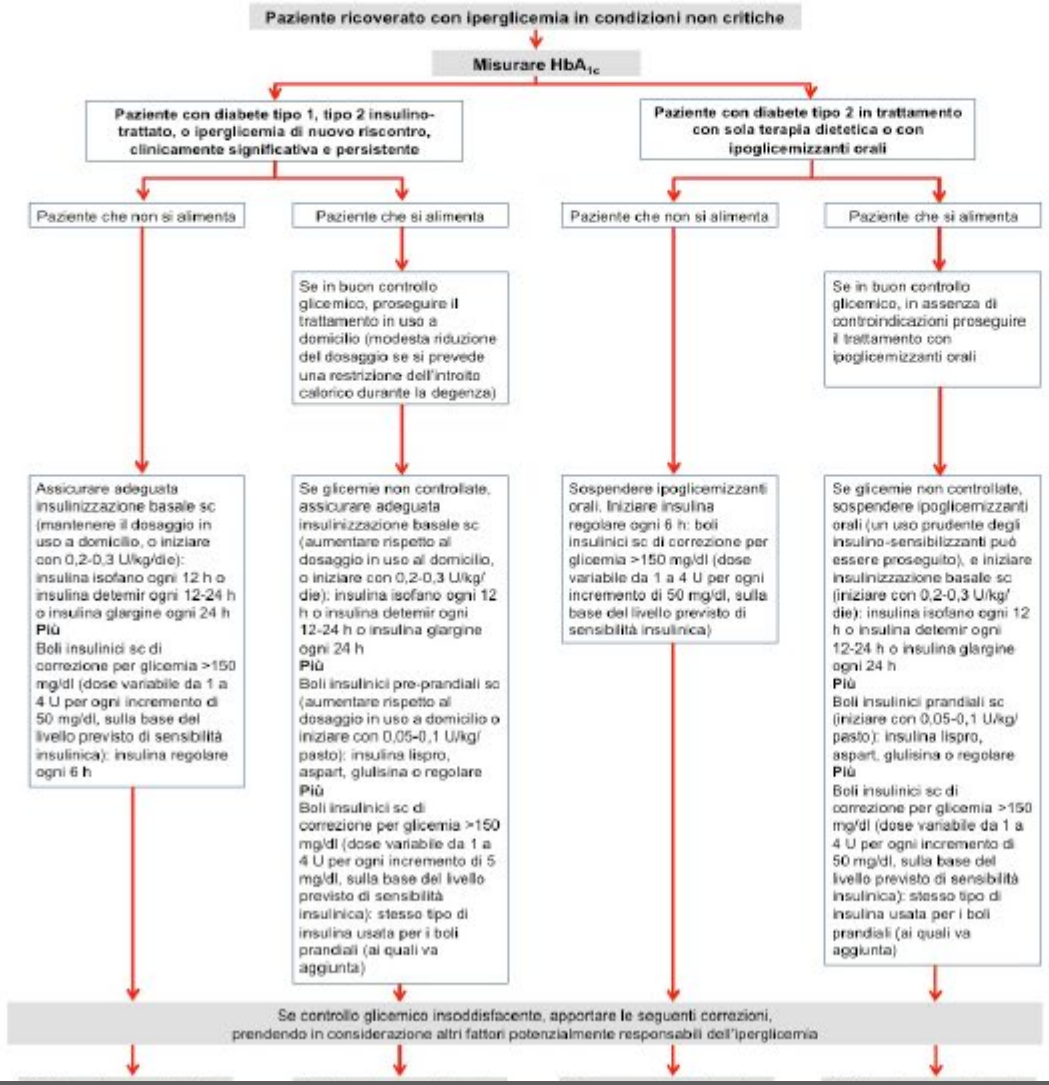
Pertanto sarebbe auspicabile definire un percorso specifico per il paziente con diabete ricoverato per un intervento chirurgico. Diversi sono gli approcci proposti, ma non vi è ancora un consensus definitivo basato su prove di efficacia.

Sicuramente è necessario (Smiley DD, Umpierrez GE. 2006; Dhatariya K, Levy N, 2012; National Institute for Health and Care Excellence -Preoperative tests (update)Routine preoperative tests for elective surgery Clinical guideline NG45, 2016- https://www.nice.org.uk/guidance/ng45):

- definire il target glicemico peri-operatorio tra 80-180 mg/dl
- valutare il rischio preoperatorio nei pazienti ad alto rischio per cardiopatia ischemica, insufficienza renale e neuropatia autonomica
- verificare il trattamento ipoglicemizzante in fase pre- e perioperatoia
- monitorare la glicemia nei pazienti che restano a digiuno prolungato, ed intervenire con analogo rapido s.c. al bisogno
- implementare i protocolli di preospedalizzazione per il pazienti che devono essere sottoposti ad interventi chirurgici di elezione al fine di assicurare una condizione metabolica di sicurezza alla persona con diabete e di individuare i casi di diabete misconosciuto prima del ricovero

Tabella VII.A1 Modello schematico di gestione dell'iperglicemia nel paziente ospedalizzato in condizioni non critiche.

Tabella 34. Modello schematico di gestione dell'iperglicemia nel paziente ospedalizzato in condizioni non critiche*



PROBLEMI DEL PAZIENTE DIABETICO IN CORSO DI ANESTESIA E CHIRURGIA

A. **CHIRURGIA DI ELEZIONE**

1.problemi del periodo preoperatorio:

1.1 la valutazione della malattia diabetica;
1.2 la valutazione delle complicanze;
1.3 il riequilibrio metabolico ed idro-elettrolitico;
1.4 la (ri)definizione di eventuali terapie mediche accessorie;
1.5 la preparazione farmacologica all'intervento:
1.5.1 la terapia insulinica;
1.5.2 la premedicazione anestetica;
1.5.2.1 la profilassi della trombosi venosa profonda;
1.5.2.2 la prevenzione della sindrome da inalazione.

2. **problemi del periodo intraoperatorio**:
2.1 la scelta della tecnica anestesiologica;
2.2 la somministrazione di insulina;
2.3 in monitoraggio in generale e quello metabolico, in particolare.

CALSSIFICAZIONE DEGLI INTERVENTI CHIRURGICI

MINORI

Richiedono meno di due ore ed è prevista la ripresa dell'alimentazione nel postoperatorio (endoscopie, angiografie, cataratta, interventi ortopedici minori)

MAGGIORI

Durata superiore alle due ore e in cui non è prevista la ripresa dell'alimentazione nel postoperatorio (by-pass vascolari e coronarici, interventi neurochirurgici, trapianti, ortopedici maggiori ecc.)

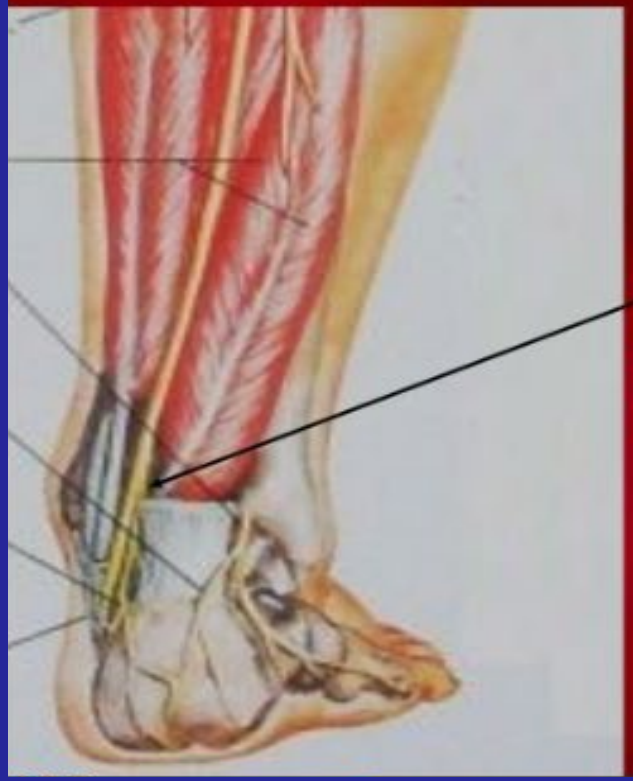
Lower leg block or modified ankle block



Deep peroneal nerve – can be blocked by injecting subcutaneously
3-5 mm along the lat border of the shin with 2 ml 2% xylocaine with 24 g 1.5 inch needle



Lower leg block or modified ankle block



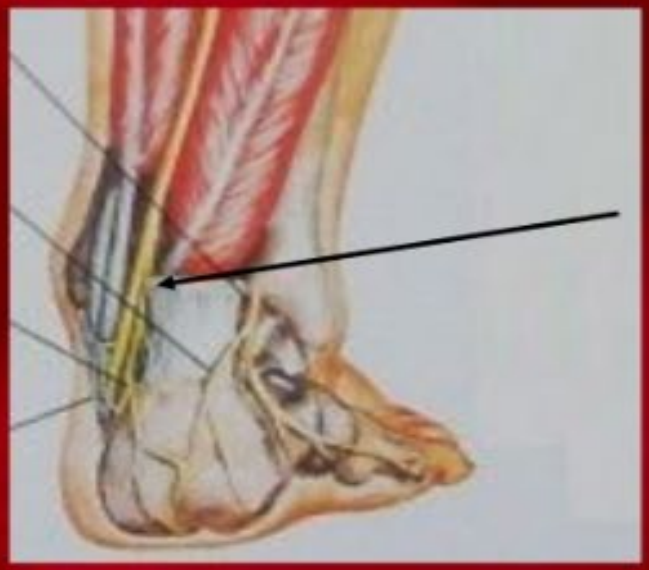
Post. Tibial nerve –

Blocked by injecting 3-5 ml 2% xylocaine at the junction of proximal 1/3rd with distal 2/3rd of medial malleolus to calcaneum, where normally pulsations of post. Tibial artery is felt.



Lower leg block or modified ankle block

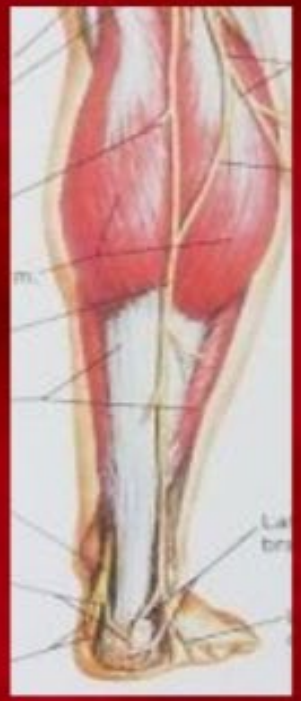
Calcaneal nerve block



2 Finger breadths proximal to the medial malleolus

Inject along the direction of the nerve

Lower leg block or modified ankle block



Sural nerve

Inject 2% xylocaine between the tendoachilles and the calcaneaum on the lateral aspect



POST OPERATORIO





DOLORE



Classification of pain medications (analgesics)

Note: Refer to the appendices for individual medication information and doses.

1. **Simple analgesics**
   - Paracetamol
   - Non-steroidal anti-inflammatory medicines
     - Aspirin
     - Ibuprofen
     - Diclofenac
2. **Opioids**
   - Mild opioids
     - Codeine
     - Tramadol
   - Strong opioids
     - Morphine
     - Pethidine
     - Oxycodone
3. **Other medications**
   - Tricyclic antidepressants
     - Amitriptyline
     - Nortriptyline
   - Anticonvulsants
     - Carbamazepine
     - Sodium valproate
     - Gabapentin
     - Pregabalin
   - Local anaesthetics
     - Lignocaine / lidocaine
     - Bupivacaine (Marcaine)
   - Others
     - Ketamine
     - Clonidine

Pain Medicine

Pain Medicine 2018; 19: 808–812)5
Wiley Periodicals, Inc.

Review Article

Phantom Limb Pain: A Systematic Neuroanatomical-Based Review of Pharmacologic Treatment

Zachary McCormick, MD, George Chang-Chien, DO, Benjamin Marshall, DO, Mark Huang, MD, and R. Norman Harden, MD

1. Terapie locali
2. Trattamenti farmacologici
3. Terapie complementari

PAP - Terapie locali

- Iniezioni locali di anestetico o i blocchi regionali (an locale + clonidina)– Livello 4
- tossina botulinica (dolore da moncone ma non nel PLP) – Livello 4
- Capsacina topica (TRPV1)- Livello 4

TERAPIA FARMACOLOGICA

Antagonisti NMDA (N-metil-D-Aspartato)

Oppioidi

Anticonvulsivanti

Antidepressivi

Calcitonina

Livello 2

Terapie complementari

- biofeedback
- ipnosi
- meditazione
- mirror therapy

NESSUNA EVIDENZA

Conclusioni

Non esiste ad oggi alcuna evidenza di **LIVELLO1**

E' realistico pensare invece che un **trattamento multimodale** volto a contrastare la componente nocicettica , neuropatica , psicologica del dolore possa essere più efficace

Pathophysiology/Complications

Adverse Outcomes After Noncardiac Surgery in Patients With Diabetes

A nationwide population-based retrospective cohort study

Chun-Chieh Yeh, MD[1,2,3]
Chien-Chang Liao, PhD[4,5,6]
Yi-Cheng Chang, MD[7]
Long-Bin Jeng, MD[2,3]
Horng-Ren Yang, MD[2,3]
Chun-Chuan Shih, MD[8]
Ta-Liang Chen, MD, PhD[4,5,6]

Diabetes Care, volume 36, October 2013

Table 2—*Risk of postoperative complications associated with diabetes in the multiple logistic regression models**

	No diabetes (%)	Diabetes (%)	OR (95% CI)†
Postoperative complications			
Septicemia	4.2	10.0	2.76 (2.50–3.04)
Pneumonia	2.7	4.6	1.88 (1.65–2.14)
Stroke	2.8	4.4	1.70 (1.49–1.94)
Acute renal failure	0.7	2.4	3.59 (2.88–4.48)
Deep wound infection	0.8	1.0	1.33 (1.04–1.70)
Acute myocardial infarction	0.2	0.7	3.65 (2.43–5.49)
Any of the above	9.6	19.2	2.42 (2.26–2.60)
Any noninfectious complications	6.9	14.0	2.37 (2.18–2.56)
Any infectious complications	3.6	7.2	2.23 (2.00–2.49)
30-day postoperative mortality	0.8	1.3	1.84 (1.46–2.32)
Prolonged length of hospital stay	13.2	25.2	2.30 (2.16–2.44)
ICU stay	29.0	38.8	1.67 (1.59–1.76)
Increased medical expenditure	18.0	22.0	1.32 (1.25–1.40)

*Preoperative diabetes was defined as the patient having at least one hospital admission and at least one visit for outpatient medical services related to diabetes. †Adjusted for age, sex, teaching hospital, low-income status, urbanization, coexisting diseases, type of surgery, and type of anesthesia.

Paziente non consapevole !



Operatore non consapevole !













CASO CLINCO







Drenaggio del flemmone



Amputazione 2° dito







SOLUZIONE ORTESICA



CALZATURA IDEALE



SCARPA CON SUOLA BIOMECCANICA RIGIDA E TOMAIA AUTOMODELLANTE / TERMOFORMABILE

PLANTARE IDEALE

- PLANTARE SU MISURA





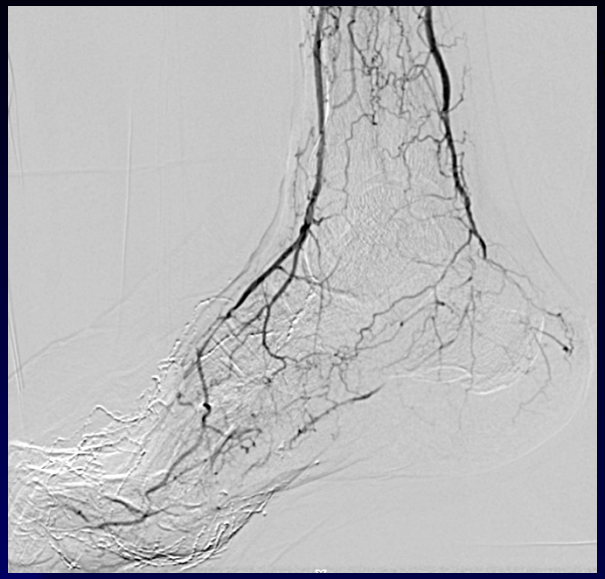
Clinical history

Patient with type 2 diabetes
Peripheral neuropathy
Peripheral vascular disease
Cardiac ischaemic disease
Renal chronic failure

Presentation:
- dry gangrene of the first/second ray
- Critical limb ischaemia





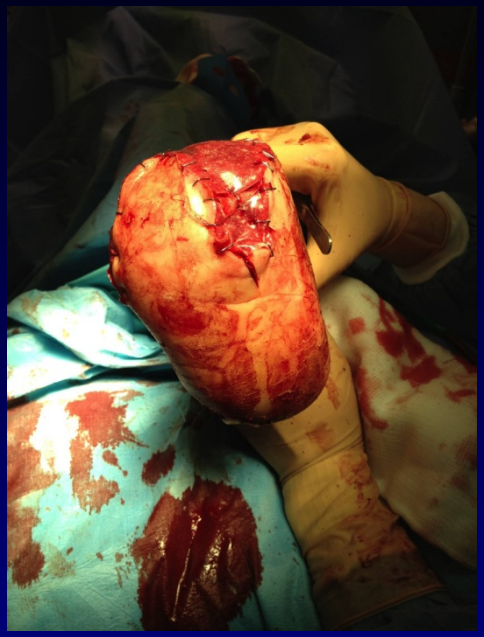



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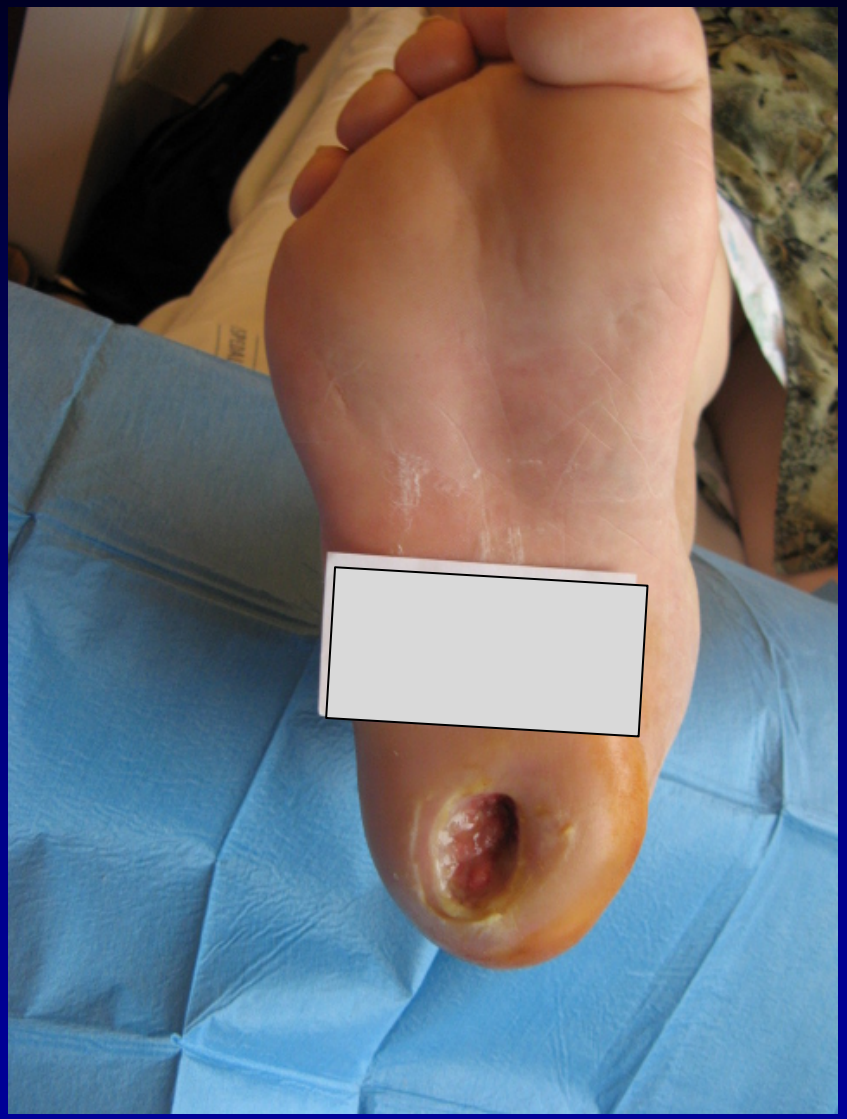








Donna, 64 anni
Diabete tipo 2
Ulcera neuropatica grado IIIB
Texas University Classification







Trattamento : ulcerectomia e parziale calcaneotomia

Heel Boot Device



1. **Imbottitura super-soft,** in materiale morbido e leggero che permette di alloggiare il piede lesionato senza nessun sfregamento e nessuna pressione.
2. **Chiusura multi velcro a volume variabile,** ed apertura avanzata per agevolare la calzabilità.
3. **Fascetta laterale regolabile,** per aiutare il piede a riacquistare la giusta postura senza affaticare le articolazioni.
4. **Battistrada superleggero,** per piccoli spostamenti in casa.
5. **Estensione anteriore,** per protezione delle dita a letto.
6. **Barra antirotazione,** per controllo degli eccessi di rotazione dell'arto a letto.



Dopo la rimozione della sutura, 1 mese di scarico al retropiede e riabilitazione tramite calzatura con **SCARICO POSTERIORE**

Risultato







After a first surgical attempt to treat the lesion (ulcerectomy and dermal substitute application), MR demonstrated heel osteomyelitis







Patient underwent further ulcerectomy, partial calcanectomy, heel filling with artificial bone, and soft tissues recontruction with dermal substitute.

In order to off-load the heel we prescribed the Heel Boot device. Patient wore Heel Boot all along treatment period, including the In-Hospital period during which a fascio-cutaneous flap was performed.













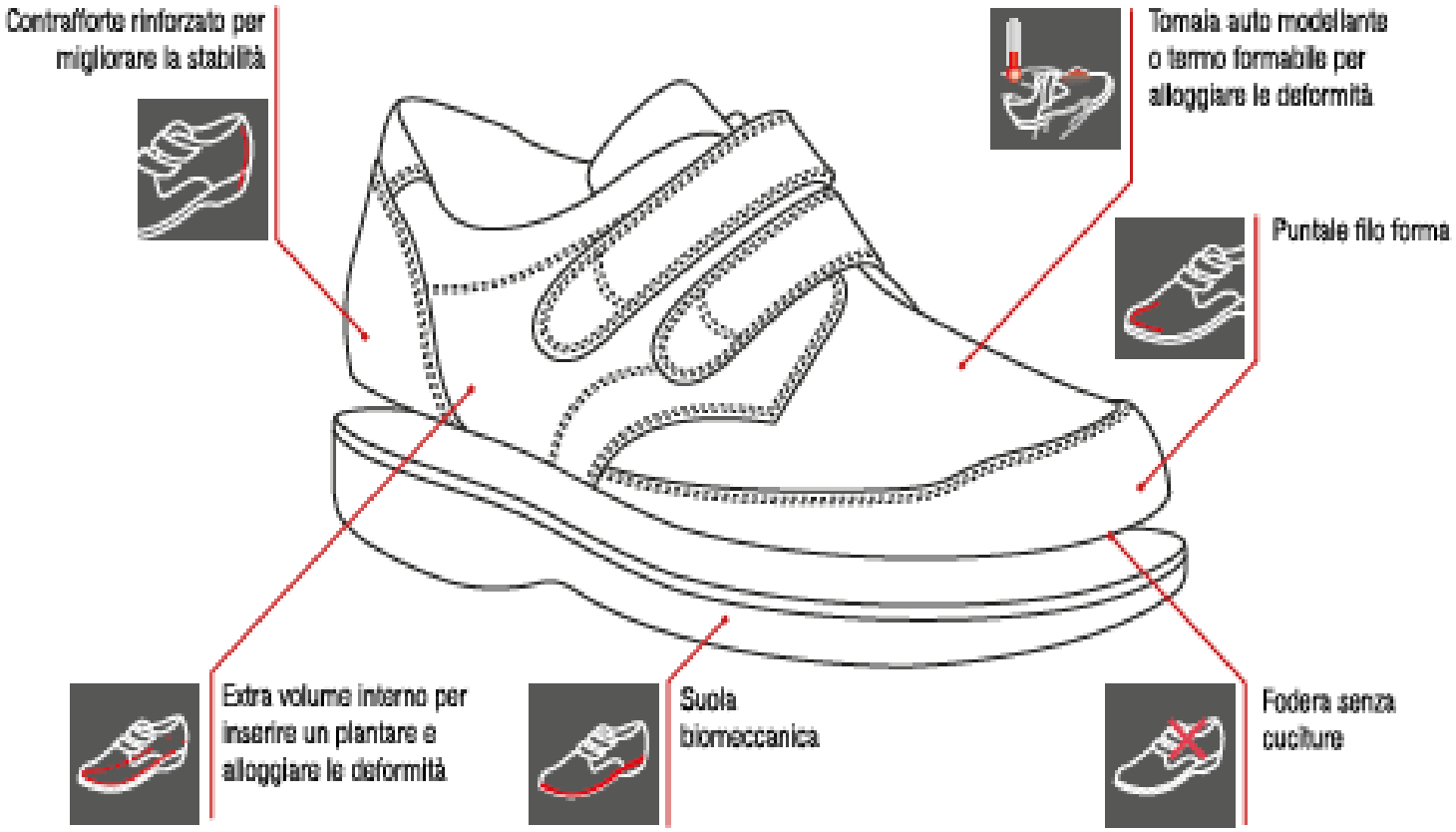
The rehabilitation period was performed with the use of Vaco Ped device.

PROBLEMA		SOLUZIONI
ULCERE DIGITALI 	DORSALI	**TERAPES** Taglie: 35-47 
	PLANTARI	**TD** Taglie: 35-47  **WPS** Taglie: 35-47  **PLANTARE MODUS** Taglie: 35-46 o **PLANTARE IN TALISMO SU MISURA** 
	SENZA INFEZIONE E/O ISCHEMIA	**TCC**
ULCERE AVAMPIEDE 	SENZA INFEZIONE E/O ISCHEMIA	**TCC "GOLD STANDARD"**
	CON INFEZIONE E/O ISCHEMIA	**TD** Taglie: 35-47  **STABIL D** Taglie: 35-47  **WALKER**  **PLANTARE MODUS** Taglie: 35-46 o **PLANTARE IN TALISMO SU MISURA** Taglie: 35-48 o **PLANTARE SU MISURA** 

ULCERE MESOPIEDE 	SENZA INFEZIONE E/O ISCHEMIA	**TCC "GOLD STANDARD"**
	CON INFEZIONE E/O ISCHEMIA	**WALKER**  **STABIL D** Taglie: 35-47  **TD** Taglie: 35-47  **PLANTARE MODUS** Taglie: 35-46 O **PLANTARE SU MISURA** 
ULCERE RETROPIEDE 	SENZA INFEZIONE E/O ISCHEMIA	**TCC**
	CON INFEZIONE E/O ISCHEMIA	**WALKER**  **TERAHEEL** Taglie: S-M-L-XL  **HEELBOOT** Decubito/sedia a rotelle Taglie: S-M-L-XL 

PREVENZIONE SECONDARIA

La scarpa terapeutica ideale



Plantare Su Misura
Su Calco “Gold Standard” per la prevenzione secondaria



Opinions that matter:

Patient's perspective of their perioperative management during surgery for diabetic foot











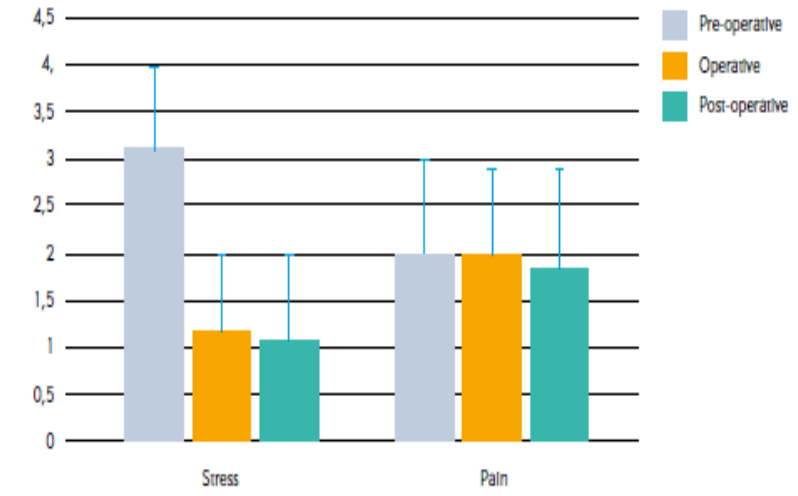


Figure 2: Numerical rating scale (NRS) scores for levels of stress and pain (0 - 10, with 10 indicating maximum stress or pain) reported by patients in each of the three perioperative phases. *p<0.05 pre-operative vs operative and post-operative phases.

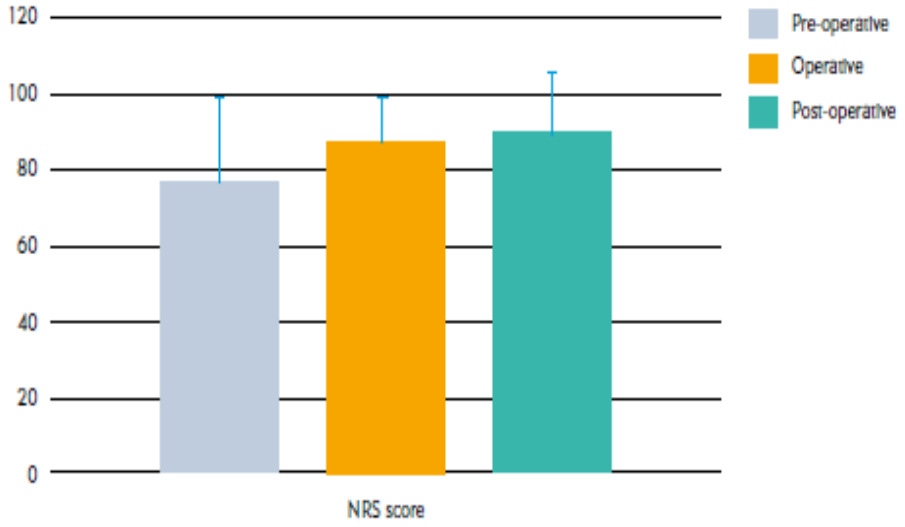
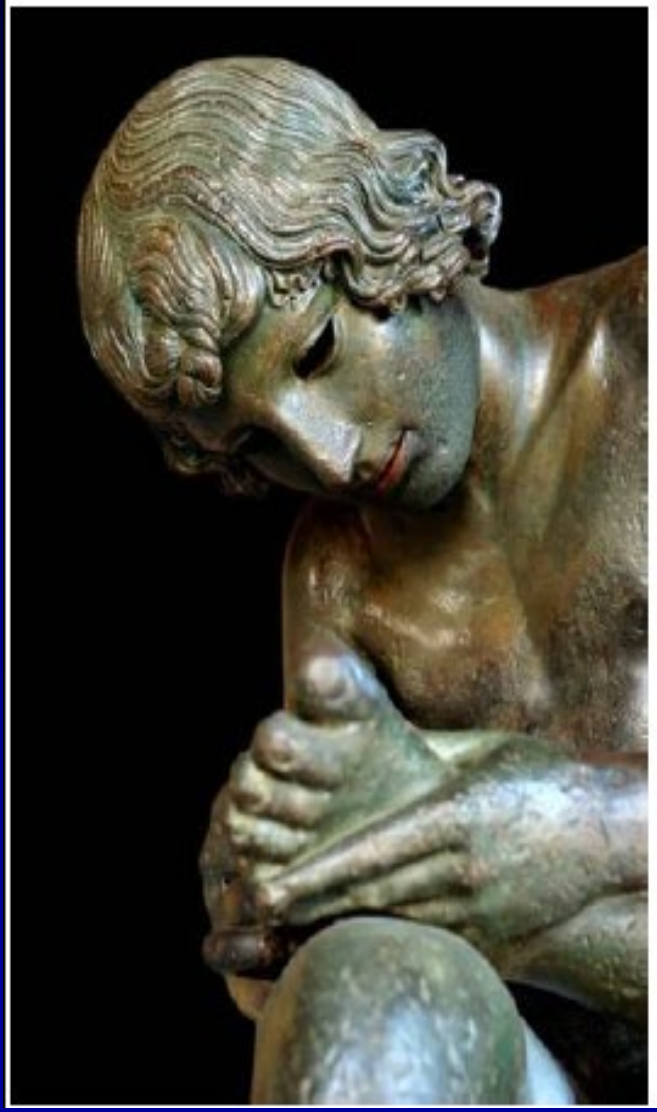


Figure 1: Numerical rating scale (NRS) scores for level of overall satisfaction (0 - 10, with 10 indicating maximum satisfaction) reported by patients in each of the three perioperative phases.

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Un'amputazione è una sconfitta per tutti



Grazie per l'attenzione

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Padova, 24 Novembre 2018
Crowne Plaza Padova

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podopatia diabetica

6° Congresso Nazionale del Gruppo di Studio della Podopatia Diabetica

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