



APPROCCI INTERDISCIPLINARI IN REUMATOLOGIA  
9ª edizione

## RIABILITAZIONE E MALATTIE REUMATICHE

TORINO, 8-9 ottobre 2021

RESPONSABILI SCIENTIFICI

Enrico Fusaro, Giuseppe Massazza

### PROGRAMMA 9 ottobre 2021

Modulo WEB 3

8:45 Accesso alla sede congressuale e autenticazione sulla piattaforma

#### SESSIONE I – LA MANO (Moderatori: N. Romeo, E. Magistroni)

9:00 La mano reumatoide (M. Priora)

9:20 Il progetto Ma.Re. (B. Battiston, T. Benigno)

9:40 La mano sclerodermica: il punto di vista del reumatologo (N. Del Papa)

9:55 La mano sclerodermica: il punto di vista del chirurgo (G. Di Luca, P. Tos)

10:10 Discussione plenaria

#### SESSIONE II – RACHIDE E ARTRITE PSORIASICA (Moderatori: P. Stobbione, P. Merli)

10:20 Coinvolgimento del rachide nell'artrite psoriasica (G. Rovera)

10:40 Il progetto riabilitativo (L. Olino)

11:00 Discussione plenaria

Questionario ECM e valutazione evento. Solo per chi segue il convegno online

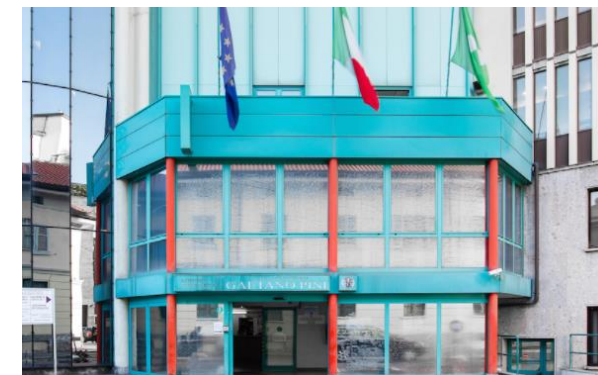
# La mano sclerodermica: il punto di vista del chirurgo

Gabriele Di Luca ^ - Pierluigi Tos \*

ASST Gaetano Pini – CTO  
Istituto Ortopedico Gaetano Pini

^ SS Chirurgia Vascolare

\* UOC Chirurgia della Mano e  
Microchirurgia Ricostruttiva



Centro Specialistico Ortopedico Traumatologico  
Gaetano Pini-CTO

Sistema Socio Sanitario



Regione  
Lombardia

ASST Gaetano Pini





# PROBLEMATICHE DELLA MANO NELLA SCLERODERMIA

- Raynaud
- Ulcere
- Necrosi
- Sclerodattilia
- Calcinosi
- Rigidità articolare e deformità digitale

# Maurice Raynaud 1934

Raynaud primitivo o secondario

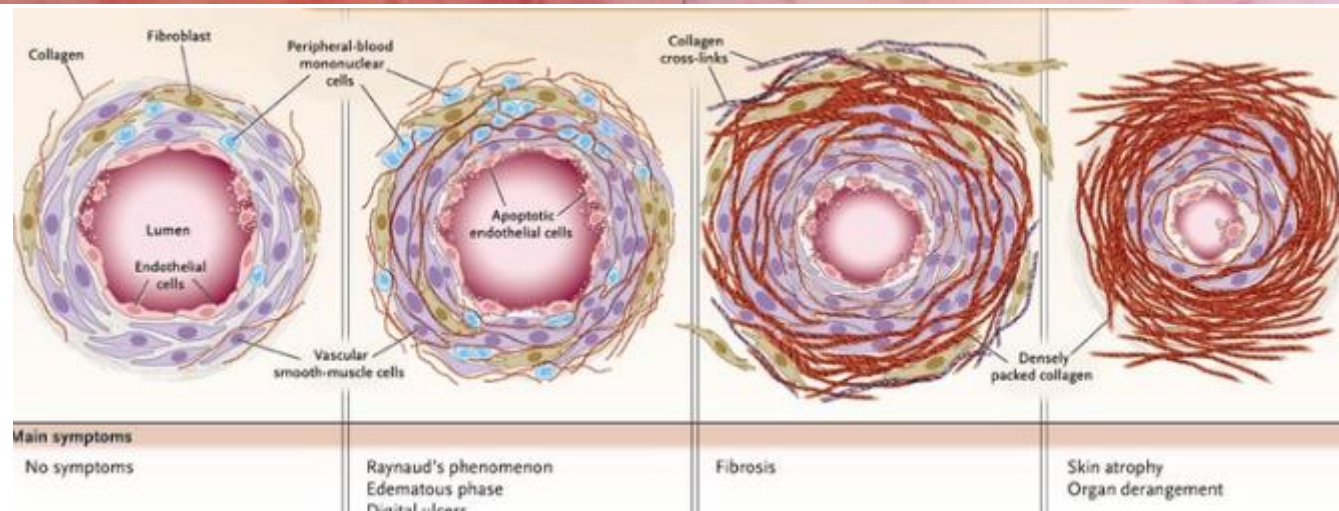
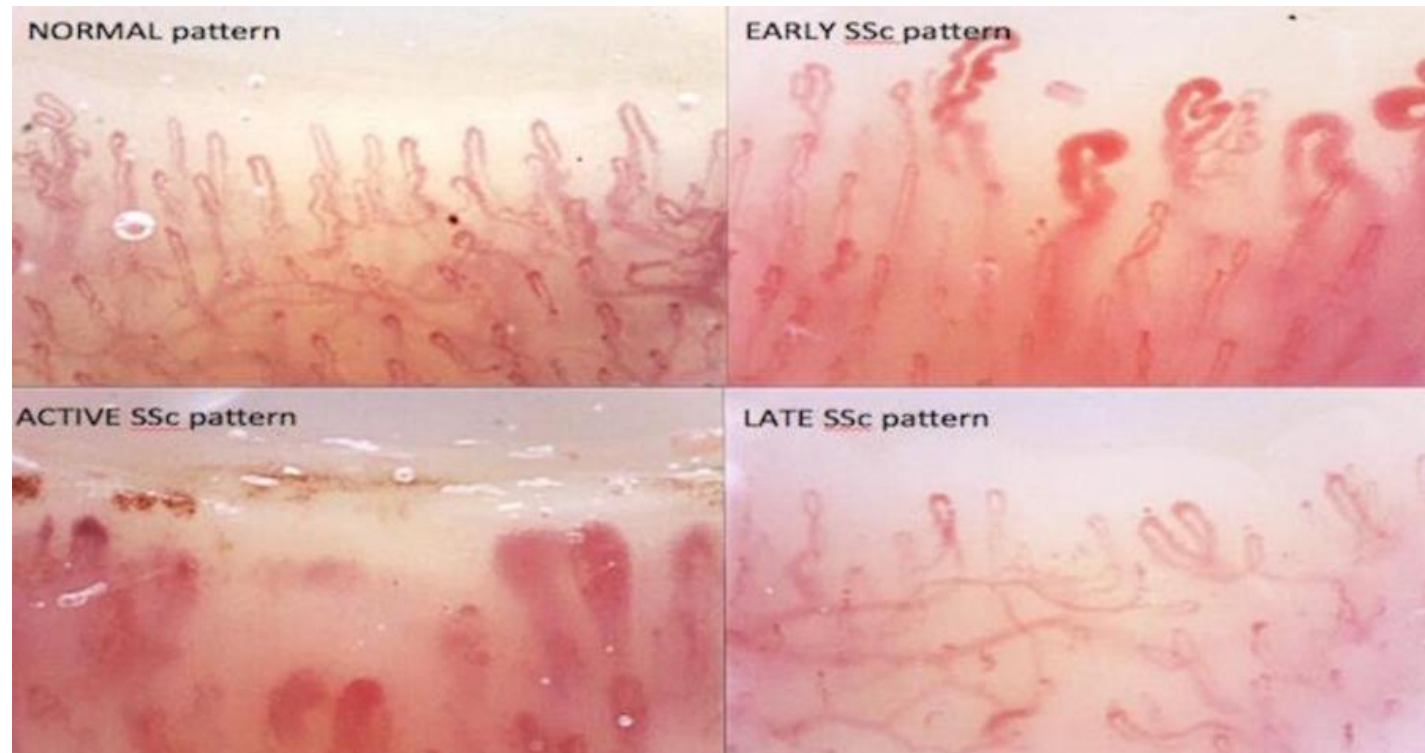
Fenomeno di Raynaud

La maggior parte dei casi sono in relazione alla sclerosi sistemica



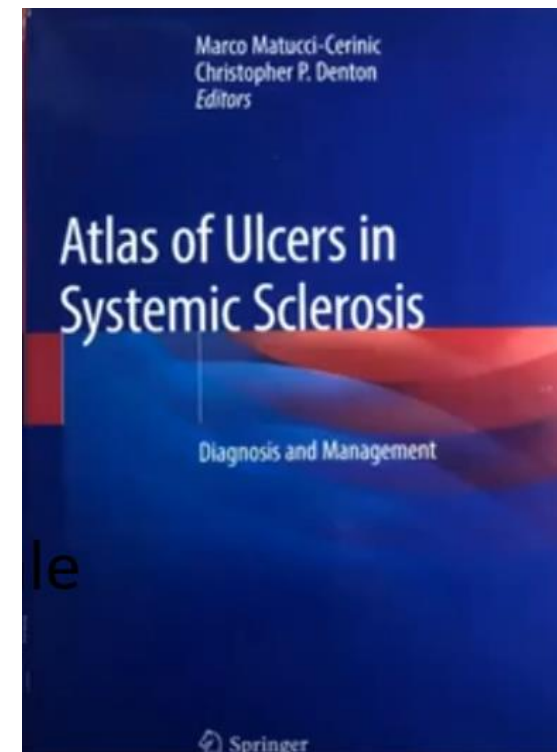


# Capillaroscapia



# PROBLEMATICHE DELLA MANO NELLA SCLERODERMIA


- Raynaud's
- **Ulcere**
- Necrosi
- Sclerodattilia
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- Raynaud's
  - Ulcere
  - **Necrosi**
  - Sclerodattilia
  - Calcinosi
  - Rigidità articolare e deformità digitale
- 



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# PROBLEMATICHE DELLA MANO NELLA SCLERODERMIA

- Raynaud's
- Ulcere
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# CHIRURGIA NELLA SCLEROSI SITEMICA

- Ulcere
- Raynaud's
- Necrosi/dolore
- Sclerodattilia
- Calcinosi
- Rigidità articolare e deformità digitale
- Debridment delle ulcere
- Iniezione di tossina botulinica
- Simpatectomia
- Iniezione di grasso
- Ricostruzione arteriosa
- Arterializzazione del sistema venoso
- Escissione del calcio
- Artroplastiche
- Artrodesi



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- Ulcere
  - Raynaud's
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  - Calcinosi
  - Rigidità articolare
  - deformità digitale
- Debridment delle ulcere
  - Iniezione di tossina botulinica
  - Simpatectomia
  - Iniezione di grasso
  - Ricostruzione arteriosa
  - Arterializzazione del sistema venoso
  - Amputazione del calcio
  - Artroplastiche
  - Artrodesi



# Tecnica

- Anestesia locale o generale
- Rimuovere il tessuto necrotico finche non vi è sanguinamento
- Non aspettarsi sanguinamento sul fondo dell'ulcera
- Il paziente deve sapere che purtroppo la cura è lunga e non si guarisce con facilità







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- Artrodesi

# Tossina botulinica

- Botox fono a 100 u.i.
- Semplice
- Non garantito risultato a lungo termine

## Botox Therapy for Ischemic Digits

Michael W. Neumeister, MD

**Background:** Treating patients with Raynaud's phenomenon who have chronic

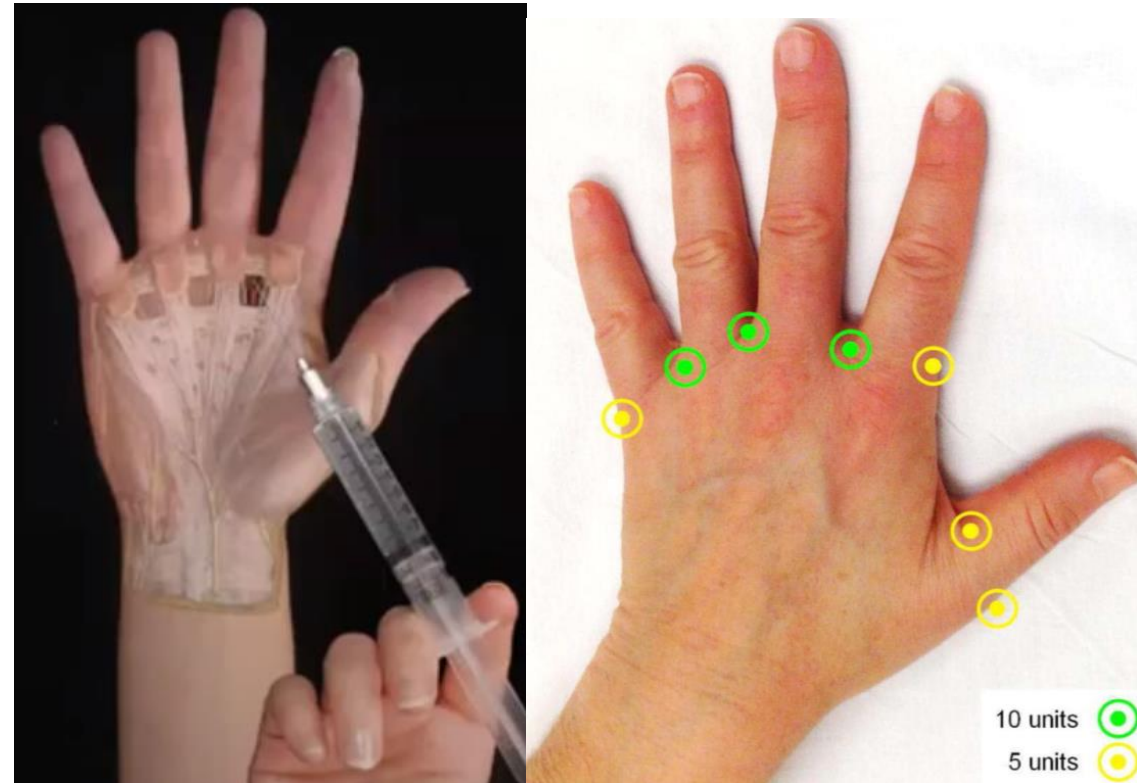
Plastic and Reconstructive Surgery • July 2009

## The Therapeutic Efficacy of Botulinum Toxin in Treating Scleroderma-Associated Raynaud's Phenomenon: A Randomized, Double-Blind, Placebo-Controlled Clinical Trial


Ricardo J Bello <sup>1</sup>, Carisa M Cooney <sup>1</sup>, Eitan Melamed <sup>1</sup>, Keith Follmar <sup>1</sup>, Gayane Yenokyan <sup>1</sup>, Gwendolyn Leatherman <sup>1</sup>, Ami A Shah <sup>1</sup>, Fredrick M Wigley <sup>1</sup>, Laura K Hummers <sup>1</sup>, Scott D Lifchez <sup>1</sup>

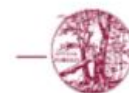
Affiliations + expand

[Arthritis Rheumatol.](#) 2017 Aug;69(8):1661-1669.



# SIMPATECTOMIA

- Cervicale
  - Può essere efficace nel breve periodo
  - Può anche far peggiorare nel lungo periodo – aumenta l'effetto del simpatico
- Periferica
  - Leriche 1937 
  - Periarteriale
  - Arcata palmare
- Rimozione e legatura di tutte le arterie che hanno una trombosi
- Tentativo di rimuovere la «scarica» simpatica data dalle arterie malate



# SIMPATECTOMIA PERIARTERIOSA

- Arterie **Radiale** e **Ulnare**

- 50% dei pazienti con patologia del collagene ha un problema vascolare dell'arteria ulnare

- **Digitale**

- Rimozione dell'avventizia e simpatectomia per 2-3 cm – tronchi comuni
- Di norma solo per le dita più in difficoltà ma possibile a anche su tutte

- **Arcata palmare**

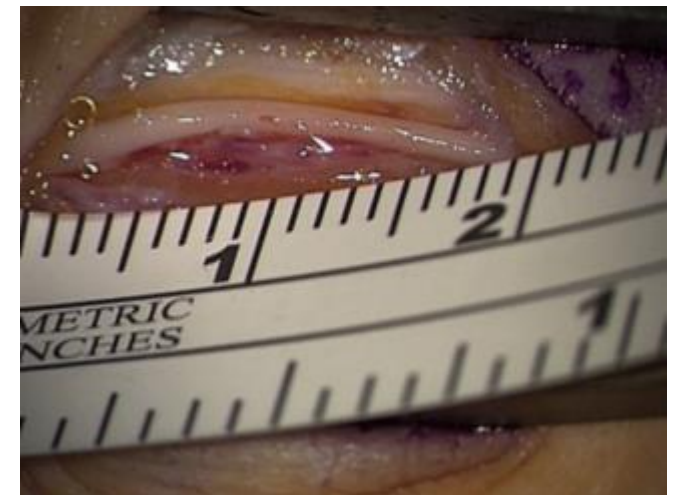
**Alcuni autori suggeriscono di eseguire tutte le procedure insieme**



# RUOLO E RAZIONALE DELLA SIMPATECTOMIA

Wyndell H. Merritt, MD

Role and Rationale for Extended Periarterial Sympathectomy in the Management of Severe Raynaud Syndrome Techniques and Results  
*Hand Clin* 31 (2015) 101–120







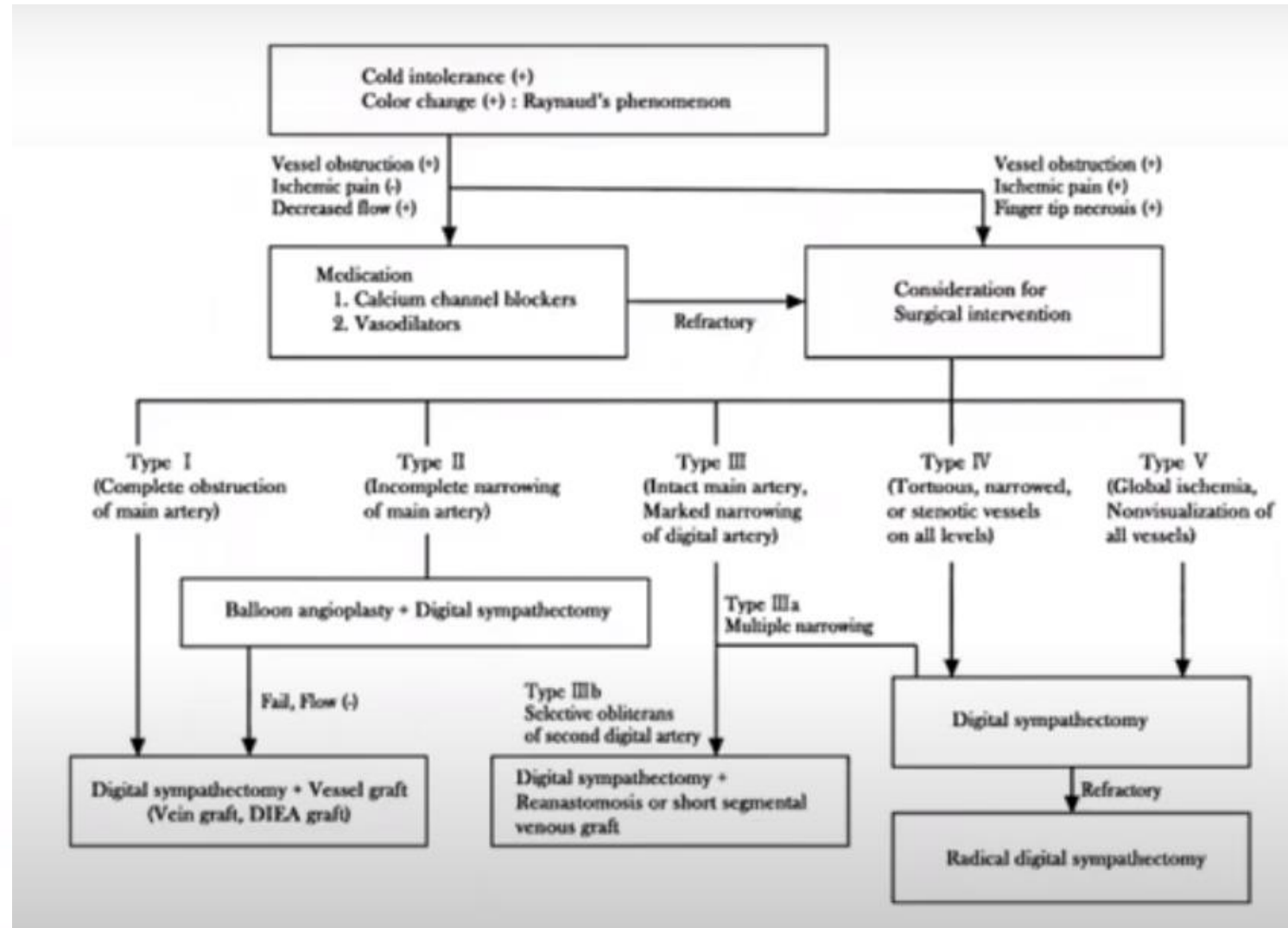


# RICOSTRUZIONE ARTERIOSA



## Classification of Raynaud's disease based on angiographic features

Youn Hwan Kim <sup>a</sup>, Siew-Weng Ng <sup>b</sup>, Heung Seok Seo <sup>c</sup>, Hee Chang Ahn <sup>a,\*</sup>



## Arterialization of the Venous System of the Hand

Gabriel M. Kind, M.D.

San Francisco, Calif.

**Background:** The treatment of hand ischemia can be very challenging. In cases in which there are no reconstructible arterial lesions, treatment options are limited. Arterialization of the venous system of the hand is a straightforward surgical procedure that provides arterial blood to the distal soft tissues of an ischemic hand.

**Methods:** The author conducted a retrospective review of the history, indications, technique, and results of this technique as applied to the treatment of five hands in three patients.

**Results:** For each of these patients, the treatment included an anastomosis from the distal radial or ulnar artery to a distal hand vein. Blood flow was directed distally by ligating venous side branches. Valsalvas were performed as needed to the base of the digits on the dorsum of the hand. This approach resulted in excellent pain relief in all treated hands and healing of digital wounds.

**Conclusion:** This relatively straightforward salvage procedure provides arterialized blood to ischemic digits, resulting in wound healing and significant reduction in pain. (*Plast Reconstr Surg* 118: 421, 2006.)

Management of hand ischemia can be very challenging. Although somewhat uncommon, hand ischemia can be caused by a variety of mechanisms.<sup>1,2</sup> The end result is tissue necrosis and/or severe pain. Arterial insufficiency caused by proximal obstruction is generally responsive to vascular bypass or reconstruction.<sup>3</sup> However, there are several processes that create extensive disease in the distal arterial tree. These lesions may not be reconstructible.<sup>4,5</sup> When medical management fails to control ongoing pain and/or tissue loss, arterialization of the venous system should be considered.

Carrell arterialized the veins of a painful ischemic extremity as early as 1902.<sup>6</sup> Although there were several other published reports using this technique,<sup>7-9</sup> this salvage procedure never gained widespread use, likely because of the significant side effects when used in the lower ex-

trinity.<sup>10-12</sup> There is some experimental evidence that arterialization of the venous system results in neovascularization of the soft tissues.<sup>13</sup> It has been shown to have clinical application in small cutaneous flaps<sup>14-16</sup> ("venous flow-through flaps"); there have also been reports of successful replantation<sup>17</sup> and toe-to-thumb transplantation<sup>18</sup> based solely on arterialized veins.

### PATIENTS AND METHODS

#### Patient Selection

The patients in this series were referred for management of intractable hand pain. There were ischemic changes with necrosis or impending tissue loss in each case. Angiography was performed in every case to diagnose the extent and level of vasculopathy.

#### Surgical Technique



### SURGICAL TECHNIQUE

## Revascularization of the Ischemic Hand With Arterialization of the Venous System

Marina R. Haxer, M.D., Warren C. Hannon, M.D.

Chronic ischemia in the upper extremity is a challenging condition for both patients and surgeons. When ischemia reaches a critical level, tissue loss ensues, which results in necrosis of fingers at various levels. Amputation of necrotic digits, without addressing the etiology of the necrosis, often results in wound-healing problems and more proximal amputations. The purpose of this report was to describe a surgical technique that improves vascular supply to the hand and allows for healing of the amputation sites and relief of pain through arterialization of the venous system. (*J Hand Surg* 2011;34A:2047-2051. Copyright © 2011 by the American Society for Surgery of the Hand. All rights reserved.)

**Key words:** Arterialization, chronic hand ischemia, revascularization.

Chronic limb ischemia usually results from atherosclerotic disease and primarily affects the lower extremity. However, 5% of patients with chronic limb ischemia have involvement of the upper extremity. Although lower extremity ischemia is usually secondary to large-vessel atherosclerosis, upper extremity ischemia may result from different etiologies and treatment depends on the appropriate diagnosis. Common causes of upper extremity ischemia include vascular thrombosis such as hyperthrombotic syndrome,

embolism, infection, and more proximal amputations. The goals of treating patients with chronic ischemia, with or without tissue necrosis, are to improve blood flow to the hand, allow ischemic wounds to heal, relieve pain, and preserve or improve function. When there is a localized area of occlusion and a patent distal vessel, arterial vascular bypass is the procedure of choice. Ischemia resulting from vasospastic disease is treated with vasodilating medications and sympathectomy. When the cause of ischemia is secondary to atherosclerosis and no



Simpatectomia radicale



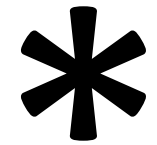
Innesti venosi



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- Rigidità articolare e deformità digitale

- Debridement delle ulcere
- Iniezione di tossina botulinica
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- **Iniezione di grasso**
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- Artroplastiche



# REGOLARIZZAZIONI NELLE NECROSI

- **Non seguono i livelli canonici** delle regolarizzazioni «dei libri»
- Si possono lasciare aperte **ma meglio accostare i margini con cura senza tensione**
- Possono **non essere livelli definitivi** ed essere rieseguite
- Sono necessarie, **non è possibile avere una guarigione in seguito a necrosi**, non si riescono a scolpire dei LEMBI di vicinanza ne lembi liberi











# CHIRURGIA NELLA SCLEROSI SITEMICA

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- Rigidità art e deformità c

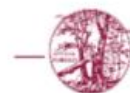


- Debridement delle ulcere
- Iniezione di tossina botulinica
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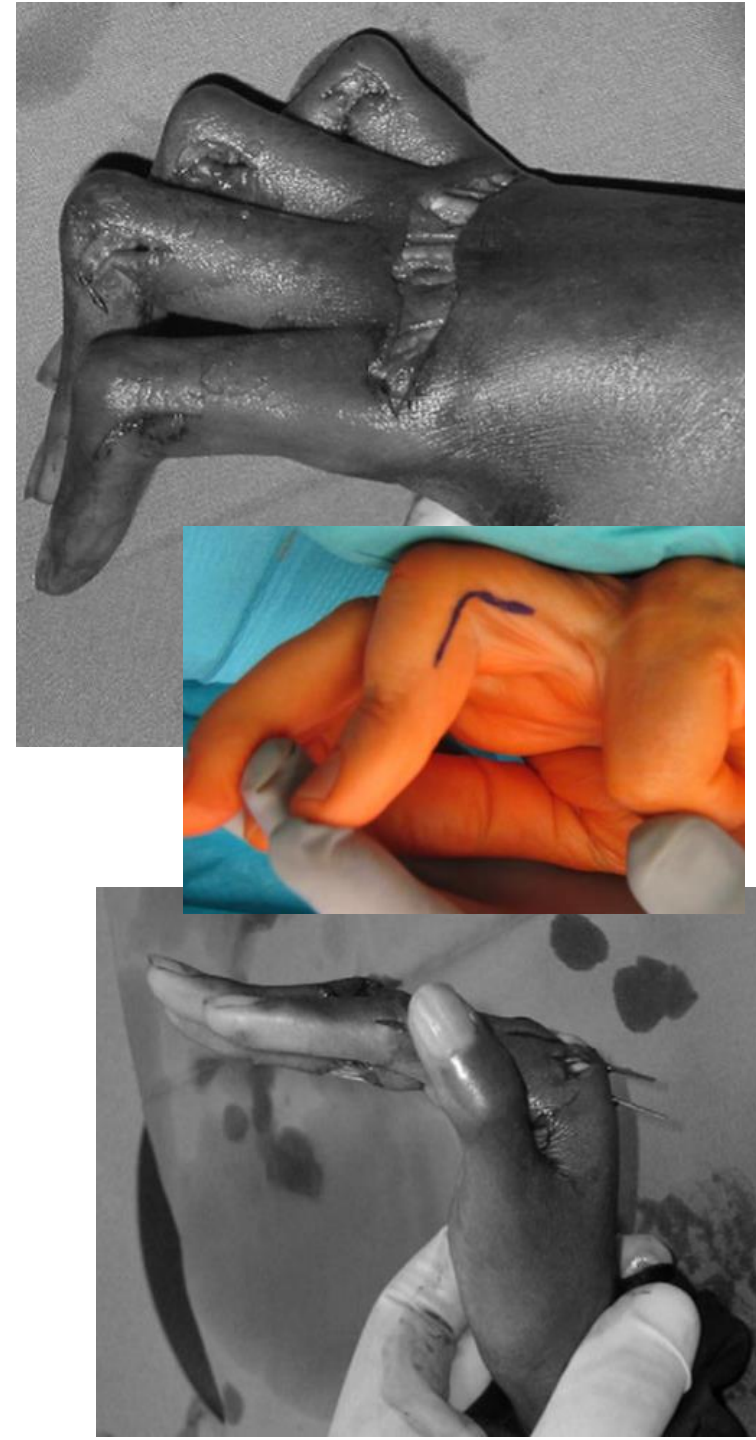
# CHIRURGIA NELLE RIGIDITÀ

## PREPARAZIONE PREOPERATORIA CON MESENCHIMALI DEL GRASSO

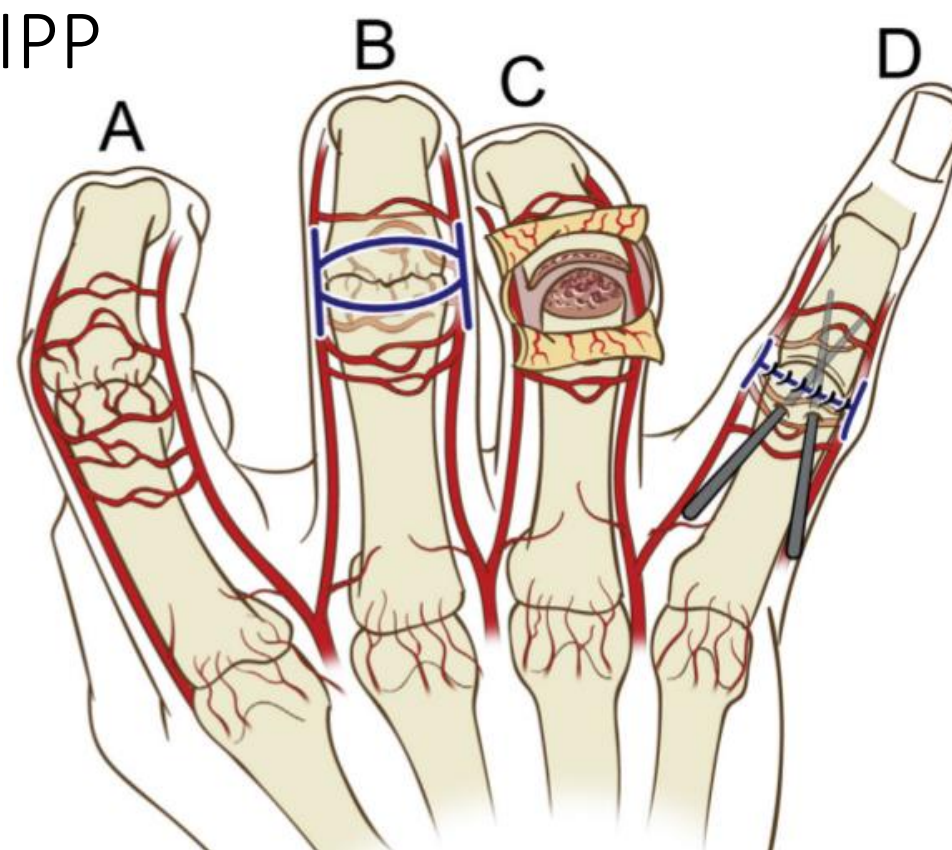
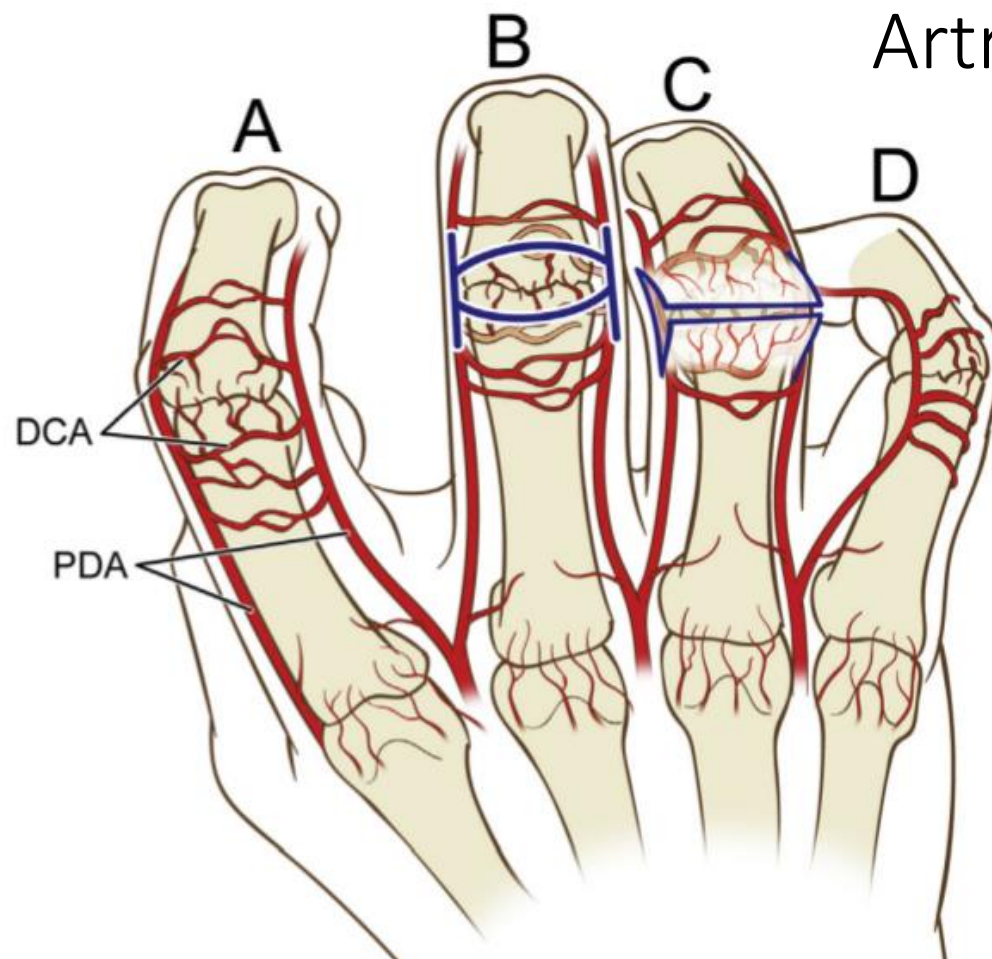
- **Artrodesi delle IPP** – di norma quando si flettono a 60° è il momento migliore
- **Artroplasticeh delle MF**
  - Sylastic
  - Artroplastica biologica (escissione dell'articolazione)

**Artrodesi delle IPP prima di occuparsi delle MF** –  
dipendente dallo stato cutaneo

Alto rischio di deiscenze, infezione, non chiusura  
delle ferite



## Artrodesi IPP



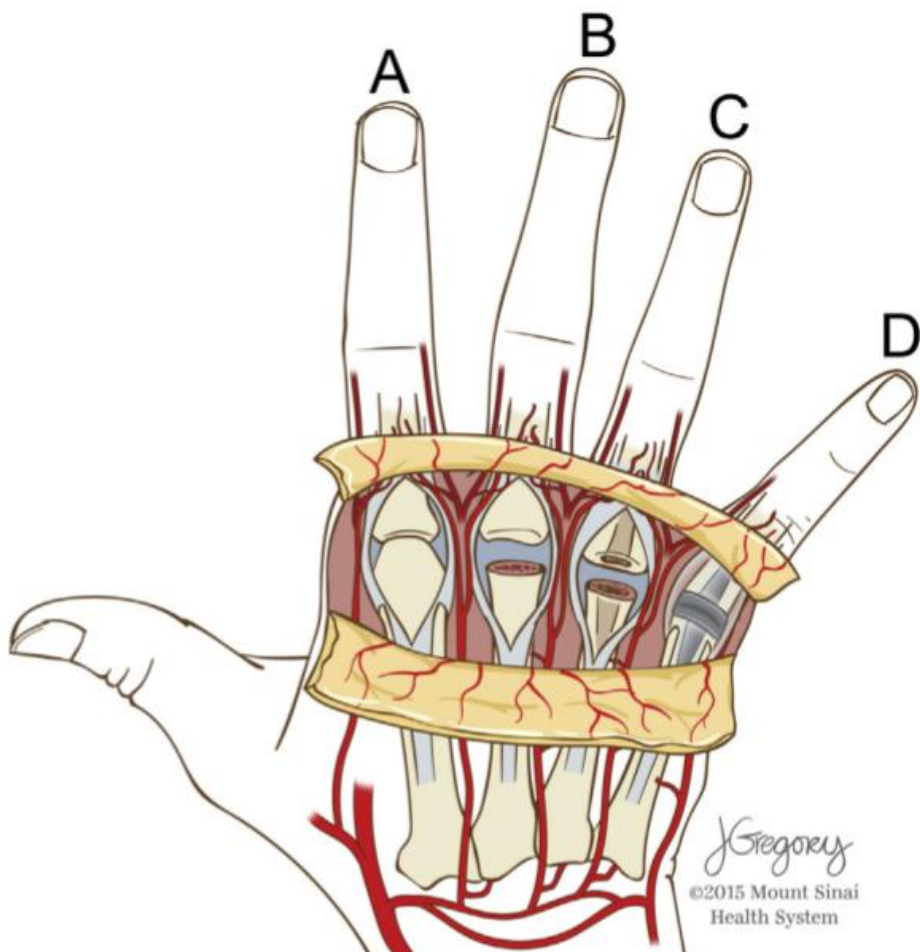
**INCISIONI ELLITTICHE CHE ESCIDONO  
IL TESSUTO NECROTICO**

**FILI DI K**





# Artroplastiche delle MF

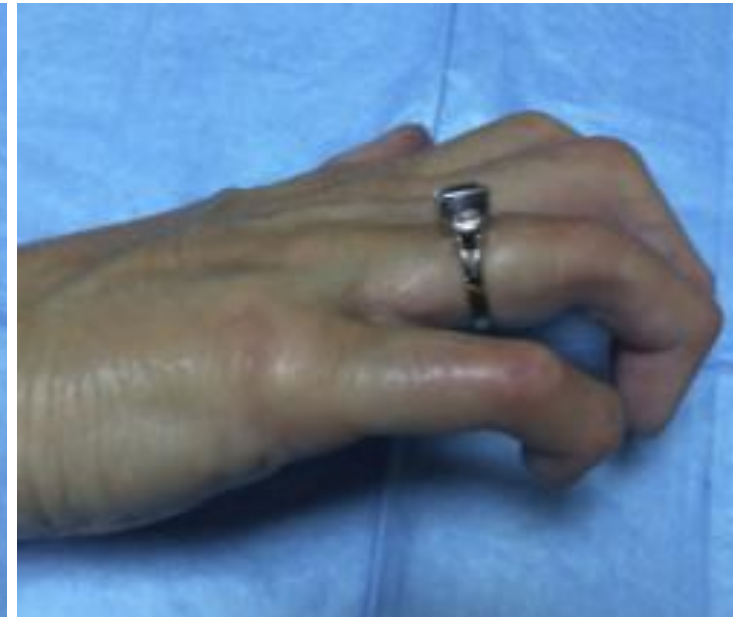


SURGICAL TECHNIQUE

## Articular Surgery of the Ischemic Hand in Systemic Scleroderma: A Vascular Basis for Arthrodesis and Arthroplasty

Charles P. Melone Jr, MD,\* Erez Dayan, MD†

J Hand Surg Am. 2018 Jun;43(6):574.e1-574.e9.



CURRENT CONCEPTS

## The Scleroderma Hand: Manifestations of Disease and Approach to Management

Ariel A. Williams, MD,\* Hannah M. Carl, BS,†  
Scott D. Lifchez, MD\*



J Hand Surg Am. • Vol. 43, June 2018



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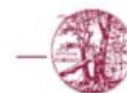


# Trattamento con grasso autologo



Gabriele Di Luca  
Chirurgo Vascolare IO G Pini

Gabriele di Luca, Pierluigi Tos



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# Istituto Ortopedico Gaetano Pini Milano

U.O. di Chirurgia Vascolare



# La gestione delle complicanze vascolari Il punto di vista del chirurgo vascolare

Gabriele Di Luca

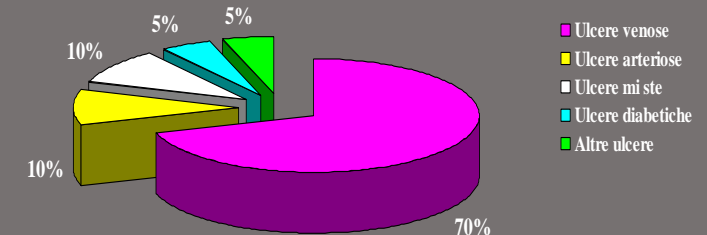
U.O. Chirurgia Vascolare I.O.G.Pini, Milano



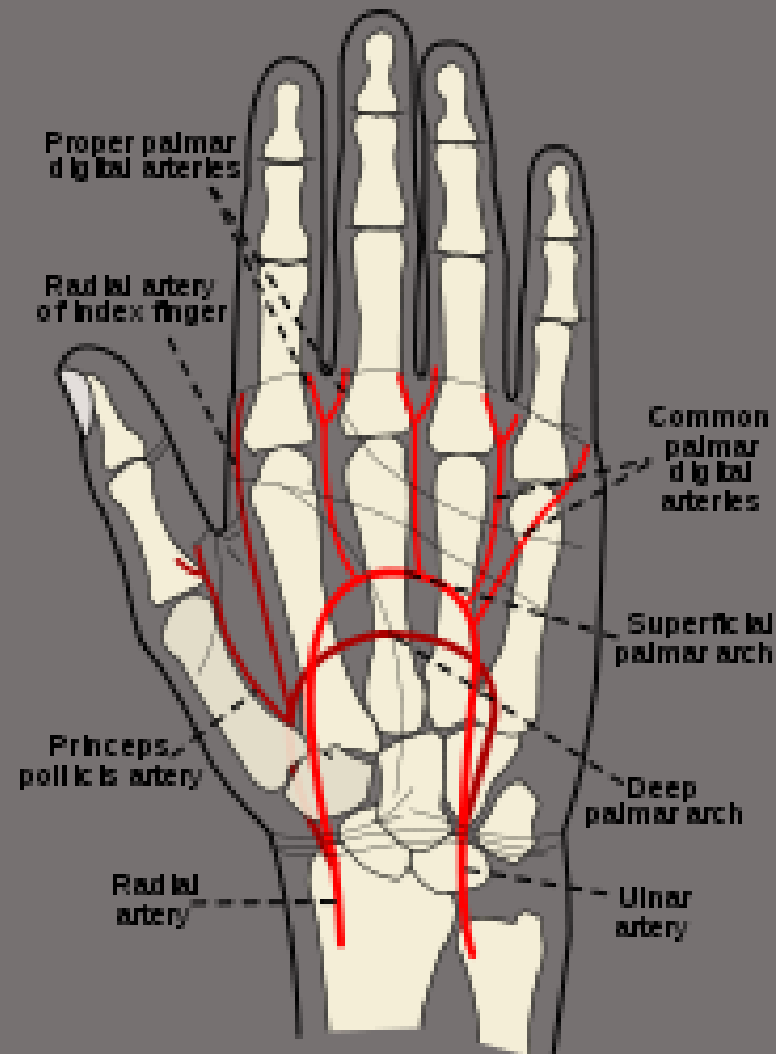
# Altre malattie correlate a lesioni ischemiche digitali

- Artrite Reumatoide
- Sindrome di Sjogren
- Poliarterite nodosa
- Malattia indifferenziata del connettivo
- Angioiti da ipersensibilità

*Ulcere croniche: prevalenza*



La **sclerosi sistemica** è una malattia del connettivo caratterizzata da fibrosi cutanea e viscerale e da una patologia vascolare coinvolgente le arteriole, le piccole e medie arterie del circolo periferico



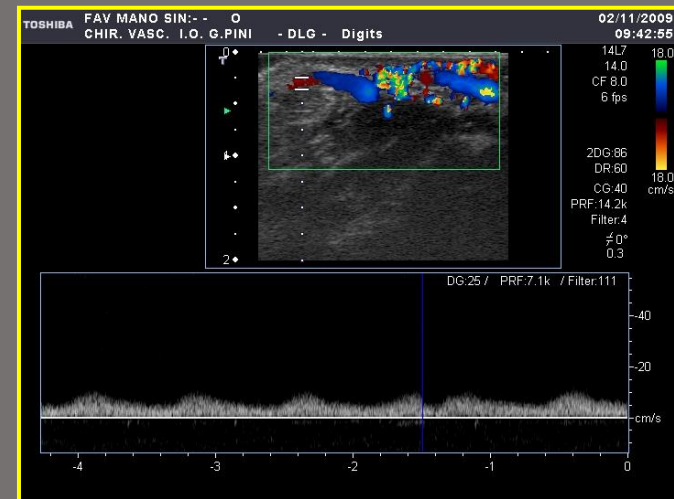
# Diagnostica

Nello studio dei pazienti affetti da ulcere degli arti è possibile utilizzare diversi strumenti diagnostici, dal capillaroscopio, al fotopletismografo al doppler cw, all'eco-color-doppler

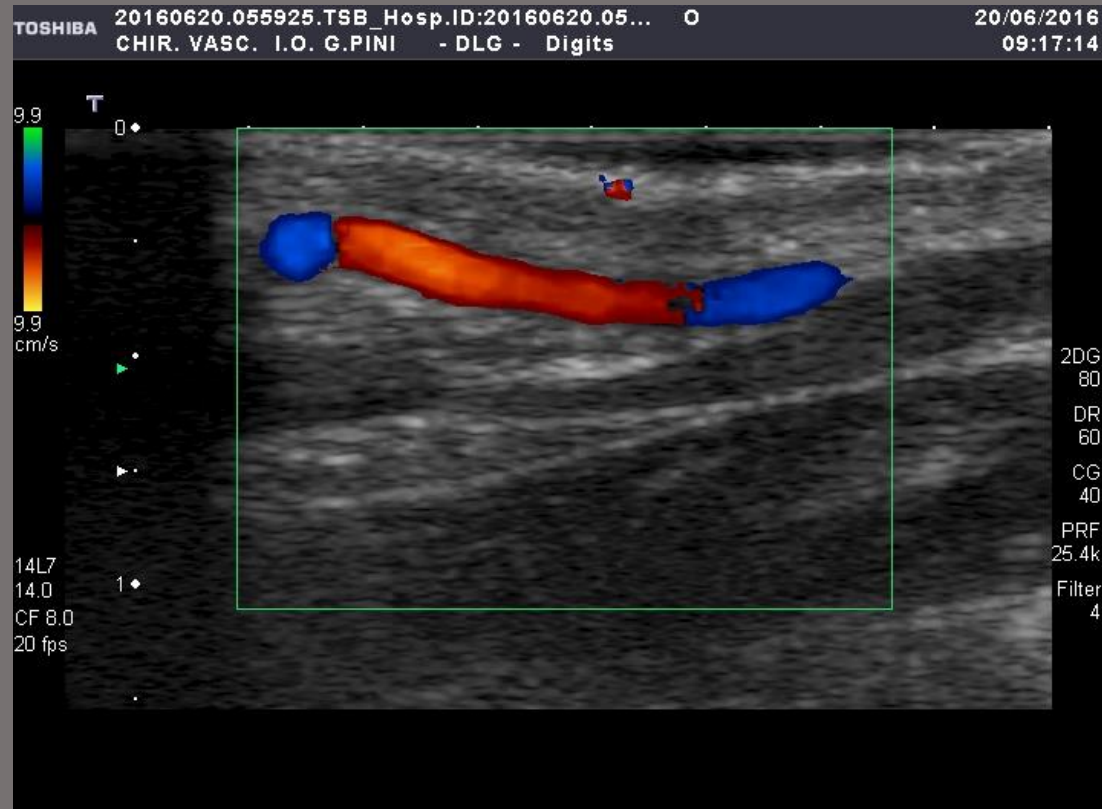


# Diagnostica

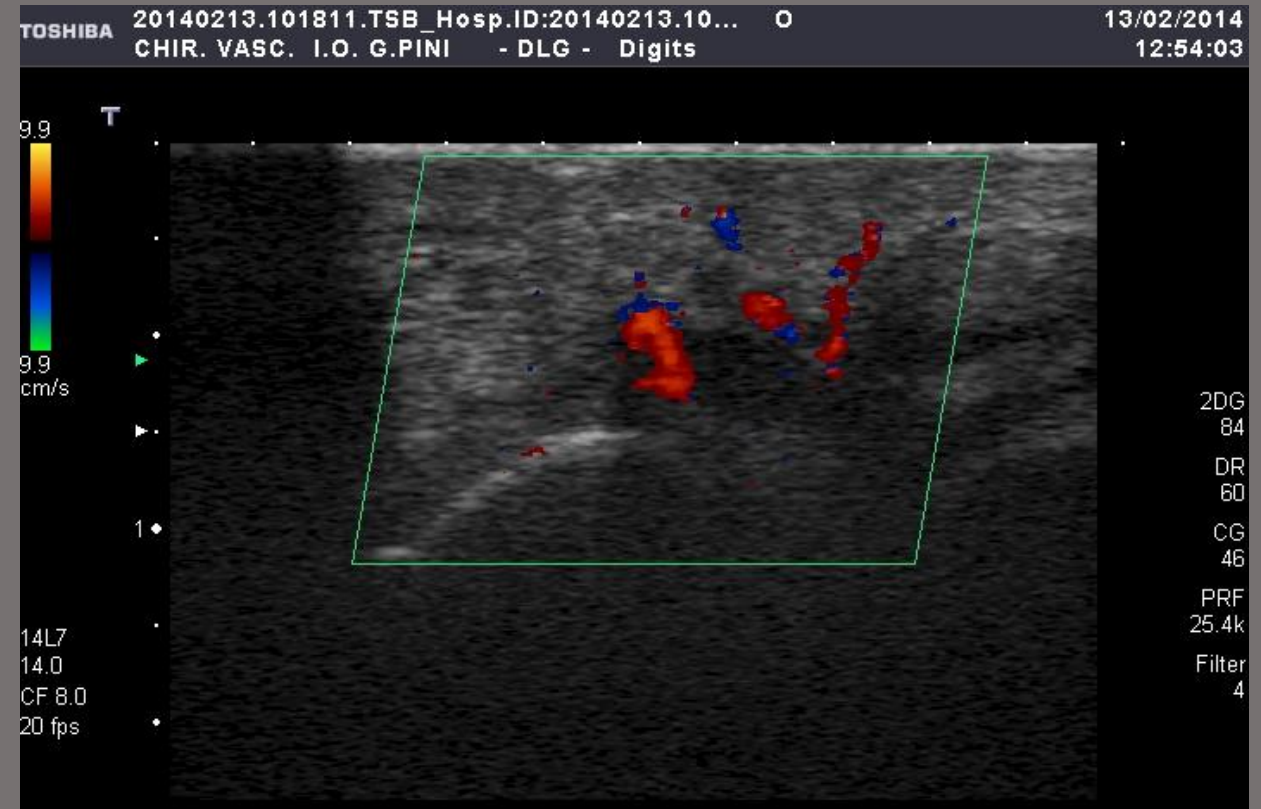
La strumentazione  
diagnostica ad ultrasuoni  
ed in modo specifico  
l'eco-color-doppler ha  
rappresentato, in questo  
campo, la svolta  
fondamentale



## a. digitale propria

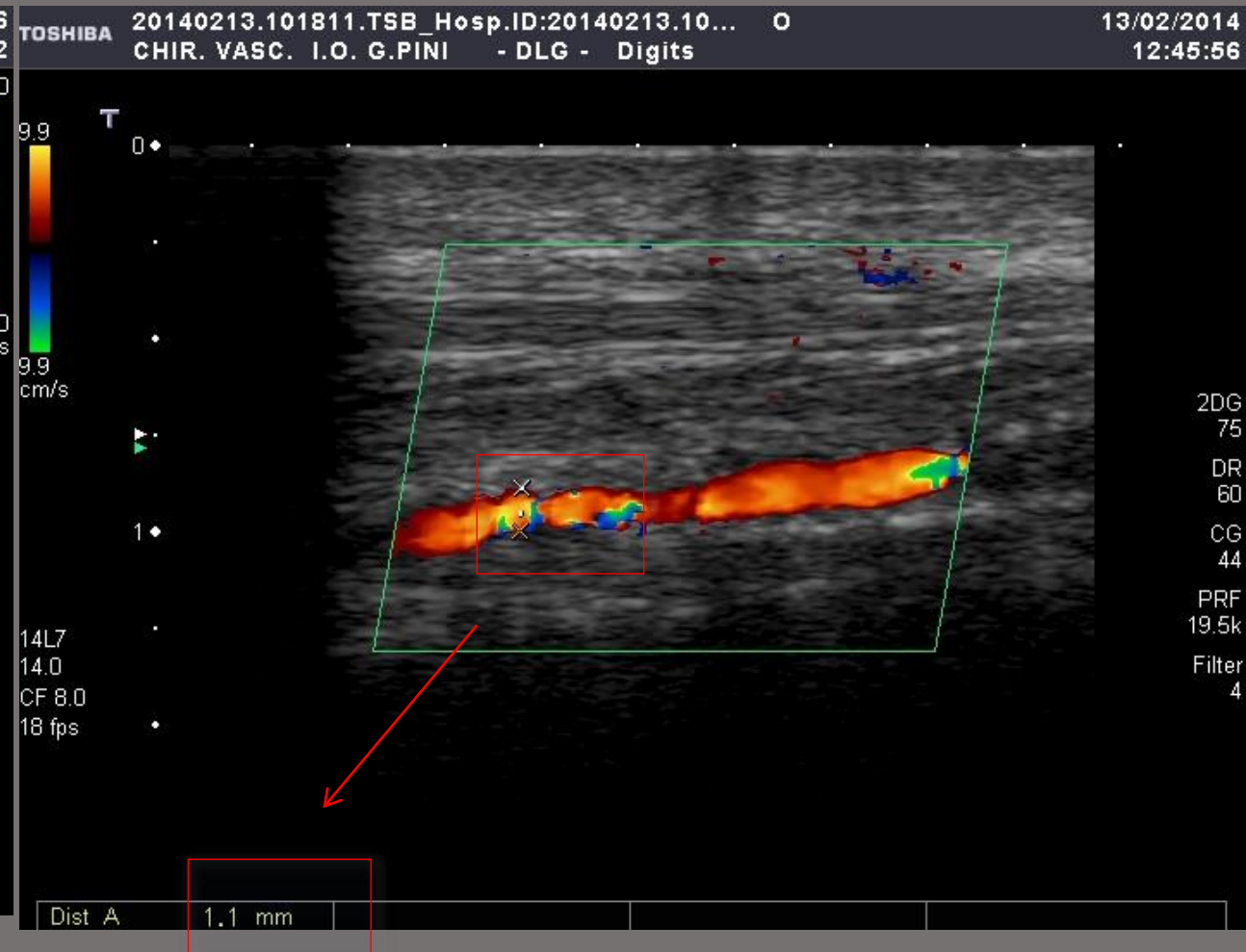
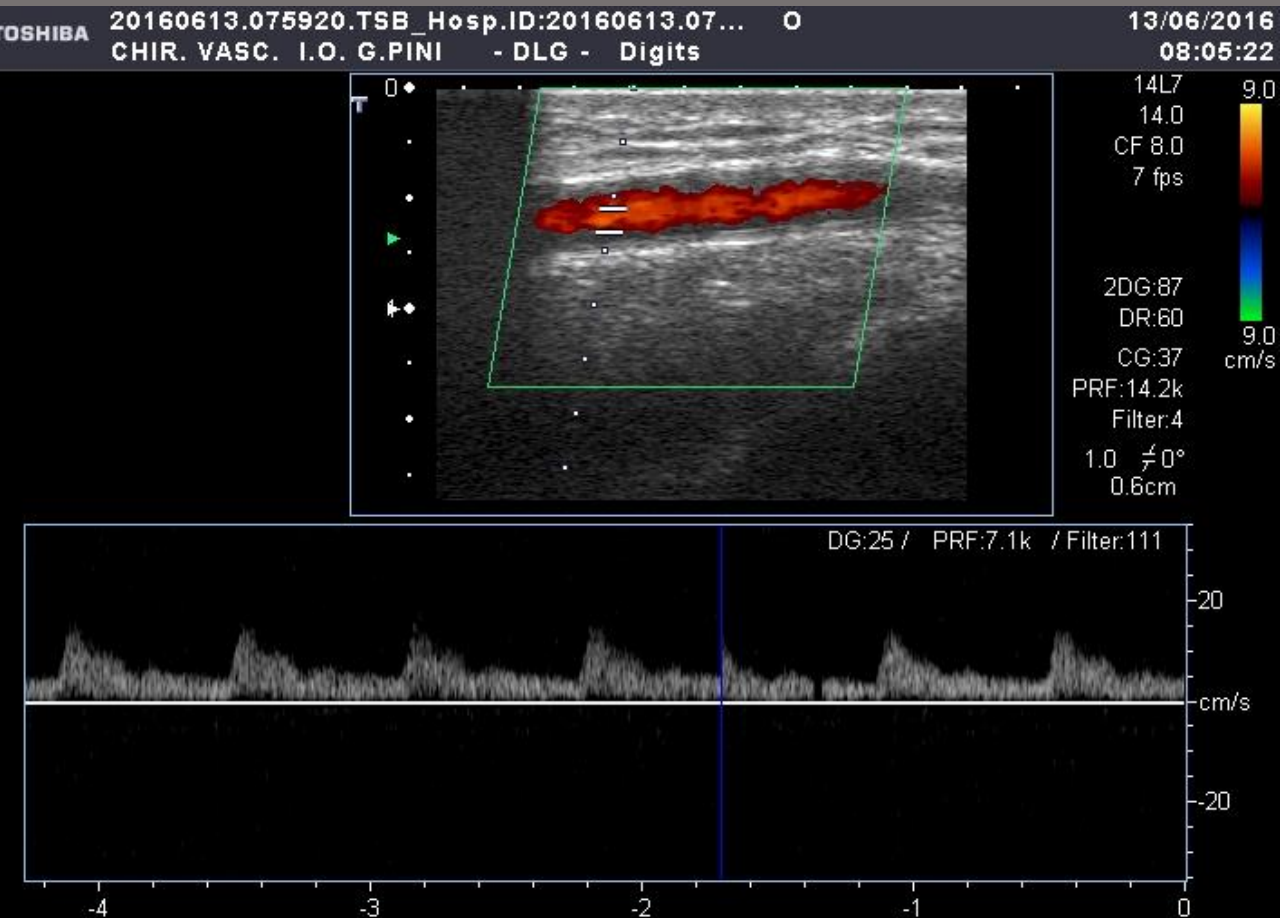


## Rami pulpari

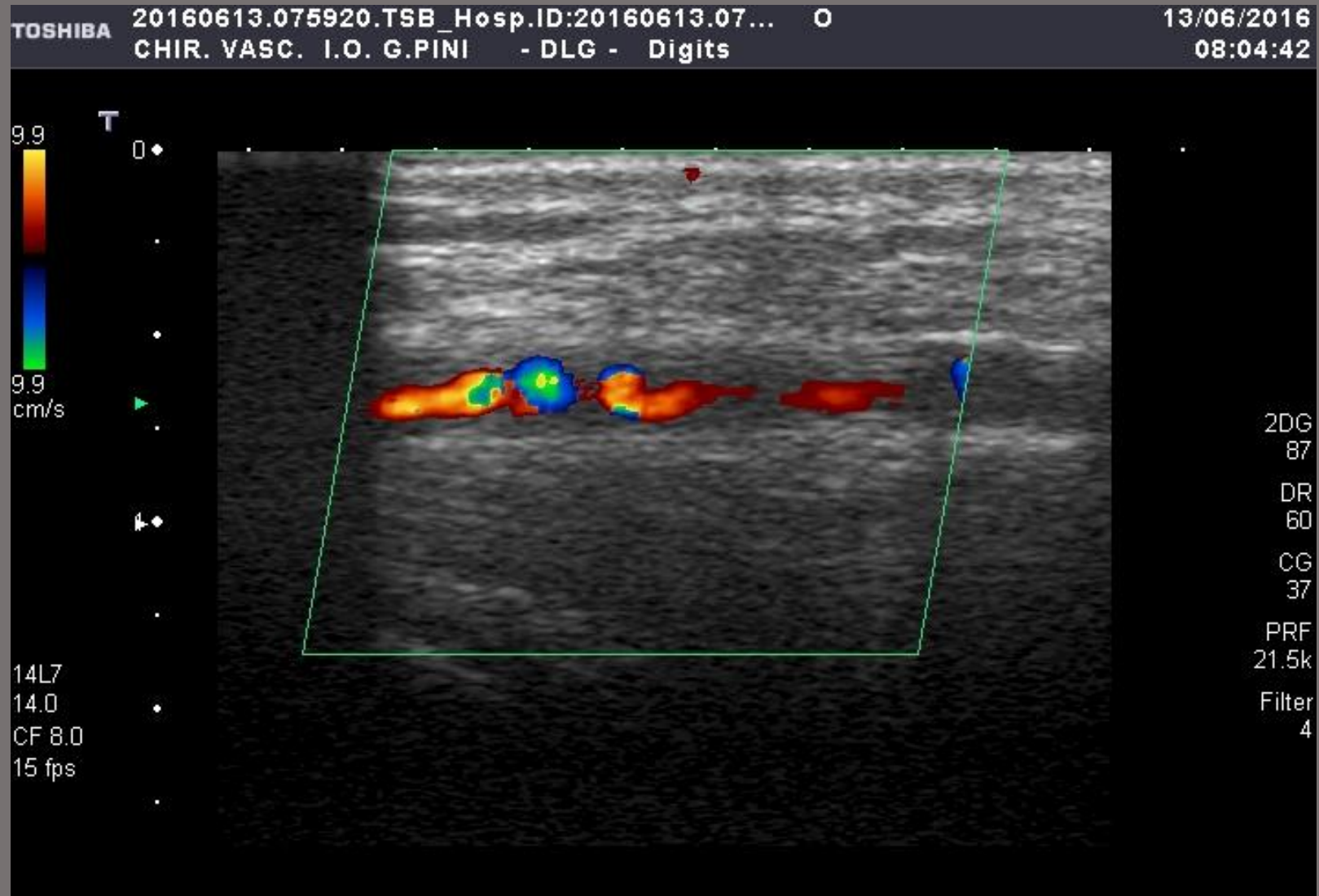




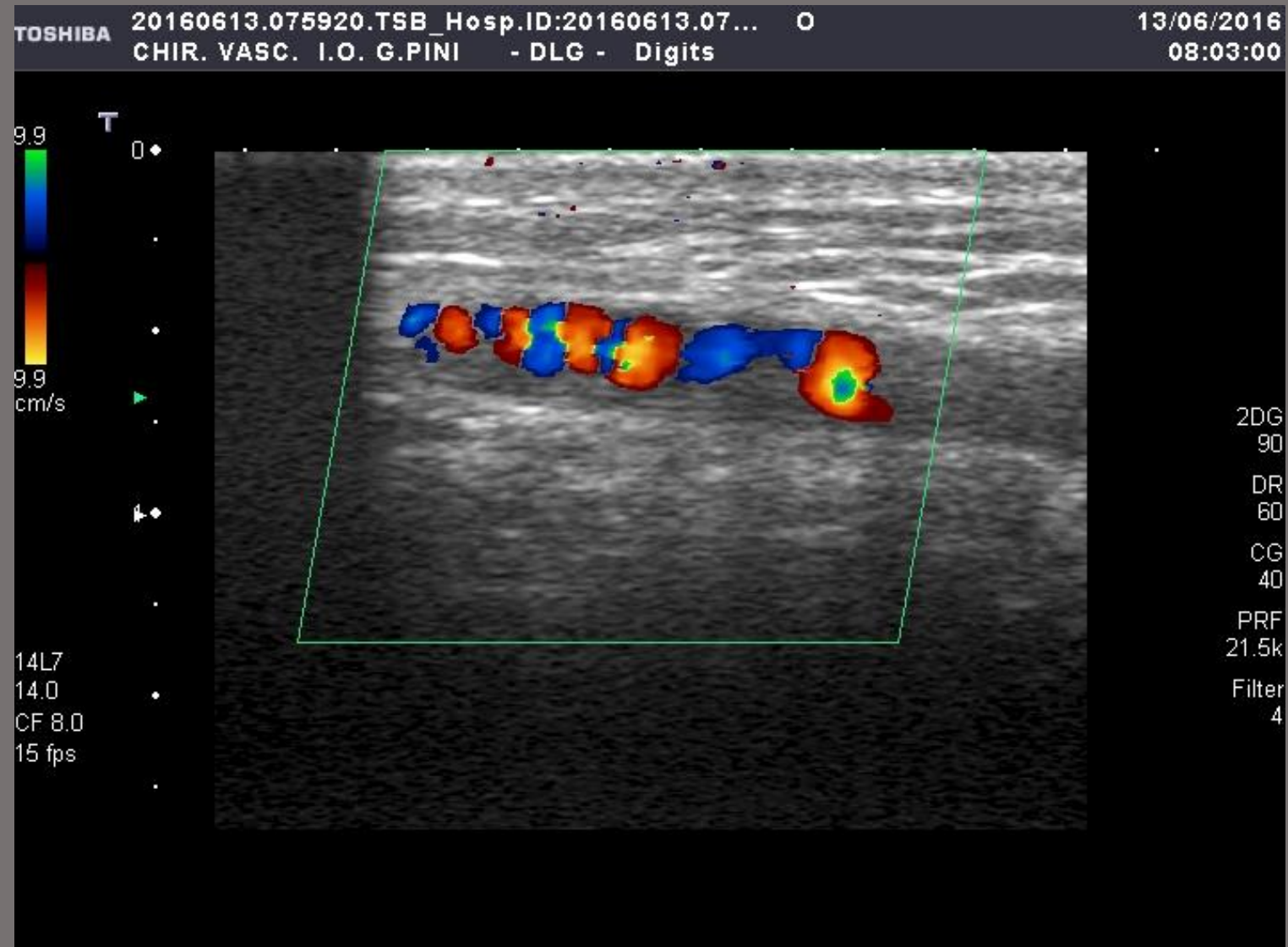
# Normale



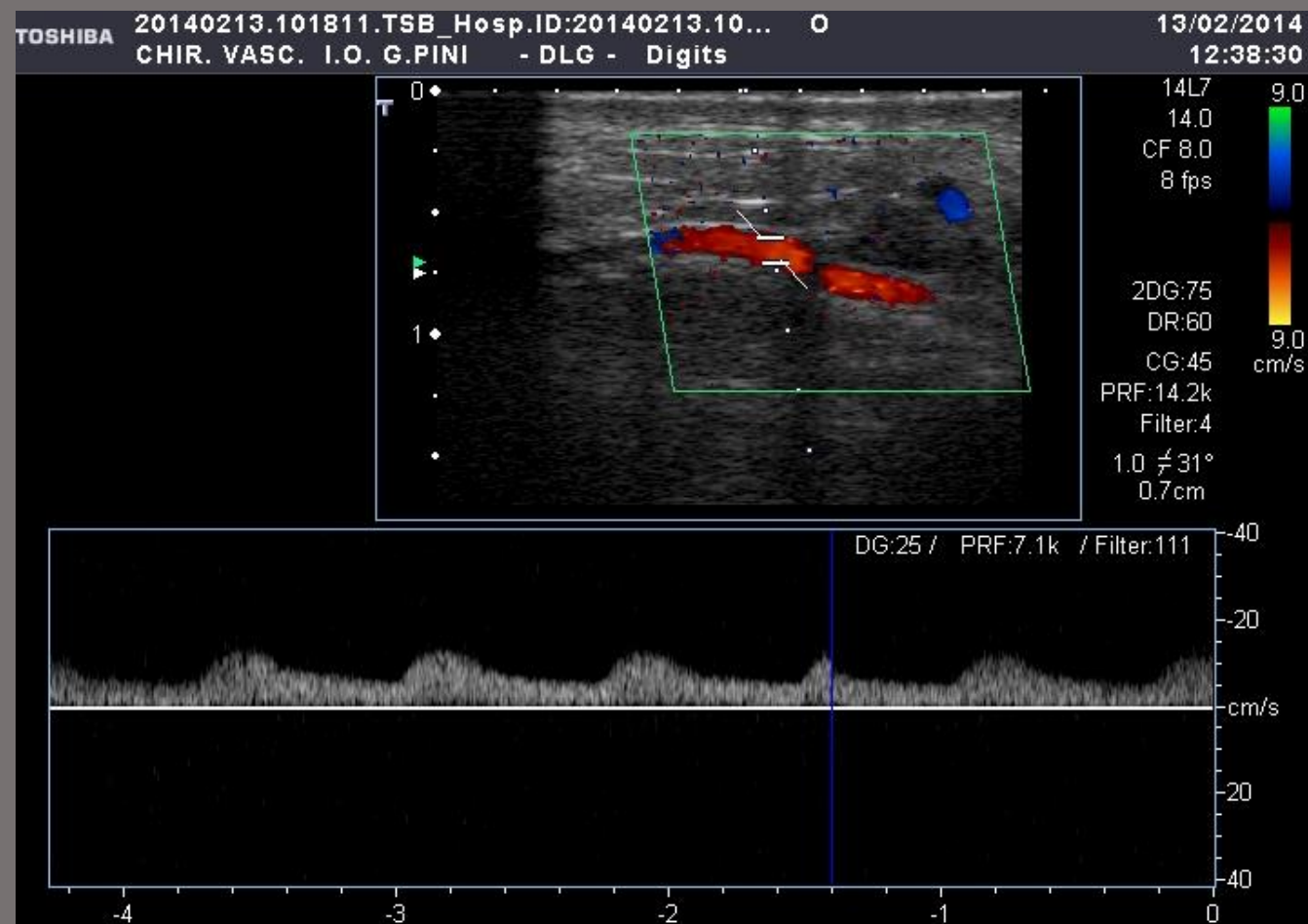
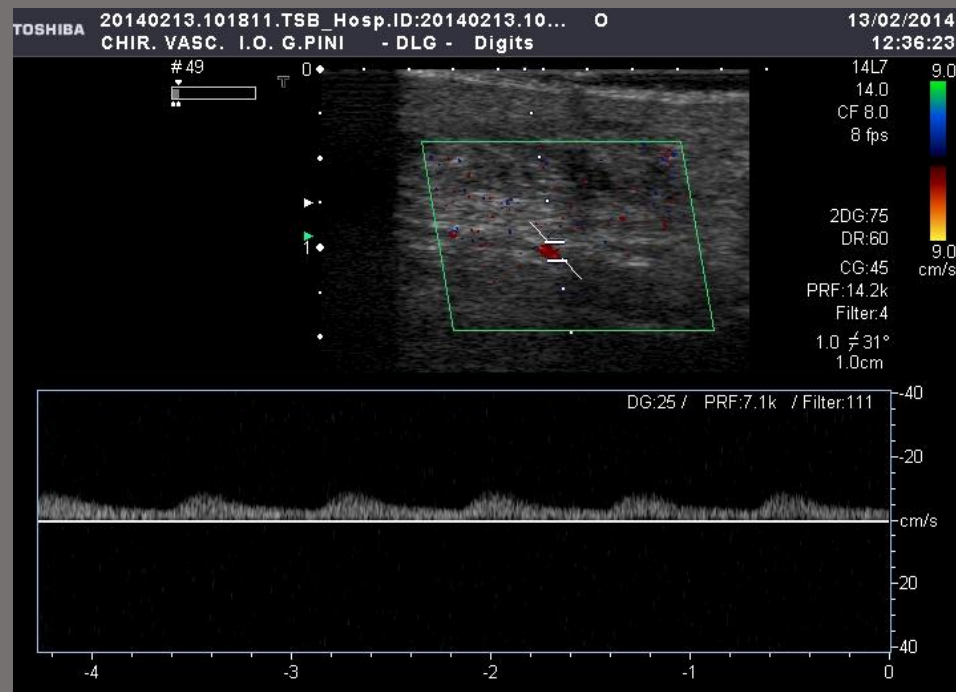
# Stenosi multiple



# Lesioni a “corona di rosario”

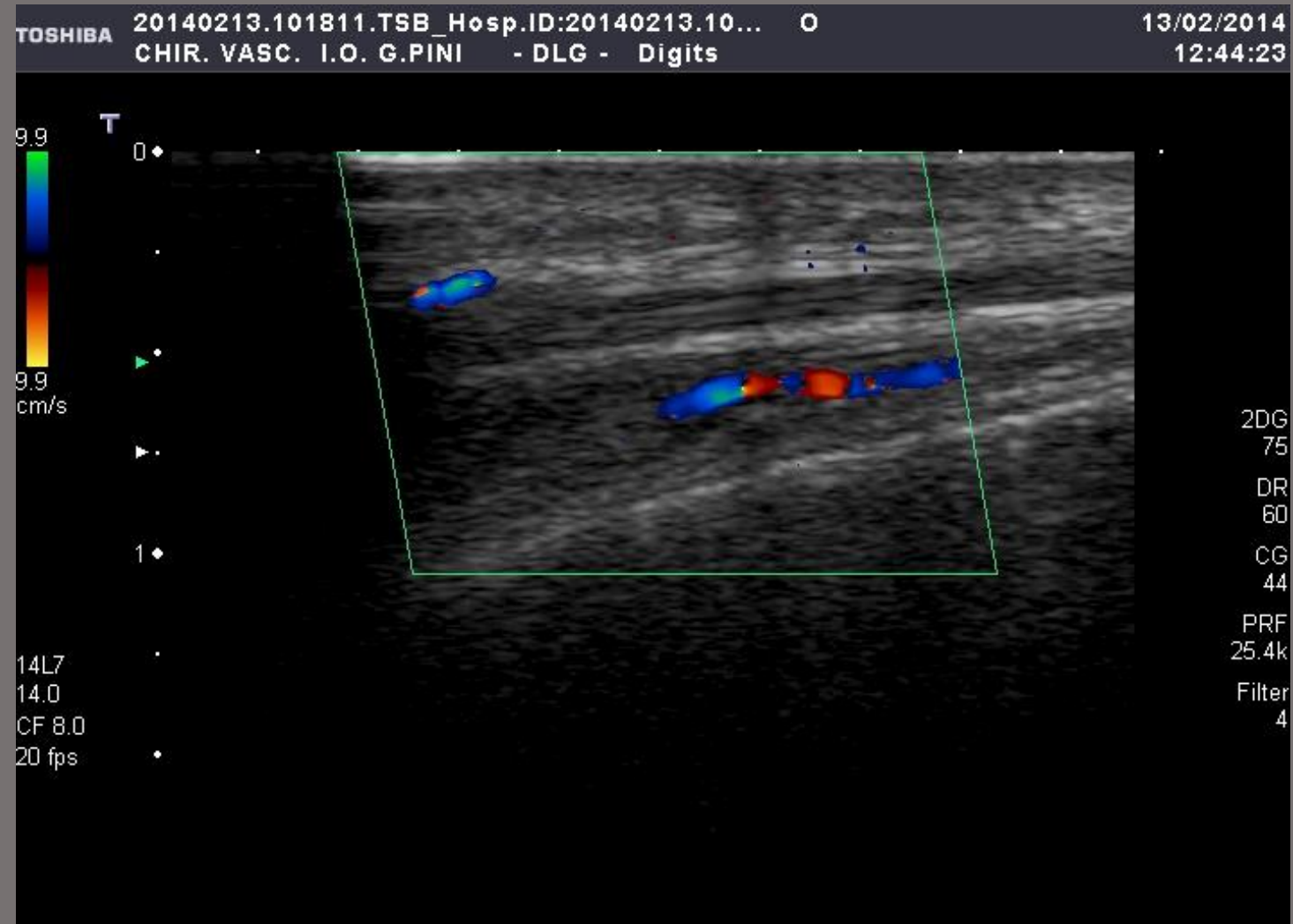


# Post-ostruttivo

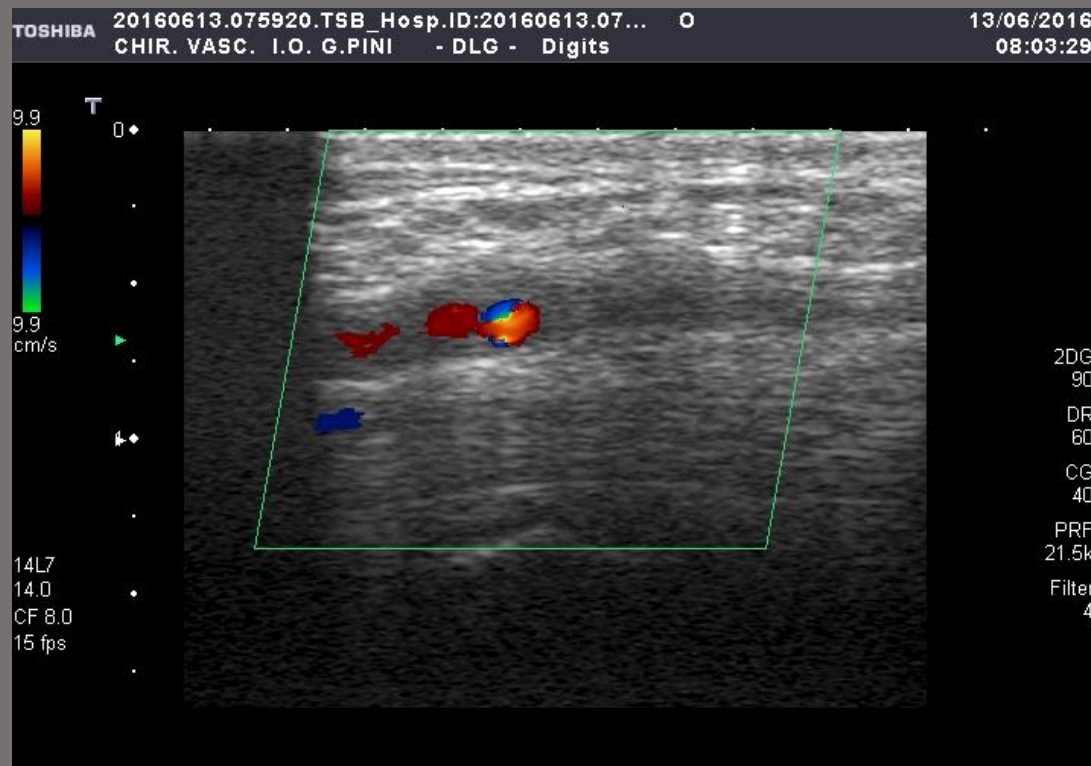




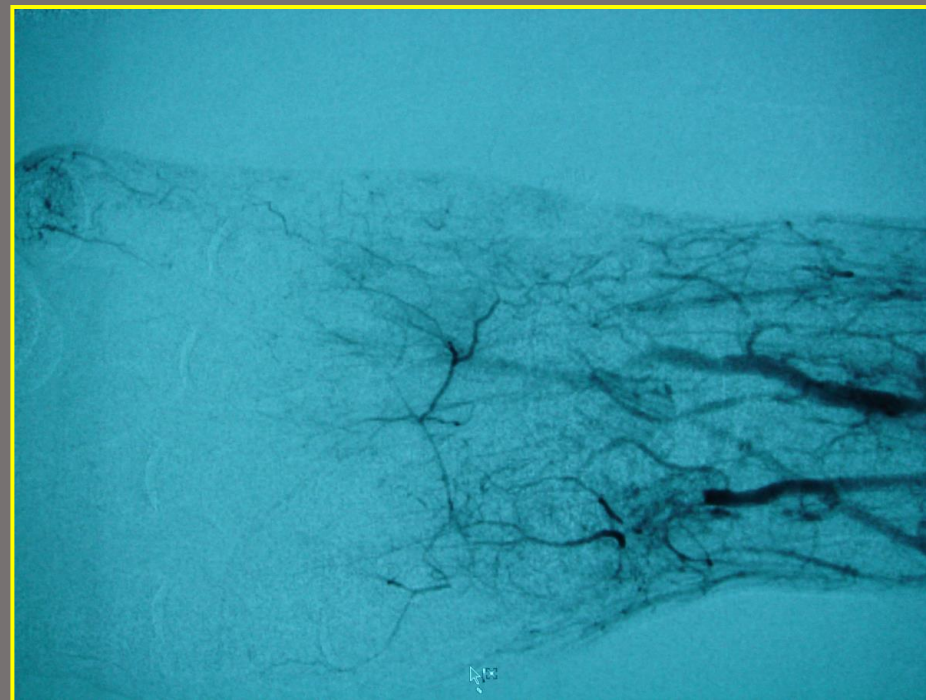
# Post-ostruttivo



# Obliterazione

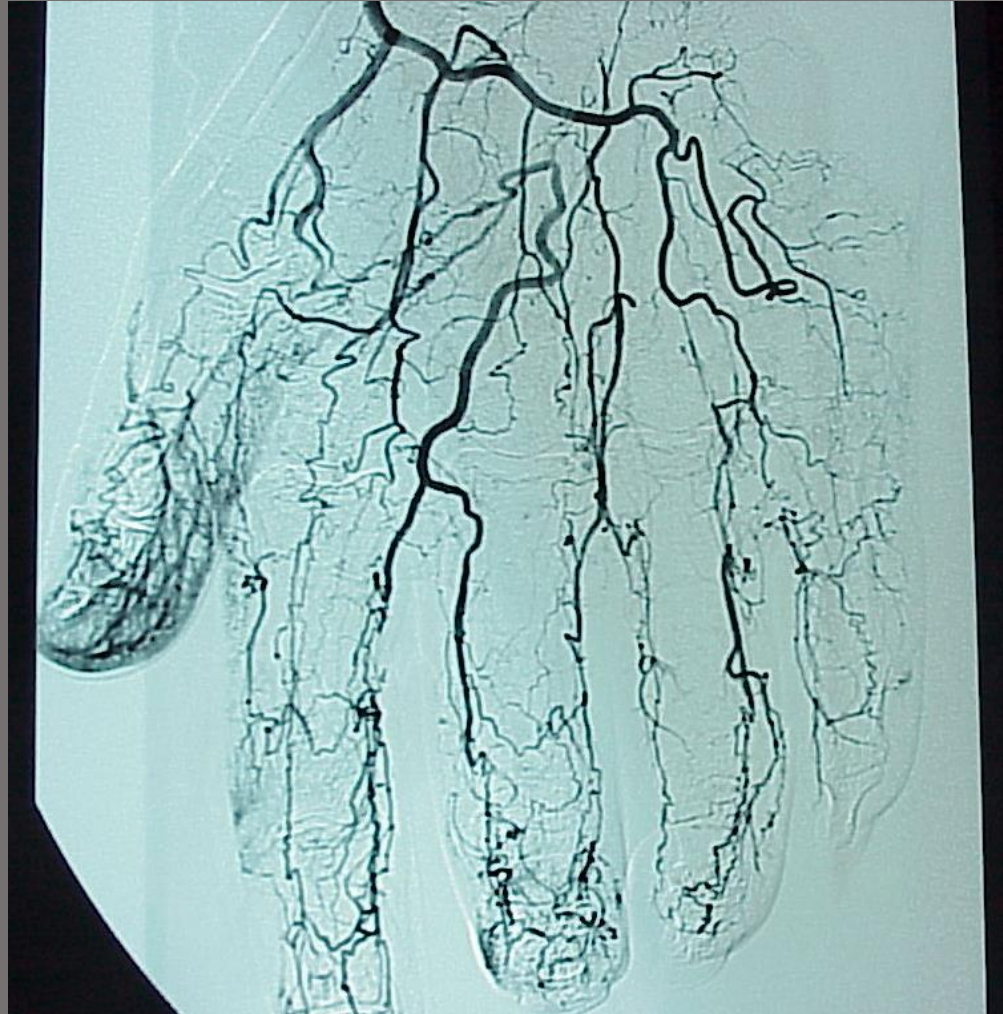


# Angiografia in arterite





# Angiografia





# Angio TC



# Terapia

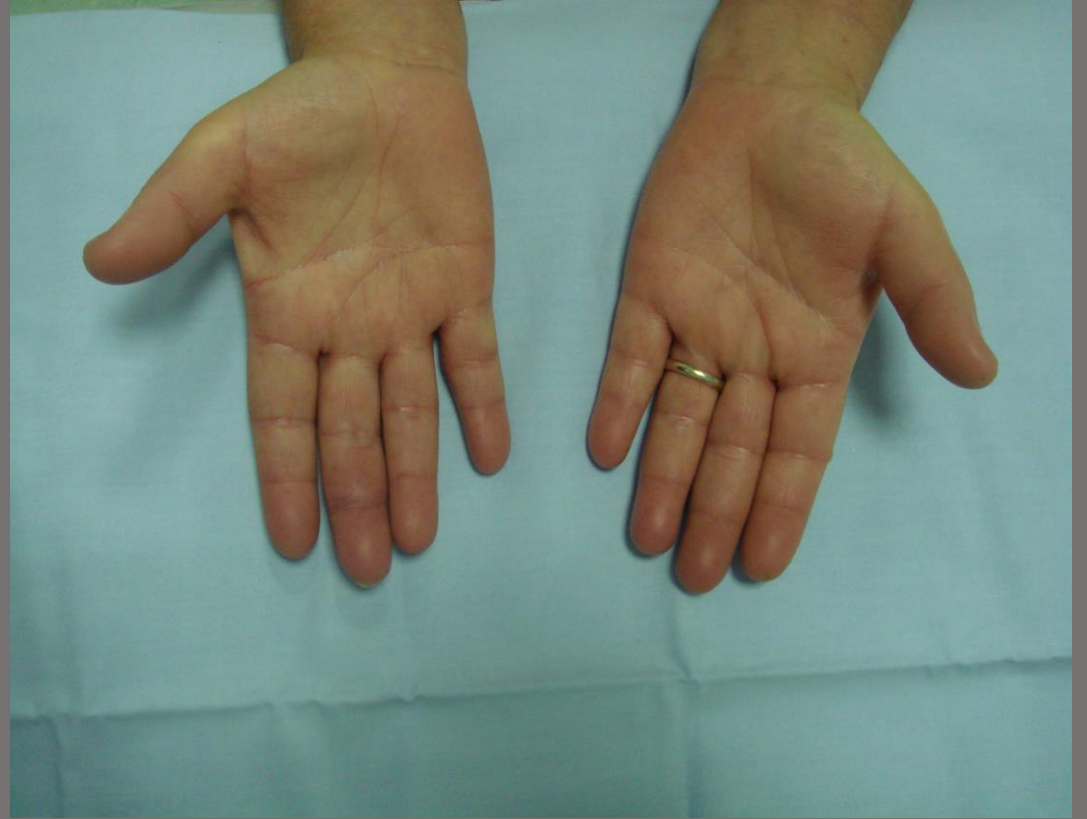


La prevenzione delle ulcere digitali inizia dal riconoscimento dei **fattori di rischio**, degli stadi iniziali della malattia e dal **trattamento di base** della malattia stessa





# Iperemia digitale





# Eritrosi ischemica digitale



# Ischemia sub-acute



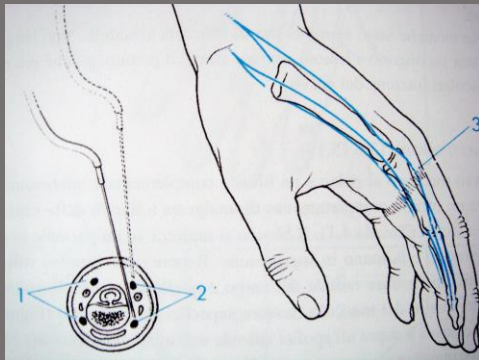


# Lesione ischemica digitale



# Chirurgia

- Il ricorso alla **simpaticectomia** sembra ridurre il numero degli attacchi ischemici e la loro intensità. Migliori risultati sembrano ottenersi nei casi di sclerodermia refrattari ad ogni trattamento, soprattutto se si tratta di **simpaticectomia digitale**, associata a tecniche di resezione e ed asportazione dell'avventizia fibrotica (**arteriolisi microchirurgica**)

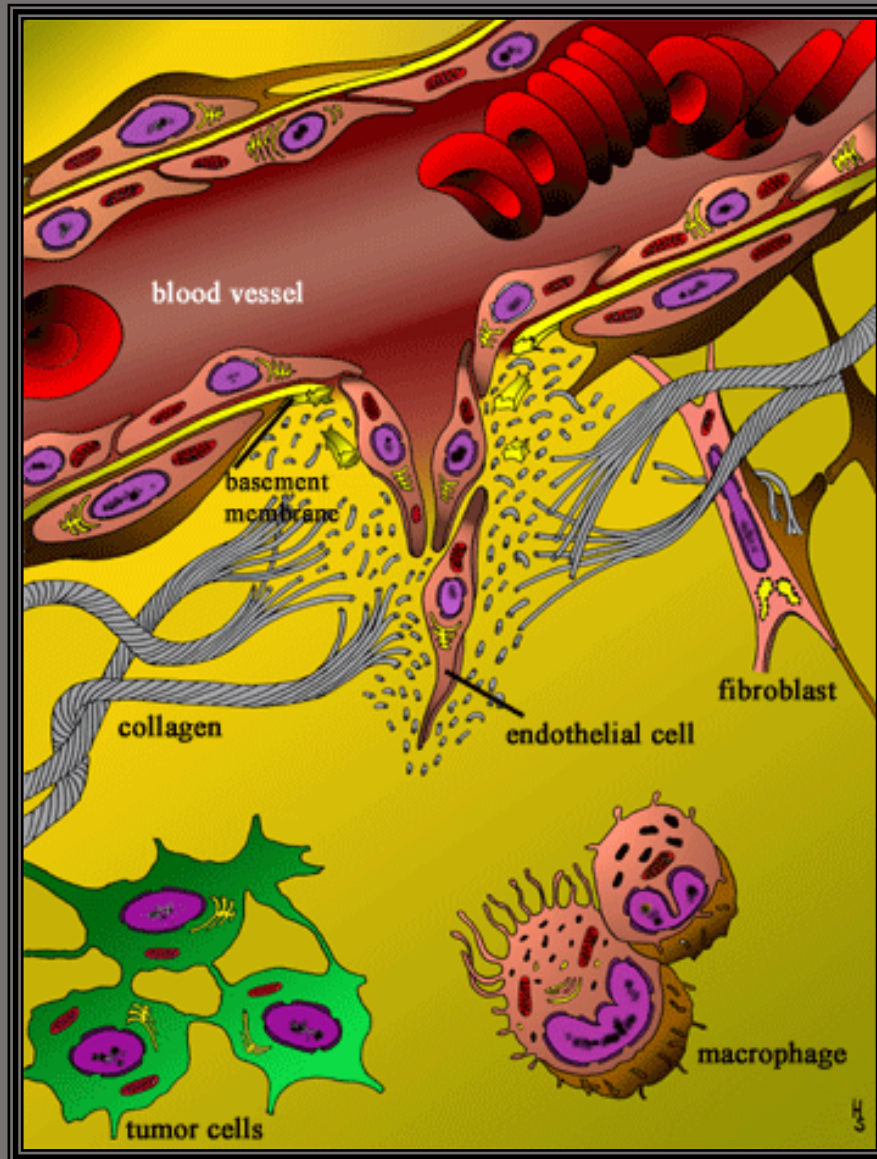


**Blocchi digitali senza adrenalina**  
**(da Blocchi periferici: B. Dalens)**

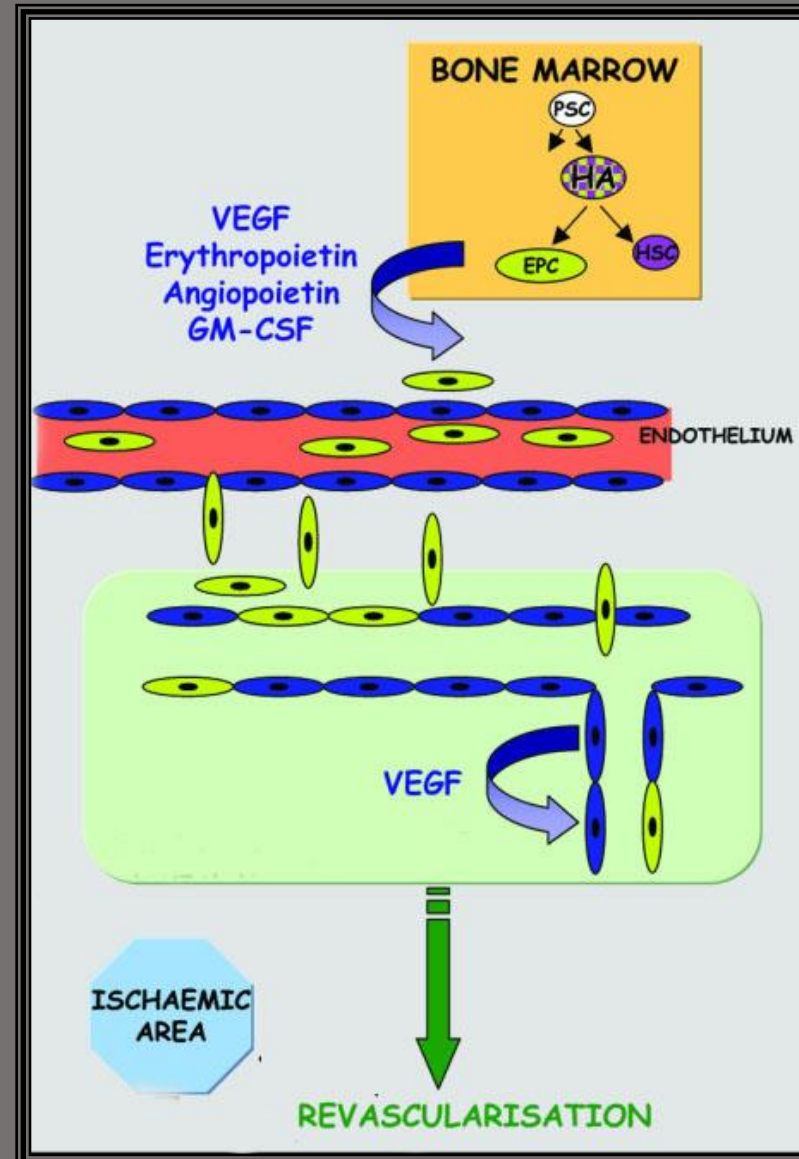


Nel caso d'indicazione all'effettuazione di procedure di **amputazione**, l'esperienza comune, consiglia procedure conservative

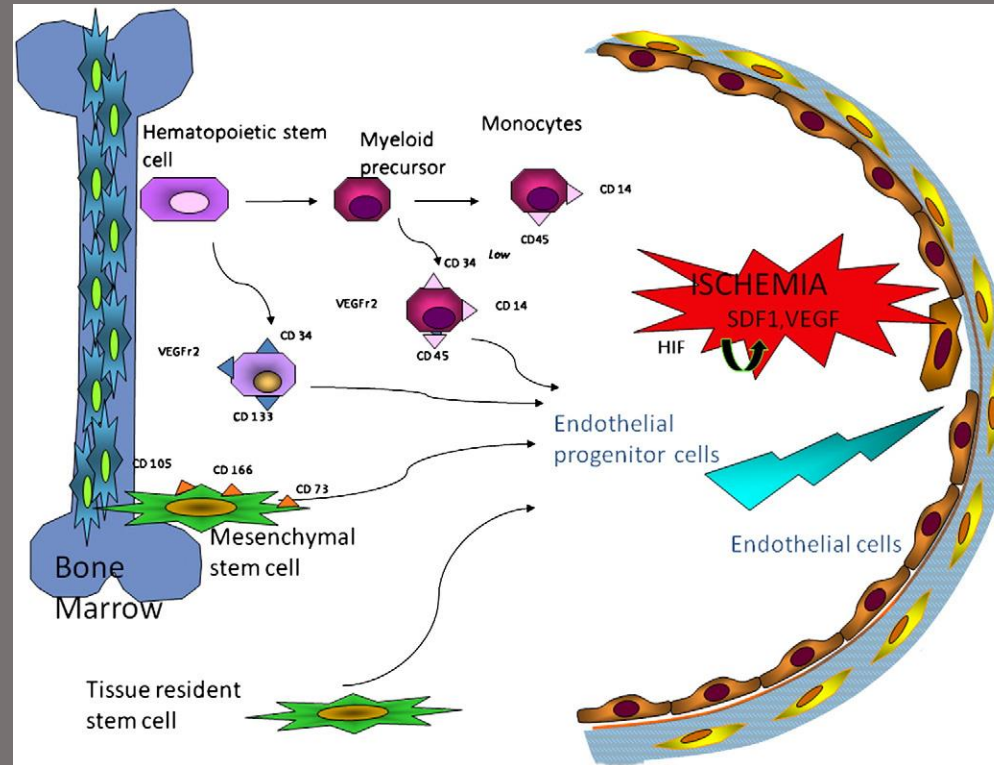
## Angiogenesis



## Vasculogenesis

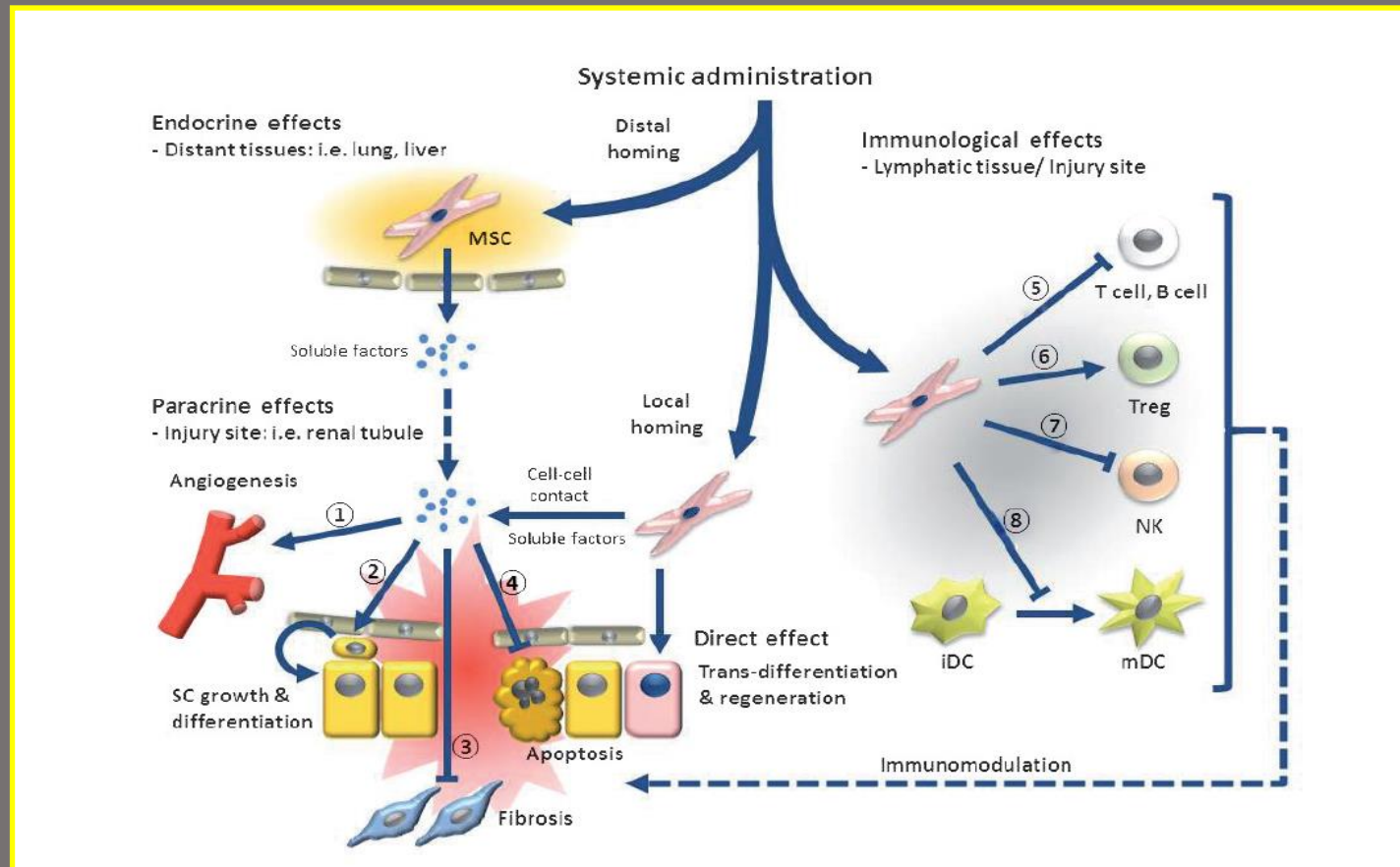


# Angiogenesis in Ssc



**Fig. 1.** Angiogenesis in systemic sclerosis. Cellular populations contributing to vessel repair mechanisms and angiogenesis following an ischemic injury (HIF: hypoxia inducible factor; VEGF: vascular endothelial growth factor; SDF1: stromal derived factor 1).

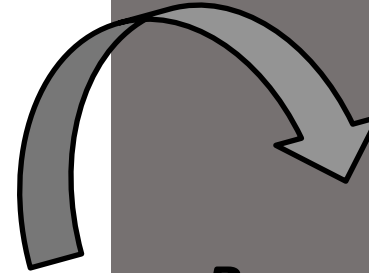
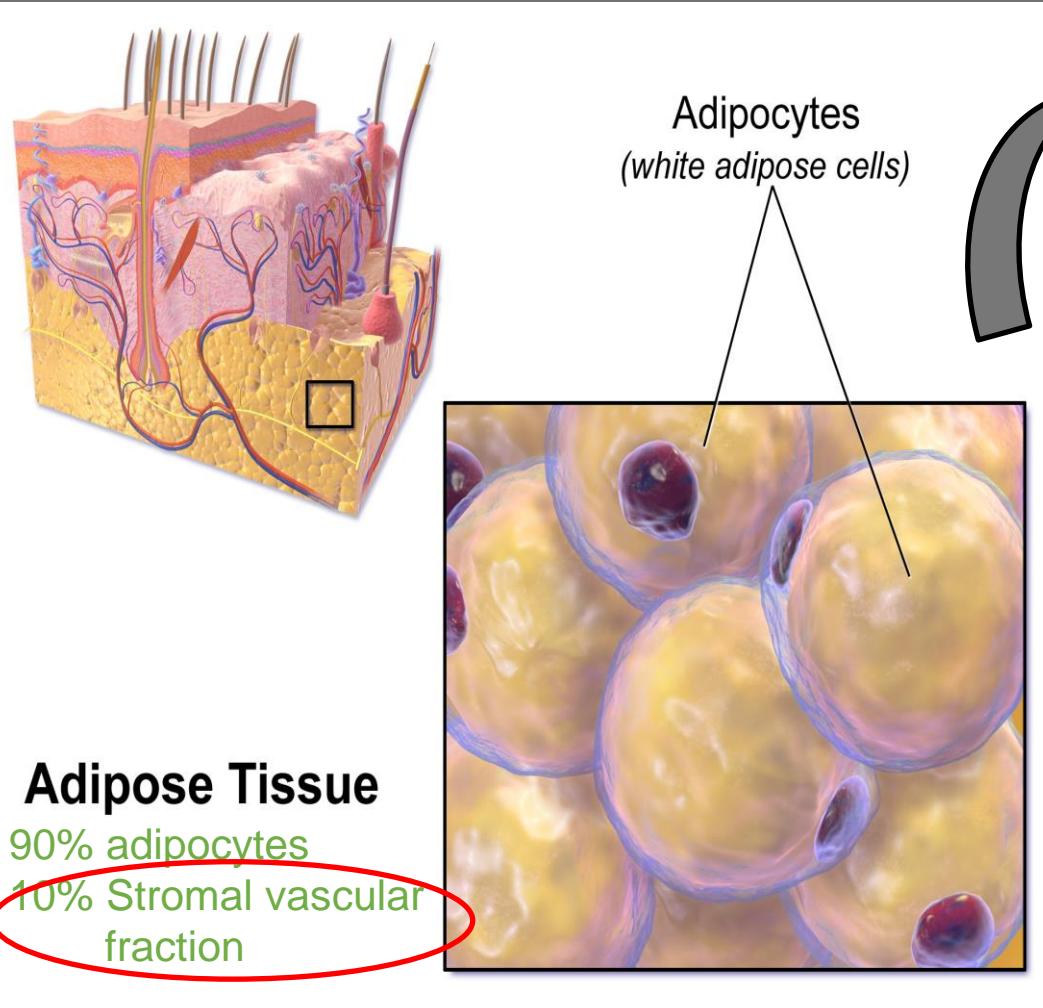
# Cellule Staminali Mesenchimali



La somministrazione per via sistemica di cellule staminali mesenchimali può indurre effetti distali (endocriini) e locali (paracrini) cellulo-mediati



# Adipose tissue as source of stem cells

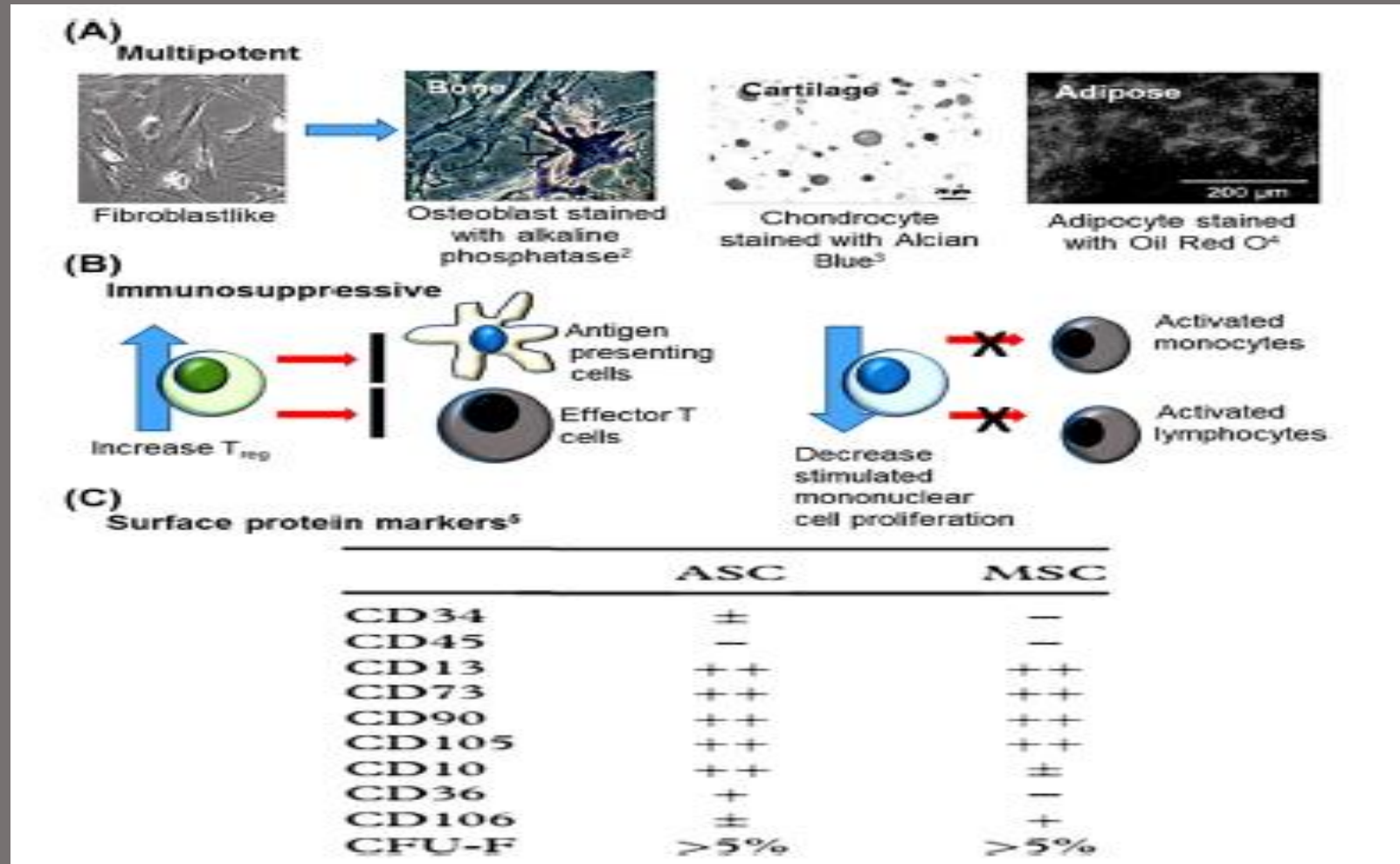


*Respond to insulin*

*Secrete adipokines  
(leptin and adiponectin)*

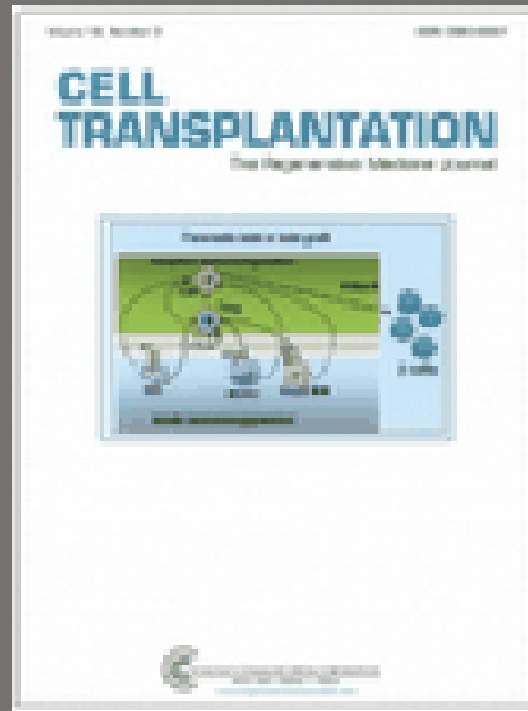
*Store triglycerides*

# Le cellule Staminali da tessuto adiposo sono simili a quelle derivate da BM



# AUTOLOGOUS FAT GRAFTING IN THE TREATMENT OF FIBROTIC PERIORAL CHANGES IN PATIENTS WITH SYSTEMIC SCLEROSIS

Del Papa, Nicoletta ; Caviggioli, Fabio ; Sambataro, Domenico ; Zaccara , Eleonora ; Vinci, Valeriano ; Di Luca, Gabriele; Parafioriti , Antonina ; Armiraglio, Elisabetta ; Maglione, Wanda ; Polosa, Riccardo ; Klinger, Francesco ; Klinger, Marco



# Indicazioni

Esiste un quadro anatomico ed emodinamico vascolare ideale per porre indicazione all'intervento di  
**Lipofilling?**

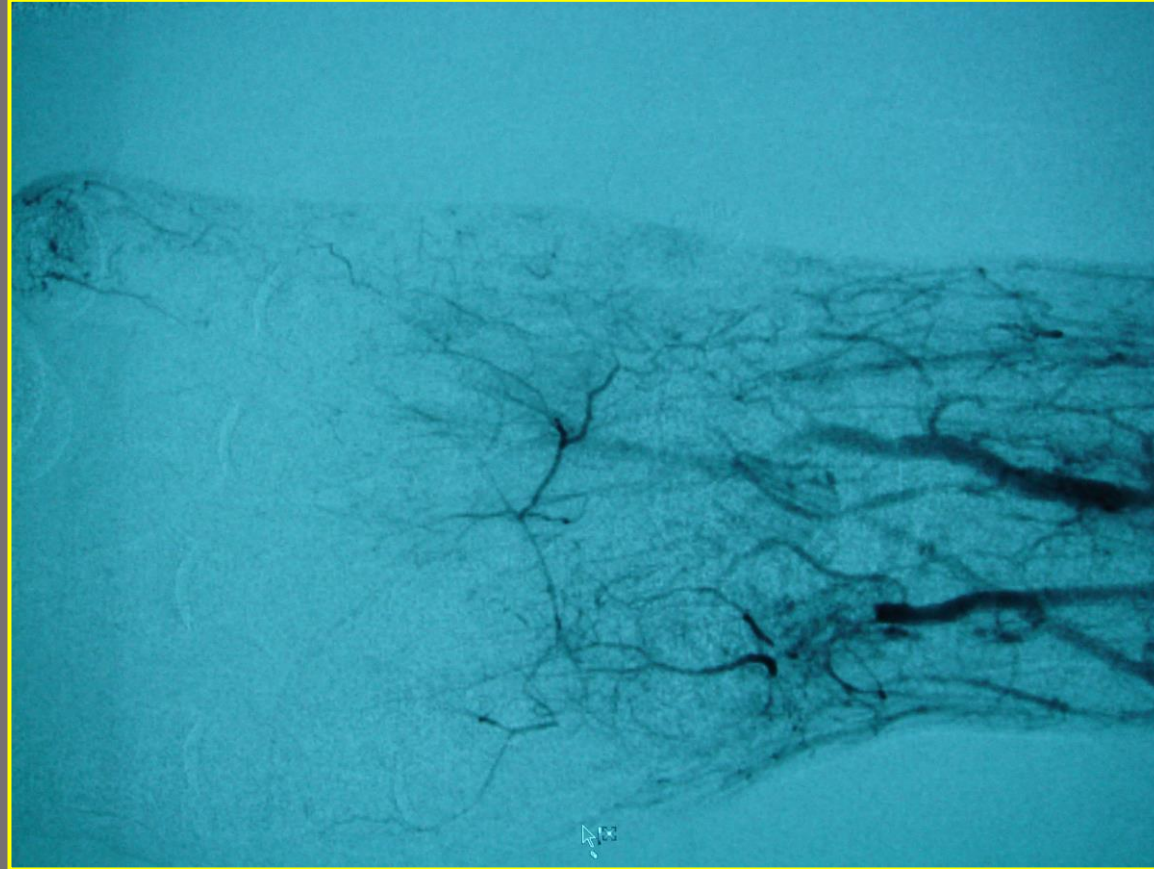


# Angiografia



Il solo esame angiografico non rappresenta il “gold standard”  
per lo studio dei pazienti affetti da complicanze vascolari  
digitali

# Angiografia



Le dimensioni ridotte dei vasi coinvolti nella patologia,  
soprattutto nei quadri iniziali, rende questa metodica  
**inadeguata**

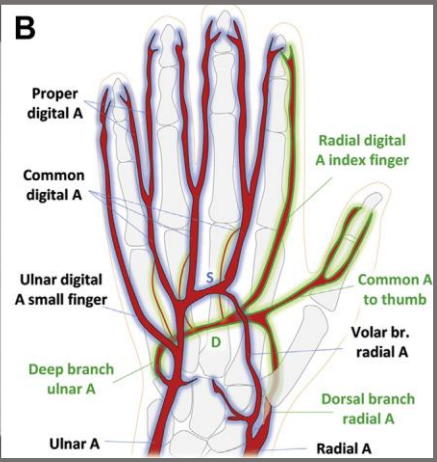
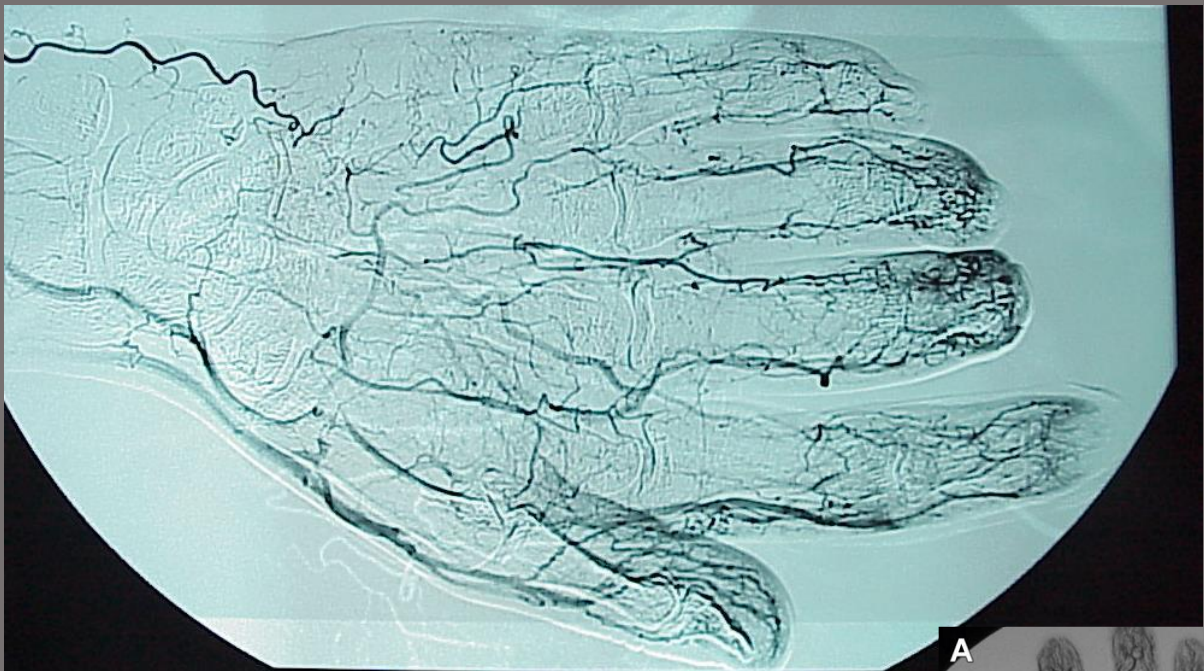
L'angio RM o l'angio TC presentano gli stessi limiti.  
L'unico esame attualmente disponibile, seppur con  
alcune limitazioni, l'eco-color-doppler effettuato  
con strumenti ad alta definizione da operatori  
esperti nella metodica e nella patologia

Attraverso lo studio dei quadri morfologici anatomici vascolari dei pazienti affetti da Sclerosi Sistemica è stato possibile individuare degli “schemi patologici” costanti.



**Malattia vascolare** coinvolgente in modo prevalente l'arteria ulnare e solo negli stadi avanzati della malattia l'arteria radiale. Interessamento costante delle arcate palmari e dei rami digitali palmari comuni e delle a. digitali proprie palmari e dorsali delle falangi distali. Il “risparmio” costante della porzione distale delle a. digitali comuni palmari alla base delle dita e della porzione prossimale delle a. digitali proprie palmari.

# Angiografia



# L'arteria ulnare ...

## Prevalence, risk factors, and clinical correlates of ulnar artery occlusion in the general population

Patrick H. Carpentier, MD,<sup>a</sup> Christine Biro, MD,<sup>a</sup> Myriam Jiguet, MD,<sup>a</sup> and Hildegard R. Maricq, MD,<sup>b</sup>  
Grenoble, France; and Charleston, SC

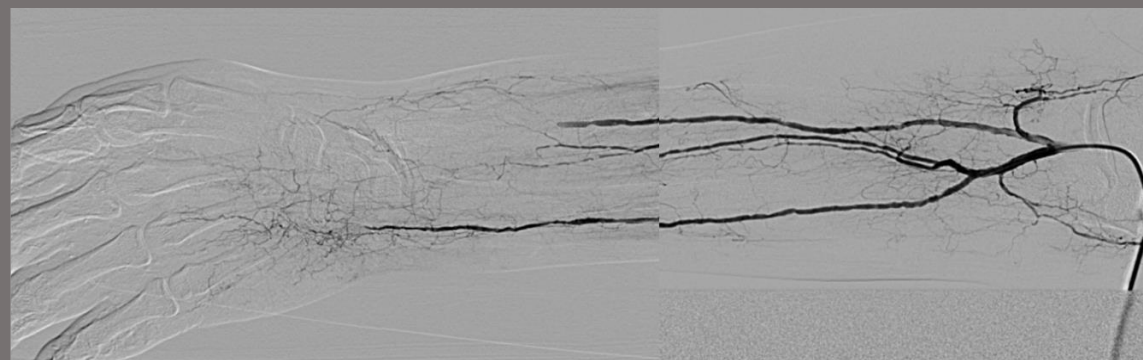
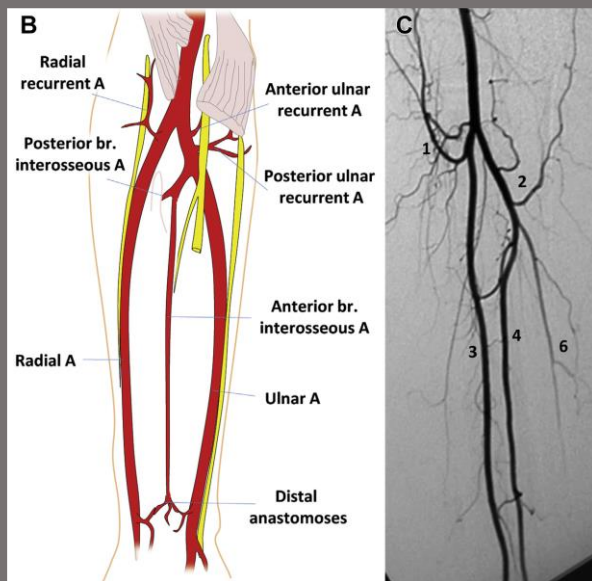
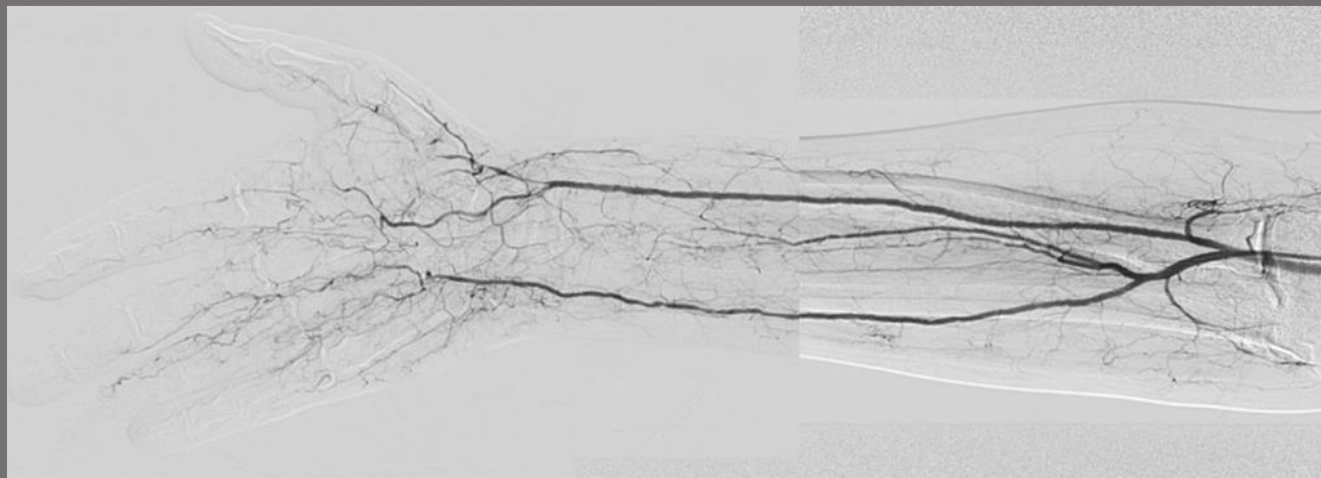
*Background:* Occlusion of the ulnar artery is found in a substantial proportion of elderly patients. The aim of this study was to estimate the prevalence of ulnar artery occlusion in a sample of the general population of France, look for its risk factors, and evaluate its clinical correlates.

*Methods:* This study was an offshoot of a cross-sectional epidemiologic study in the general population of four locations in France (Tarentaise, Grenoble, Nyons, and Toulon). In phase I, random samples of 2000 individuals per location aged  $\geq 18$  years old were interviewed by phone for screening of Raynaud phenomenon. In phase II, subsamples of individuals were invited to a medical interview and physical examination where the presence of Raynaud phenomenon and occupational risk factors were recorded and a bilateral clinical Allen test was performed for the detection of ulnar artery occlusion. Phase II comprised 688 women and 335 men.

*Results:* In 36 men and seven women, at least one occluded ulnar artery was found. The estimated prevalence was 9.6% in men and 1.0% in women ( $P < .001$ ). The occluded artery was more often in the dominant hand of both men (8.1% vs 2.4%;  $P < .001$ ) and women (0.9% vs 0.4%;  $P = .34$ ). Ulnar artery occlusion was found more often in men aged  $> 50$  years (16.4%) than in younger men (1.4%;  $P < .001$ ). Besides age, male sex, and dominant side, the only independent risk factor was an occupational exposure in men to repeated palmar trauma, with a significant quantitative relationship in the frequency of the impacts ( $P < .001$ ) and the duration of the exposure ( $P < .001$ ). Exposures to hand-held vibrating tools and cigarette smoking did not show a significant relationship in the multivariate analysis. Most individuals with ulnar artery occlusion did not have associated complaints; however, the diagnostic criteria for Raynaud phenomenon was validated in 13 of the 36 affected men. The association remained significant after adjusting for occupational exposure to vibrating tools. One individual reported a previous episode consistent with an attack of permanent digital ischemia.

*Conclusion:* This study confirms a substantial prevalence of ulnar artery occlusions in the general population, mostly in middle-aged and elderly men, which appears to be principally related to an occupational exposure to repeated occupational palmar trauma. Although there is a significant association with Raynaud phenomenon, most often the consequences of this occlusion remain subclinical. (J Vasc Surg 2009;50:1333-9.)

# Angiografia avambraccio

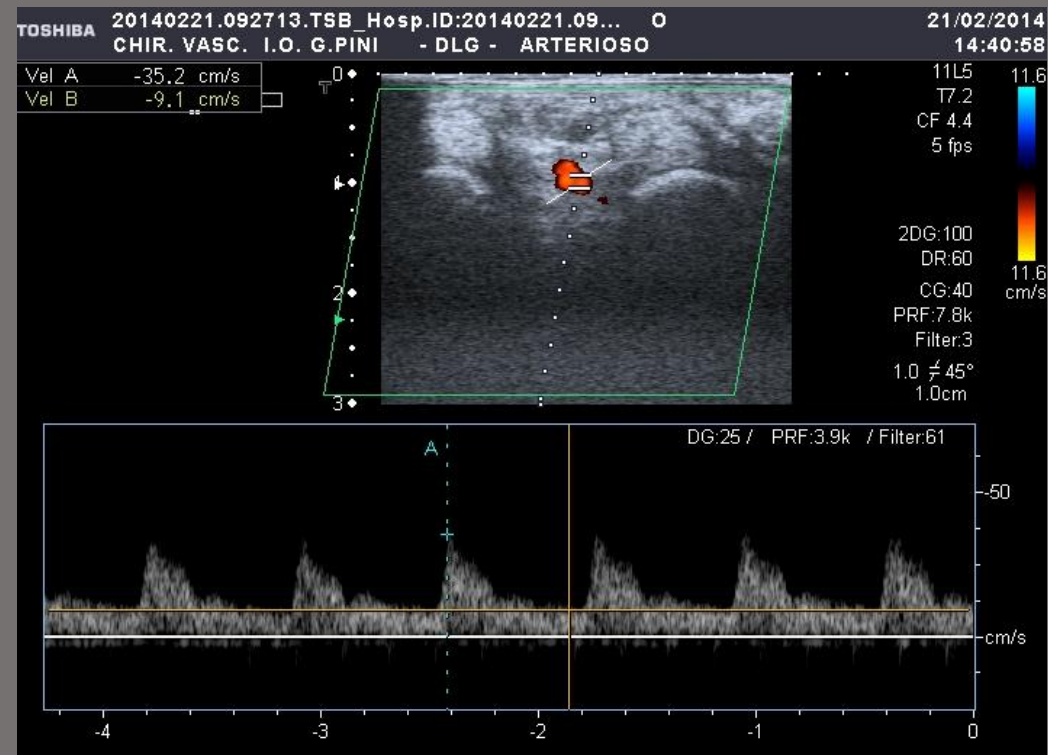




Lo studio degli **indici di resistenza (IR)** delle arterie digitali palmari comuni permette di accertare i valori della perfusione digitale distale e di monitorare l'andamento della malattia vascolare periferica

# IR a. digitale palmare comune

Indice di resistenza arterioso (IR) =  $(v_s - v_d) / v_s$



# Dallo studio di questi quadri agli studi di Taylor (teoria degli Angiosomi)

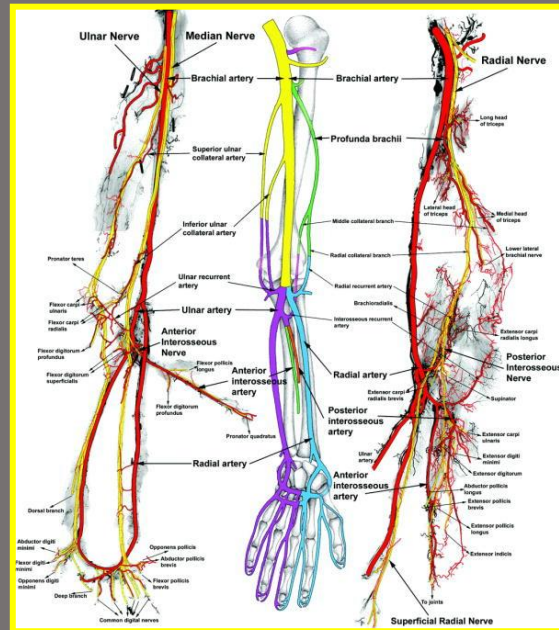
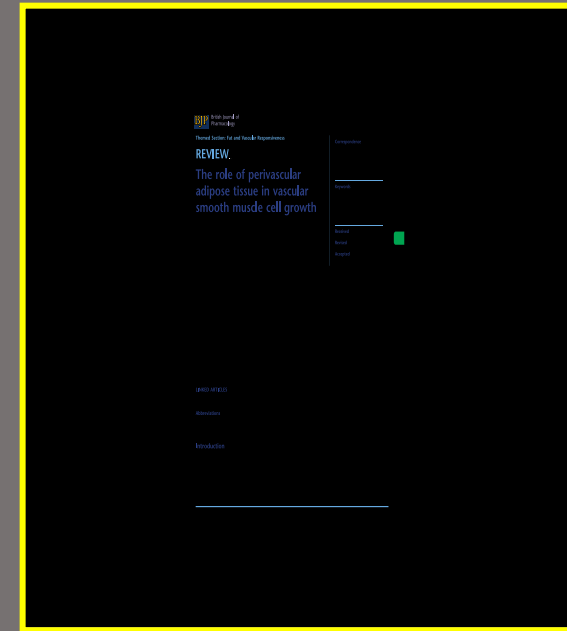


Fig. 6. Diagram of the blood supply of the median and ulnar nerves (left) traced from the radiograph in Figure 2. The radial nerve (right) and its blood supply have been traced from similar radiographs. The arteries (center) are colored to demonstrate the angiosomes.

Angiosome Territories of the Nerves of the Upper Limbs.  
Hong, Matthew; Hong, Michael; Taylor, G

Plastic & Reconstructive Surgery.  
118(1):148-160, July 2006.  
DOI:  
10.1097/01.prs.0000221075.91038.08



# Un nuovo approccio terapeutico

G Model  
RETRAM-6; No. of Pages 8

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Therapeutic actuality

State of the art. Autologous fat graft and adipose tissue-derived stromal vascular fraction injection for hand therapy in systemic sclerosis patients

P. Guillaume-Jugnot<sup>a</sup>, A. Daumas<sup>b</sup>, J. Magalon<sup>c</sup>, N. Sautereau<sup>a</sup>, J. Veran<sup>c</sup>, G. Magalon<sup>d</sup>,  
F. Sabatier<sup>e</sup>, B. Granel<sup>e</sup>

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<sup>b</sup> Service de médecine interne, gériatrie et thérapeutique, hôpital de la Timone, AP–HM, 13385 Marseille cedex 05, France

<sup>c</sup> Laboratoire de culture et thérapie cellulaire, Inserm CBT-1409, hôpital de la Conception, AP–HM, 13385 Marseille cedex 05, France

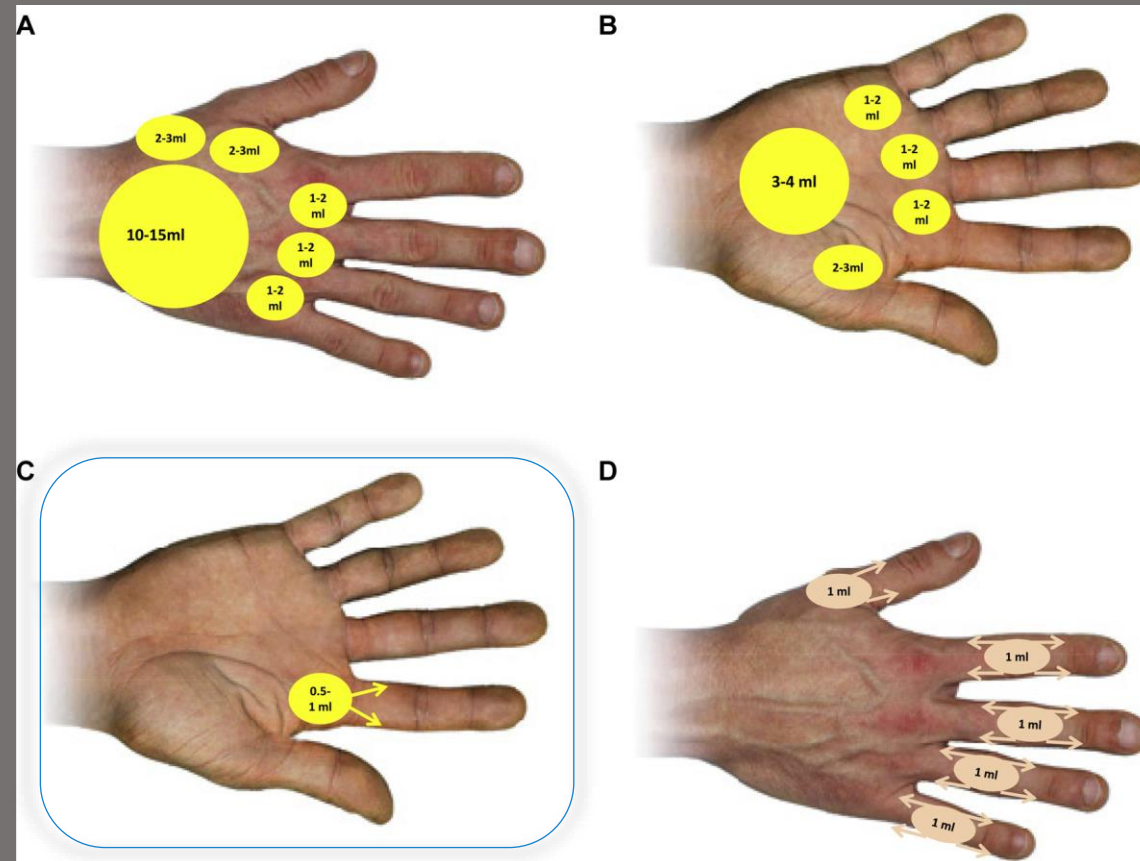
<sup>d</sup> Service de chirurgie plastique et réparatrice, hôpital de la Conception, AP–HM, 13385 Marseille cedex 05, France

<sup>e</sup> Inserm UMR 1076 Vascular Research Centre of Marseille, Aix-Marseille université, 13385 Marseille cedex 05, France



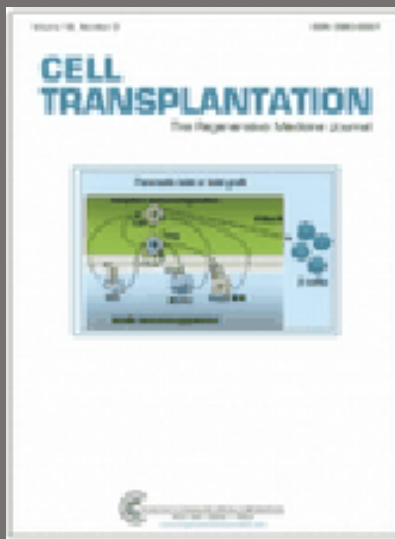
# Localization of entry points (injection areas) for autologous adipose tissue

*P. Guillaume-Jugnot et al./Current Research in Translational Medicine xxx (2016) xxx-xxx*

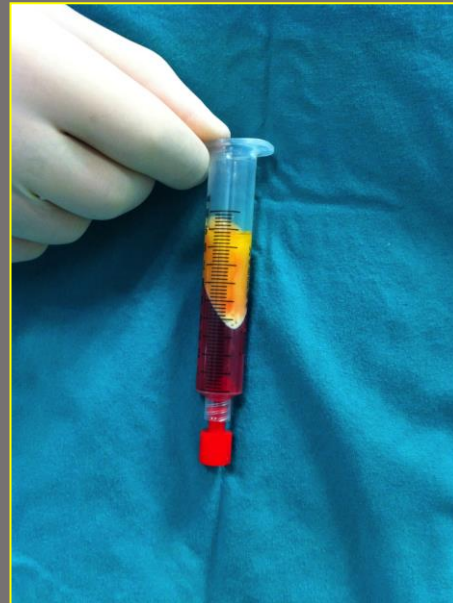
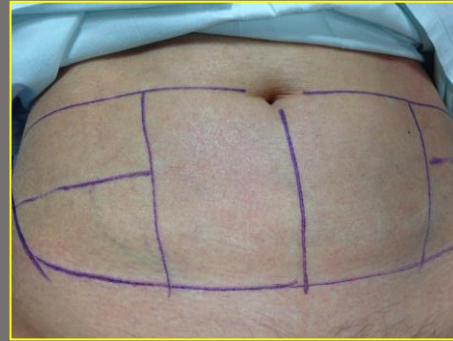


# Regional implantation of autologous adipose tissue-derived cells induces a prompt healing of long-lasting indolent digital ulcers in patients with Systemic Sclerosis

N. Del Papa, G. Di Luca, D. Sambataro, E. Zaccara, A. Gabrielli, P. Fraticelli, G. Moroncini, L. Beretta, A. Santaniello, W. Maglione, G. Sambataro, R. Ferraresi, C. Vitali



*Del Papa et al, Cell Transplantation 2014*



# Implantation of autologous adipose tissue-derived cells induces a prompt healing of long-lasting digital ulcers in SSc





# CONCLUSIONI



# Clinical Conclusions

Regional Fat grafting in SSc fibrotic and ischemic areas can provide rapid benefits.

Autologous fat grafting is a safe, relatively non-invasive, and rapid procedure.

Further and long-term studies are needed to know how the benefits are lasting, how safe could be to repeat the procedure to maintain the results, and which kind of patients are preferentially eligible for the treatment.

# Further comments

The overtime increase of treatment benefits suggests that other mechanisms different from the simple fat filling may be involved.

Different actors may play some role:

- 1) **Adipose derived stem cells** have been identified as an ideal source of cells able to have a regenerative role for soft tissues
- 2) **Stromal vascular fraction** from adipose tissue is known to contain MSCs, T-reg and endothelial precursor cells and has been proposed for cell therapy in chronic inflammatory autoimmune disorders
- 3) **The adiponectin** acts as a potent anti-fibrotic signal in normal and scleroderma fibroblasts  
(Lakota K, *Arthritis Res Ther* 2012)
- 4) **????**



*The End*