

La main sclérodermique

Luc Mouthon

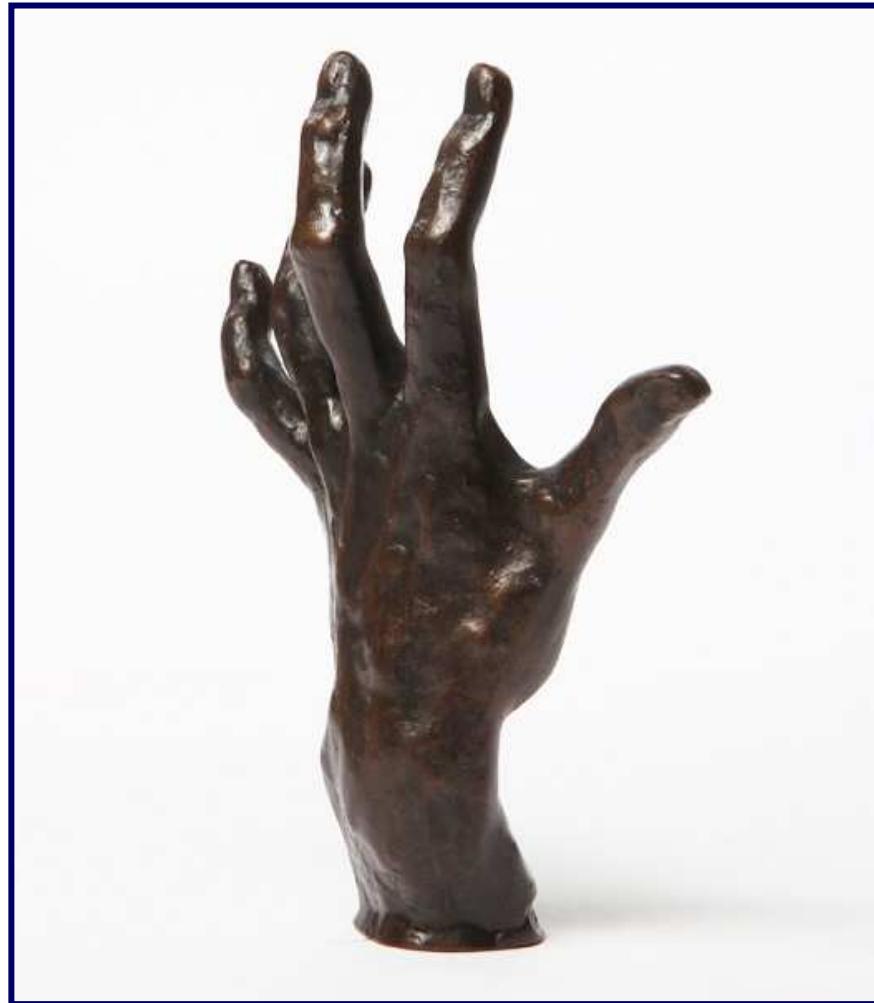
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Conflicts of interest

- Consultant: **Actelion, CSL Behring, Cytheris, GSK, LFB Biotechnologies, Lilly, Pfizer**
 - Financial support to ARMIIC
- Investigator: **Actelion, CSL Behring, Pfizer**
- Financial support (grants): **Actelion, CSL Behring, GSK, LFB Biotechnologies, Pfizer**

Rodin: la main révèle l'homme

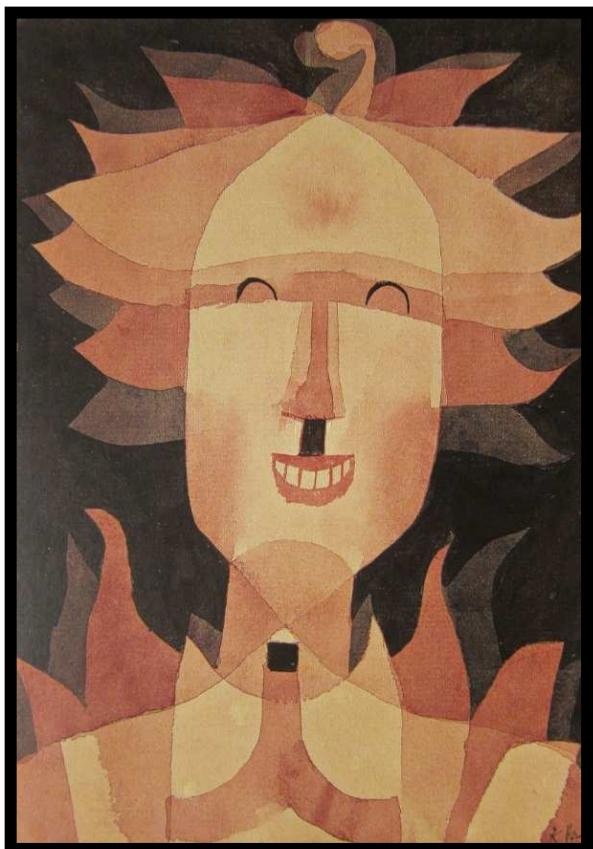


Main de pianiste

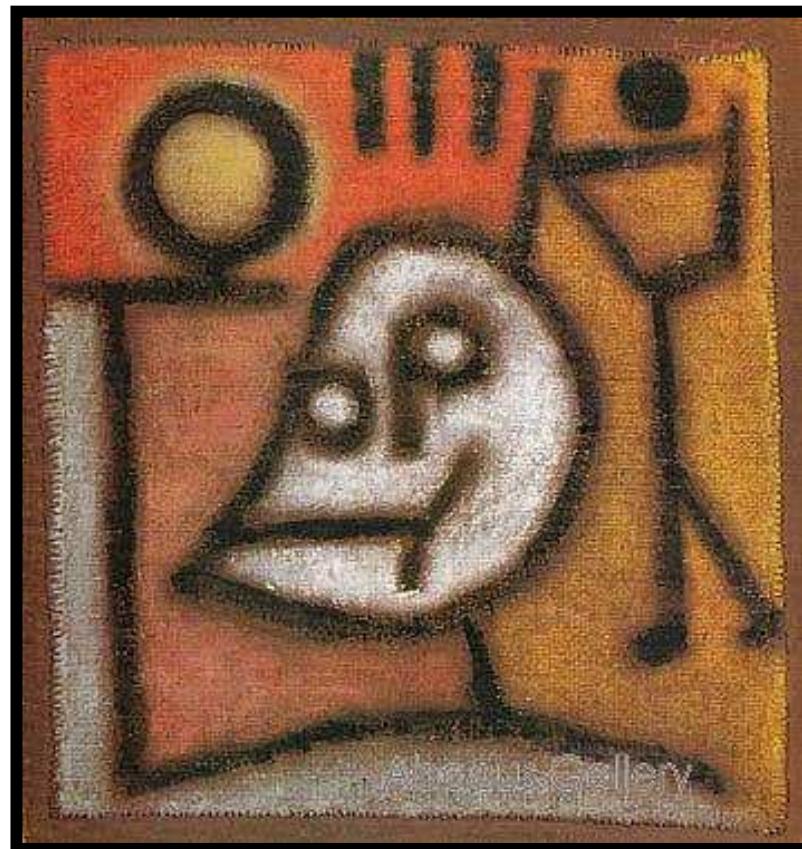


Main crispée

Paul Klee: 1879-1940



Mask – 1921



Death and Fire – 1940

*Paul Klee Polyphonies, Cité de la musique, Paris
18 October 2011 – 15 January 2012*

Main sclérodermique: objectifs pédagogiques

- L'atteinte de la main est très fréquente, souvent précoce, et apporte des éléments très contributifs pour le diagnostic de la maladie ;
- L'atteinte vasculaire est au premier plan. Le phénomène de Raynaud peut se compliquer d'ulcères digitaux, de nécrose digitale à l'origine de douleurs, de surinfections et de la survenue d'un handicap marqué ;
- L'atteinte cutanée des doigts et de la main peut être à l'origine de douleurs et d'une gêne fonctionnelle importante
- L'atteinte articulaire inflammatoire peut être invalidante et entraîner la survenue de rétractions et déformations ;
- La main contribue pour 75% du handicap global au cours de la sclérodermie systémique
- Seule une prise en charge globale, prenant en compte la vasculopathie, l'atteinte cutanée et articulaire, incluant la rééducation fonctionnelle et l'ergothérapie, peut permettre d'améliorer la fonction de la main dans la sclérodermie systémique.

Monsieur G... 77 ans

- Pneumopathie interstitielle depuis 2011
- Phénomène de Raynaud concomitant
- Mégacapillaires
- Ac anti-nucléaires 1/160 sans spécificité
- Aggravation de la pneumopathie interstitielle sous corticoides 1 mg/Ig/jour avec décroissance progressive et azathioprine 3 mg/kg.

Diagnostic ?

Examen clinique



Doigts boudinés, trois télangiectasies

2013 classification criteria for SSc: an ACR/EULAR collaborative initiative (I)

- Skin thickening of the fingers extending proximal to the metacarpophalangeal joints: SSc;
- If that is not present, 7 additive items apply:
 - skin thickening of the fingers,
 - fingertip lesions,
 - telangiectasia,
 - abnormal nailfold capillaries,
 - **interstitial lung disease or pulmonary arterial hypertension**,
 - Raynaud's phenomenon,
 - SSc-related autoantibodies.

Skin thickening of the fingers (I)



Score = 2

Puffy fingers

Only count higher score

Skin thickening of the fingers (II)



Sclerodactily

Score = 4

Only count higher score



fingertip lesions

Digital ulcers

Score = 2



Fingertip pitting scars

Score = 3

Only count higher score

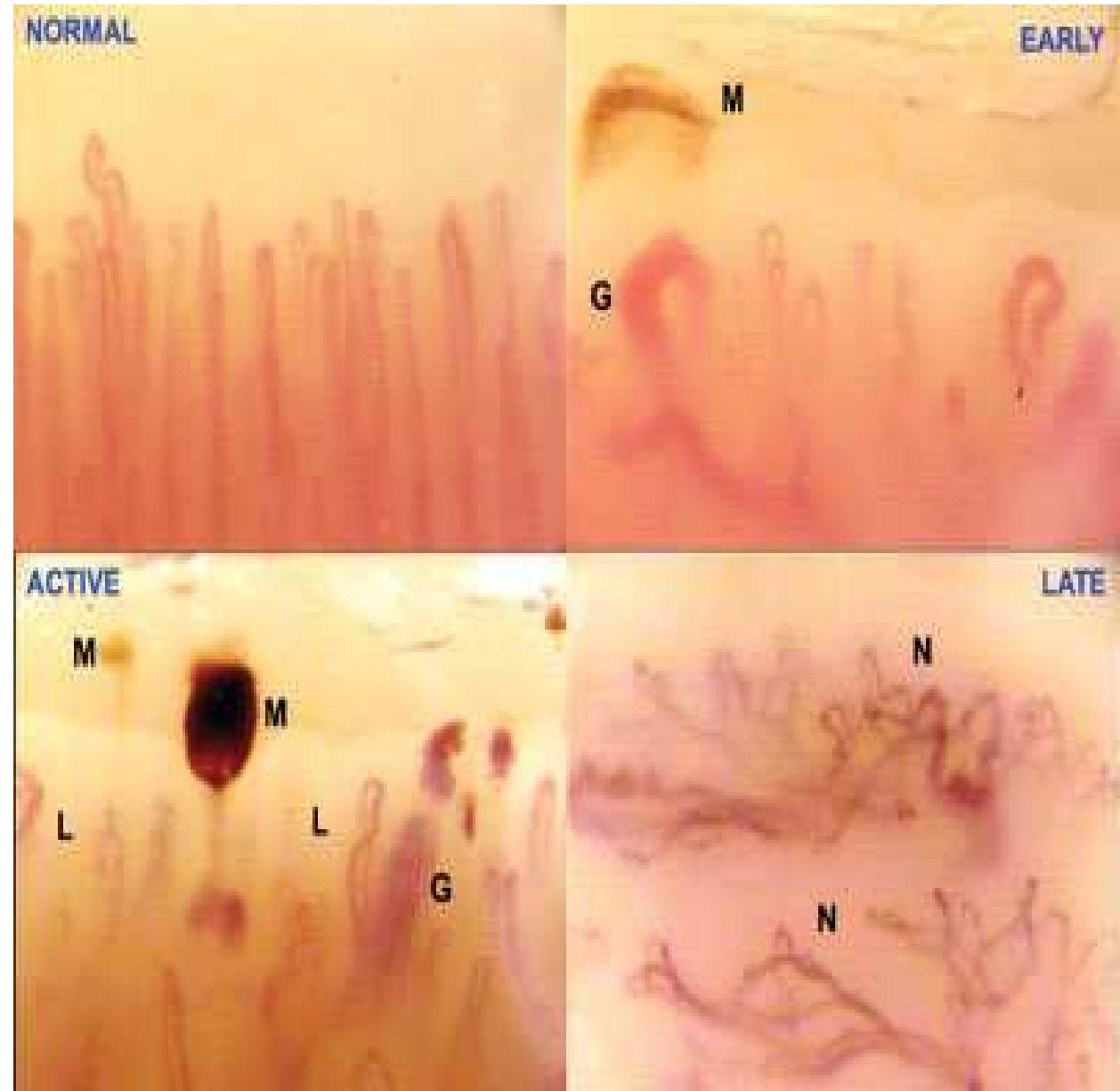


telangiectasia



Score = 2

Abnormal nailfold capillaries



Raynaud's phenomenon



Score = 3

L'atteinte de la main au cours de la ScS

- L'atteinte de la main au cours de la ScS évolue en trois phases consécutives
 - Phase d'oedème précoce, en particulier dans les formes diffuses: oedème des doigts et des mains, souvent associé ou pouvant précéder la survenue du phénomène de Raynaud.
 - Pendant la phase scléreuse, les zones œdémateuses se transforment en plaques. La peau est épaisse, indurée, du fait de l'atteinte associée du tissu sous cutané. Dans ce contexte survient une perte de fonctionnalité.
 - Phase atrophique, au cours de laquelle la peau s'atrophie et les déformations en griffe se majorent

Phase scléreuse



Phase atrophique



Sclérodermie juvénile: phase atrophique



Les atteintes de la main au cours de la sclérodermie systémique

- *Atteinte cutanée*
- *Tissus sous-cutanés*
- *Atteinte articulaire et péri-articulaire*
- *Atteinte osseuse*
- *Atteinte tendineuse*
- *Atteinte musculaire*
- *Atteinte vasculaire*
- *Système nerveux périphérique*

Skin and musculoskeletal complications: Diffuse versus limited disease

	dcSSc	IcSSc	dcSSc vs. IcSSc
RP	96%	96%	0.58
Digital ulcers	43%	33%	< 0.001
Synovitis	21%	14%	< 0.001
Contractures	47%	24%	< 0.001
Friction rubs	22%	7%	< 0.001
Muscle weakness	37%	23%	< 0.001
CK elevation	11%	4%	< 0.001

Walker UA, et al. *Ann Rheum Dis* 2007; 66:754-63.

Atteinte cutanée

- A la phase initiale on observe un aspect de doigts boudinés, eventuellement un œdème des mains, plus fréquemment dans les formes diffuses
- Dès cette phase on peut observer une hypertrophie de la cuticule des ongles
- A la phase scléreuse, la peau devient épaisse, son aspect devient brillant. La peau est adhérente aux tissus sous-jacents, dure, constituant une sclérodactylie.
- Dans la phase atrophique, la peau devient fine, atrophique et adhérente au plan profond
- Chez les patients à peau noire, à chacune des trois phases évolutives de la maladie, des lésions de dépigmentation peuvent survenir sur la peau des mains.

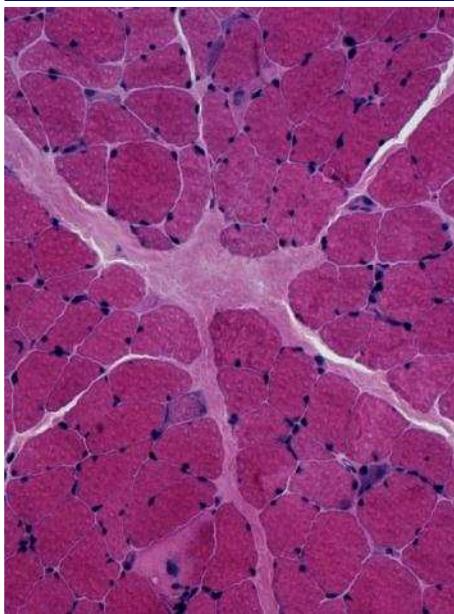
Hypertrophie de la cuticule des ongles



Sclérodermie systémique: dépigmentation



Musculoskeletal manifestations of SSc

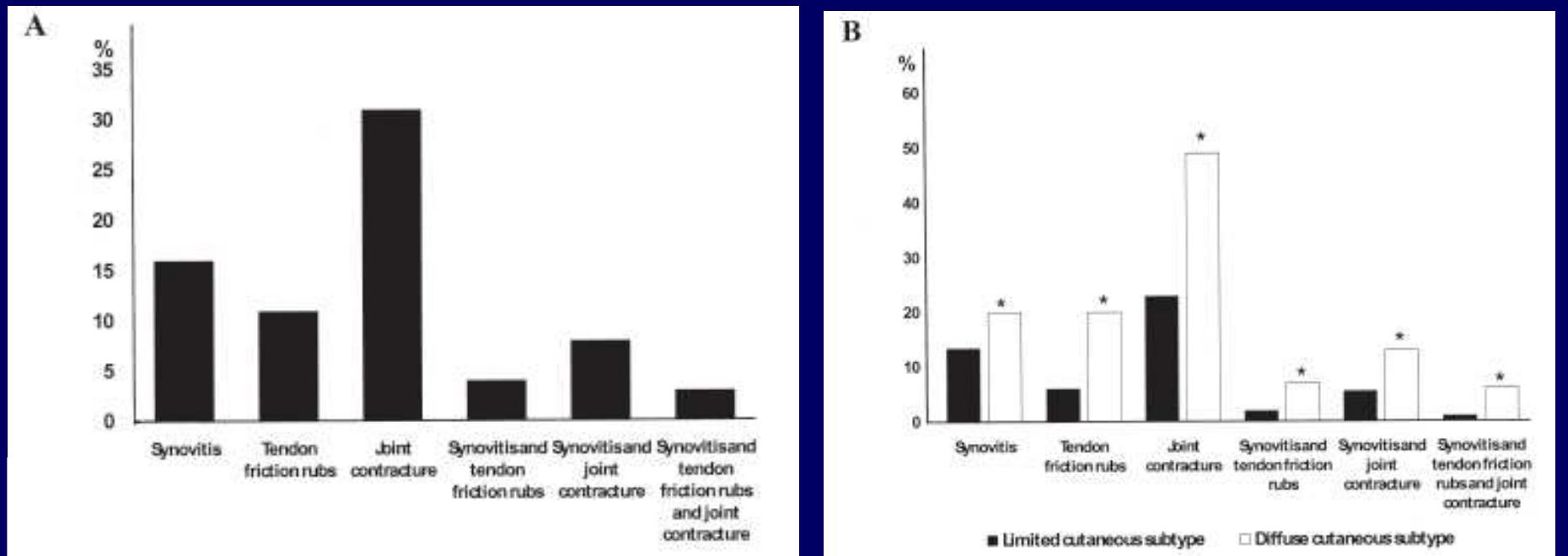


- A major cause of morbidity and disability in SSc
- Includes
 - Muscle involvement (inflammatory myopathy)
 - Arthralgias
 - Arthritis
 - Flexion contractures
 - Nerve entrapment

Pope JE, *Rheum Dis Clin North Am* 2003; 29:391-408.

Prevalence of joint involvement in patients with SSc.

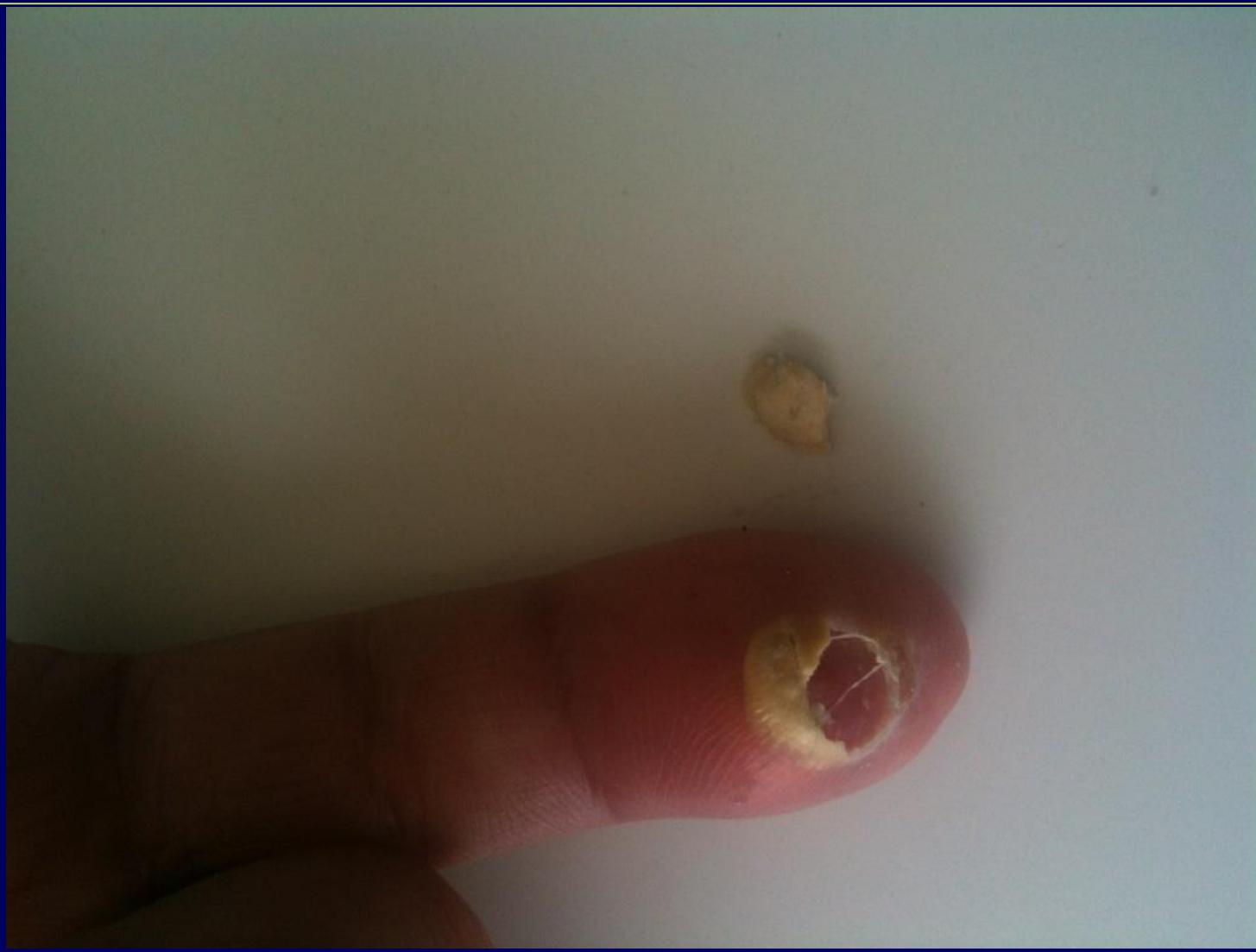
Avouac et al.... And EUSTAR. J Rheumatol 2010



Radiological hand involvement in systemic sclerosis

- 120 consecutive SSc patients
- Radiological abnormalities in SSc:
 - Erosion (21%)
 - Joint space narrowing (28%)
 - Arthritis (erosion and joint space narrowing) (18%)
 - Demineralisation (23%)
 - Acro-osteolysis (22%)
 - Flexion contracture (27%)
 - Calcinosis (23%)

Calcinose: élimination spontanée



Tendon friction rubs (TFR)

- Detected by physical examination
- Highly associated with dcSSc
 - 91% of patients with TFR classified as dcSSc
- Associated with poor prognosis
 - e.g. scleroderma renal crisis
- May aid early diagnosis of dcSSc and identification of patients at high risk for serious organ-based complications

Flexion contractures

- Common, especially in hands
 - MCP, PIP, DIP joints and wrists
- Often related to skin, fascia and tendon involvement
- Responsible for functional disability
- May favour digital ulcerations



Nerve entrapment

- **Carpal tunnel syndrome**
 - Patients with early SSc are likely to develop median nerve entrapment secondary to oedema and inflammation
 - Often settles spontaneously
- **Ulnar nerve entrapment**
- **Brachial plexopathy**

Pope JE, *Rheum Dis Clin North Am* 2003; 29:391-408.

Mouthon L, et al. *Rheumatology* 2000; 39:682-3.

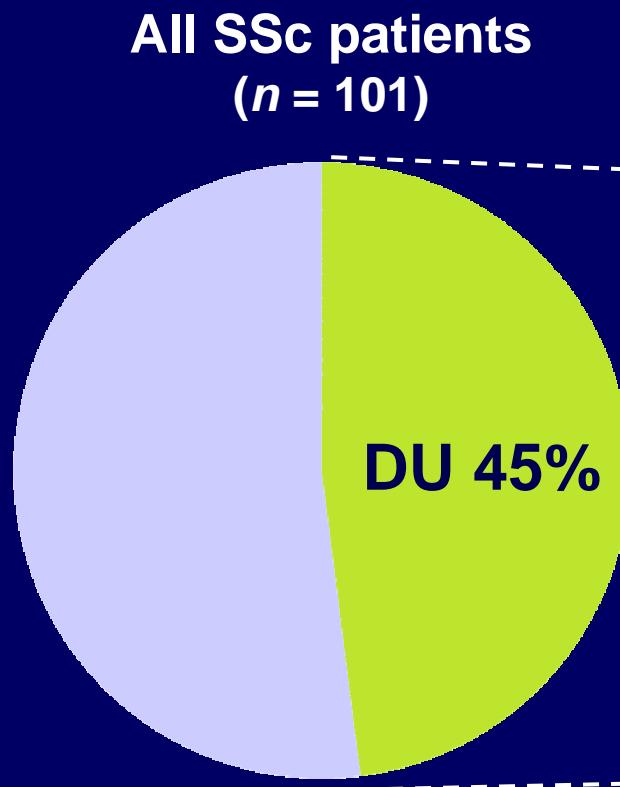
Mouthon L, et al. *Ann Med Intern* 2000; 151:303-5.

Skeletal muscle involvement in SSc

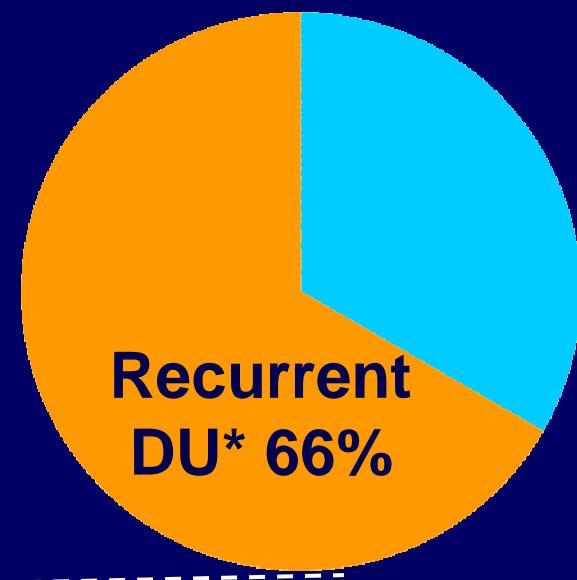
- Common feature in SSc
- Muscle weakness is found in up to 90% of SSc patients when systematically assessed
- Muscle clinical, biological and electromyographic features are similar to those of polymyositis or dermatomyositis, except for a higher proportion of mild symptoms
- SSc-associated myopathy is more prevalent in dcSSc and is associated with cardiomyopathy

Follansbee WP, *Am Heart J* 1993; 125:194-203.
Ranque B, et al. *Ann N Y Acad Sci* 2007; 1108:268-82.

DU are a common and recurrent manifestation of SSc



Patients with DU
(n = 44)

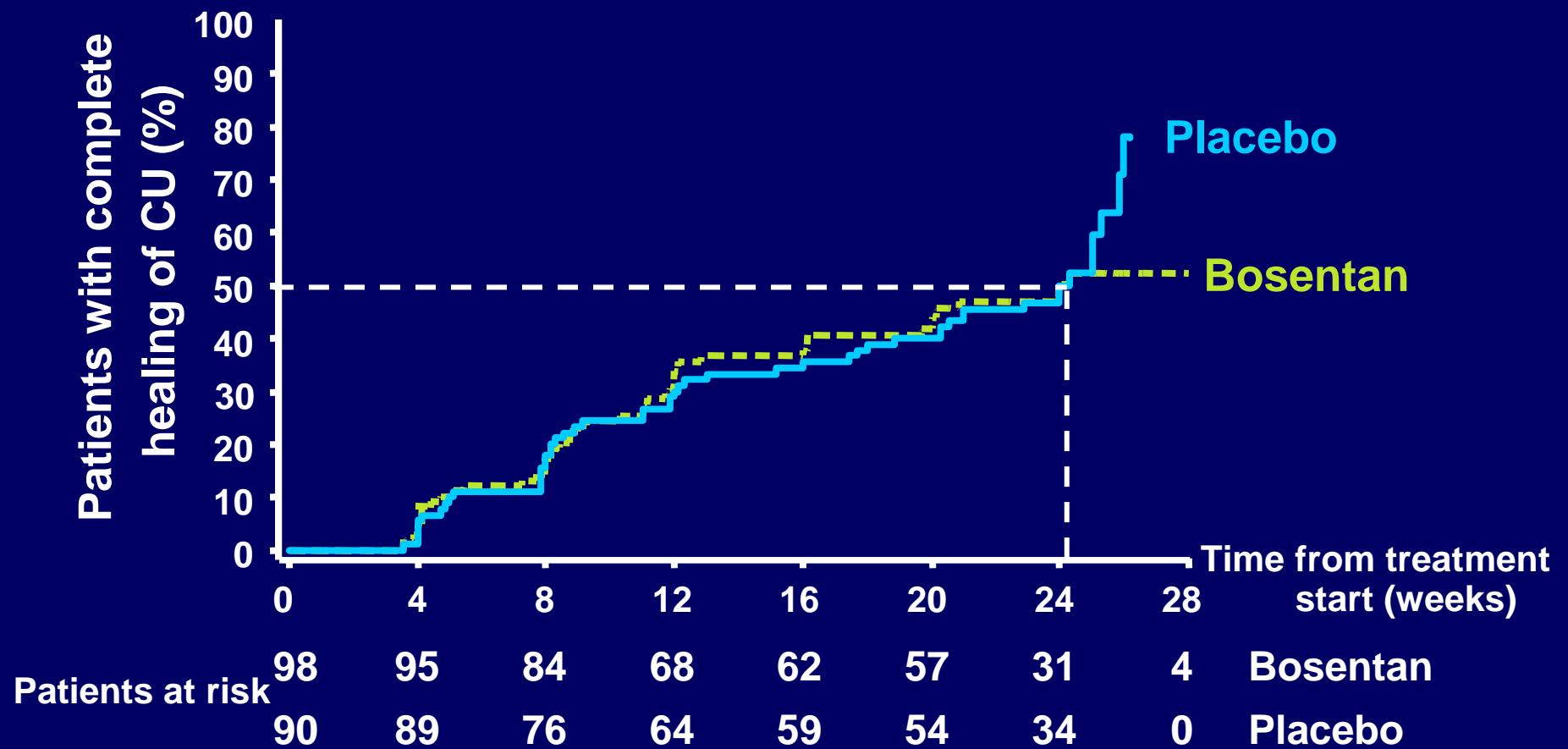


*Recurrent DU: Having more than one DU after the first DU

Hachulla E, et al. *J Rheumatol* 2007; 34:2423-30.

Persistence of DU in SSc

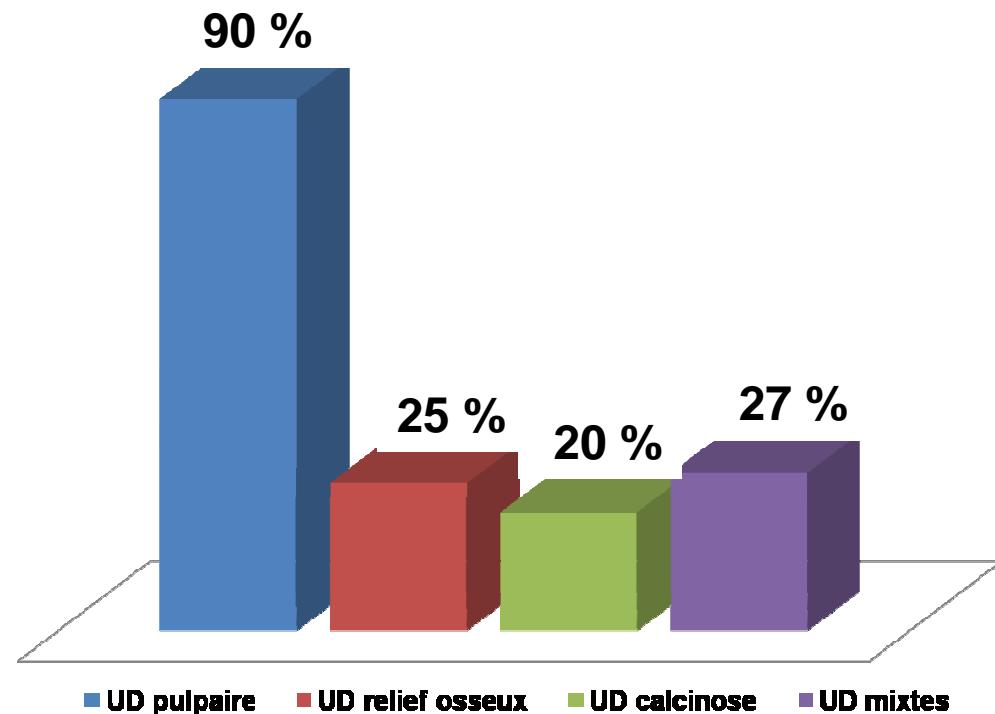
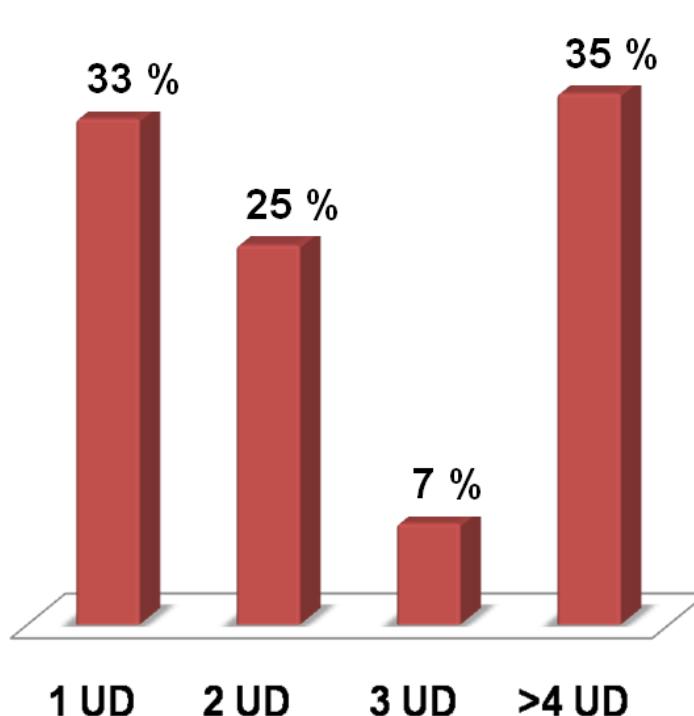
Persistence of cardinal ulcer (CU) is 50% at 6 months



Matucci Cerinic M, et al. Ann Rheum Dis 2011; 70:32-8.

Description des UD

- UD actif(s) chez 60 patients (221 UD au total)
- UD unique pour 1/3 patients
- UD multiples pour 2/3 patients



Digital ulcers: Vascular mechanisms



Calcinosis/mechanical



IMPACT DES ULCERES DIGITAUX AU COURS DE LA SCLERODERMIE SYSTEMIQUE



Infection
Gangrène
Amputation



Handicap
Douleur
Perte de fonction

Digital ischemia



Favoured

- hypotension, shock
- vasoactive drugs
- ciclosporin (transplantation)
- Past history of digital ischemia
- radial/ulnar artery occlusion

Management

- Analgesia (grade III)
- Antibiotics
- Prostacyclin (sildenafil)
- Heparin
- Surgery (differed)

Cochin hand function scale (CHFS)

Without the help of adapted instruments, in the past two weeks, did you:

- ♦ Categories for assessment



- ♦ The scale is based on the following answer scores

- 0 = Yes , without difficulty
- 1 = Yes, with a little difficulty
- 2 = Yes, with some difficulty
- 3 = Yes, with much difficulty
- 4 = Nearly impossible to do
- 5 = Impossible

Table 3. Convergent and divergent validities of the Cochin Hand Function Scale, HAQ and sHAQ, and PCS and MCS scores of the SF-36 for patients with SSc (correlation with other variables)*

<u>Scales</u>	<u>Spearman's correlation coefficient</u>
Cochin Hand Function Scale	
Convergent validity	
sHAQ	0.81
HAQ	0.75
Kapandji index	0.63
HFI	0.58
SF-36 physical functioning	0.53
Perceived individualized handicap (MACTAR)	0.48
SF-36 PCS	0.45
Divergent validity	
Anxiety (HADa)	0.16
SF-36 MCS	0.14
Depression (HADD)	0.05
Disease duration	0.15
Age	0.01

Hand disability contribute to 75 % of the variance of the HAQ

Factors associated with employment status in SSc

SSc patients on sick-leave have greater global, hand and mouth handicaps and depression

Outcome measures (range)	Sick leave (n = 53)	No sick leave (n = 34)	p value
HAQ (0-3)	0.9 (0.7)	0.6 (0.5)	0.021
CHFS (0-90)	21.7 (18.9)	10.7 (12.1)	0.003
MHISS (0-48)	20.2 (10.8)	14.6 (10.0)	0.014
HADd (0-21)	7.1 (3.9)	4.8 (3.4)	0.003

Values represent mean (SD)

CHFS = Cochin hand function scale (higher score = increased hand disability);
HADd = Depression dimension of the hospital anxiety and depression scale
(higher score = increased depression); HAQ = Global disability, ranging from 0 (no disability) to 3 (maximal disability); MHISS = Mouth handicap in SSc scale
(higher score = increased mouth disability).

Nguyen C, et al. *Rheumatology* 2010; 49:982-9.

Impact of digital ulcers on disability and health-related quality of life in SSc (I)

Scores	DU group <i>n</i> = 67			No DU group <i>n</i> = 146			<i>p</i> value
	Mean ± SD	Min	Max	Mean ± SD	Min	Max	
HFI (range 4-42)	23.9 ± 12.0	2	40	18.7±26.2	4	40	0.048
Kapandji (range 0-100)	70.1 ± 22.6	13	100	81.5±17.8	36	100	0.001
CHFS (range 0-90) (n=209)	27.4 ± 20.6	2	86	16.7±18.2	0	87	0.0001
HAQ (range 0-3)	1.2 ± 0.7	0	2.75	0.9±0.7	0	3	0.008

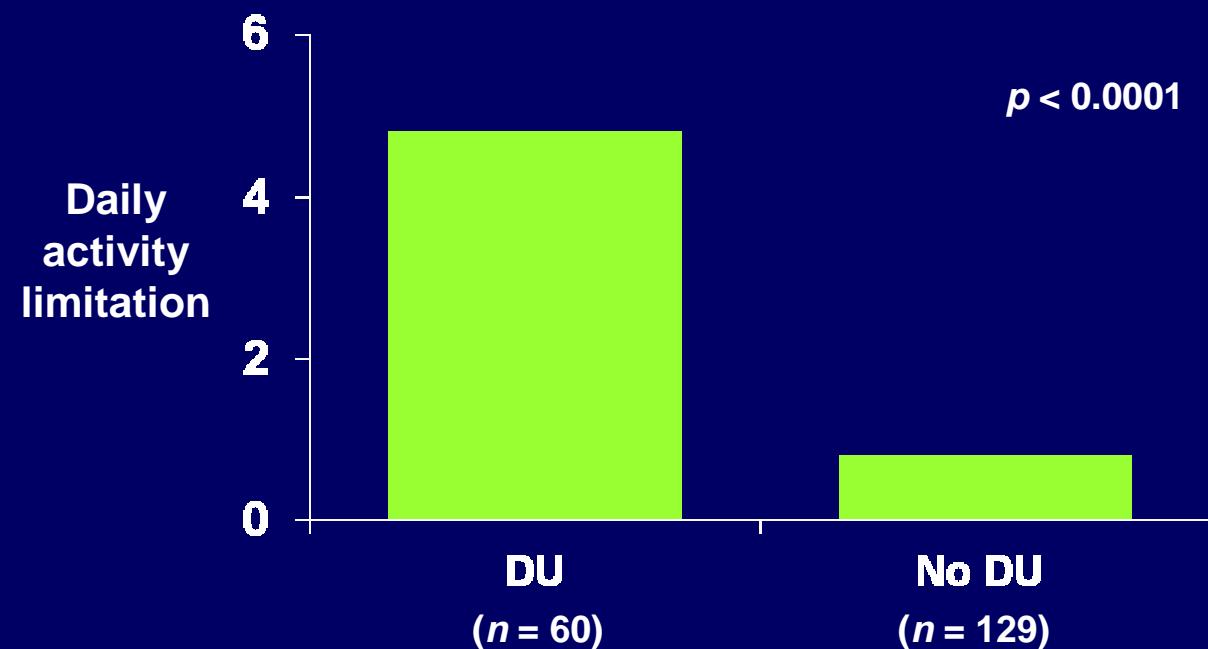
Impact of digital ulcers on disability and health-related quality of life in SSc (II)

Scores	DU group $n = 67$			No DU group $n = 146$			p value
	Mean \pm SD	Min	Max	Mean \pm SD	Min	Max	
SF-36 PCS (range 0-100) ($n = 179$)	35.86 \pm 9.39	15.41	63.23	37.7 \pm 11.6	14	79.66	0.264
SF-36 MCS (range 0-100) ($n = 179$)	39.6 \pm 9.5	15.64	60.32	43.4 \pm 12.5	18.48	76.91	0.026
MHISS (range 0-48)	23.0 \pm 10.8	2	48	17.5 \pm 10.58	0	38	0.001
Aesthetic burden (range 0-10) ($n = 148$)	6.1 \pm 2.2	0	10	3.9 \pm 2.4	0	9	0.0001

QoL is impacted in many ways by DU

Digital ulcers influence daily living activities

- ♦ Daily activity is measured on a scale of 0-10, with 0 being no limitation and 10 being major limitations; $n = 189$

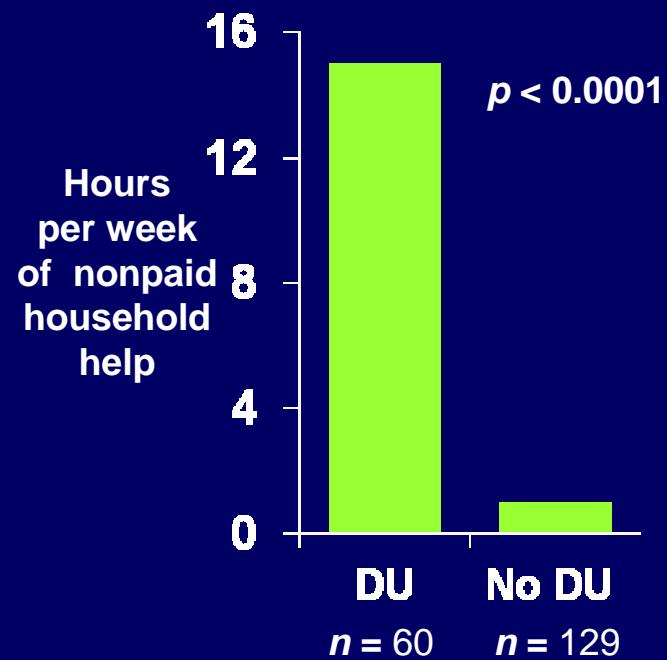
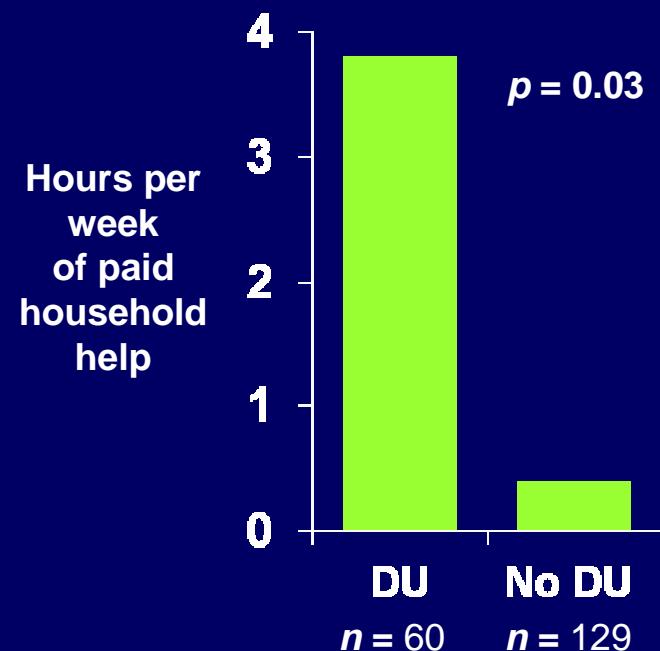


DU: digital ulcers

Bérezné A, et al. *Arthritis Care Res* 2011; 63:277-85.

Digital ulcers influence ability to perform household tasks

- Due to the inability to perform household tasks, patients with DU seek help in the form of paid or unpaid labour



DU: digital ulcers

Bérezné A, et al. *Arthritis Care Res* 2011; 63:277-85.

Management of DU: Multidisciplinary approach

Prevention of complications
Including patient education

Pharmacological treatment

Prevention of new DU

Healing pre-existing DU

Antibiotics

Pain relief

Non-pharmacological treatment: rehabilitation



Local treatment & wound care

Surgery
only when necessary

Prophylactic measures

A. Cold

- Reduce cold exposure by wearing long and warm clothes, mittens
- Reduce professional cold exposure

B. Drugs

C. Vasoconstrictive agents

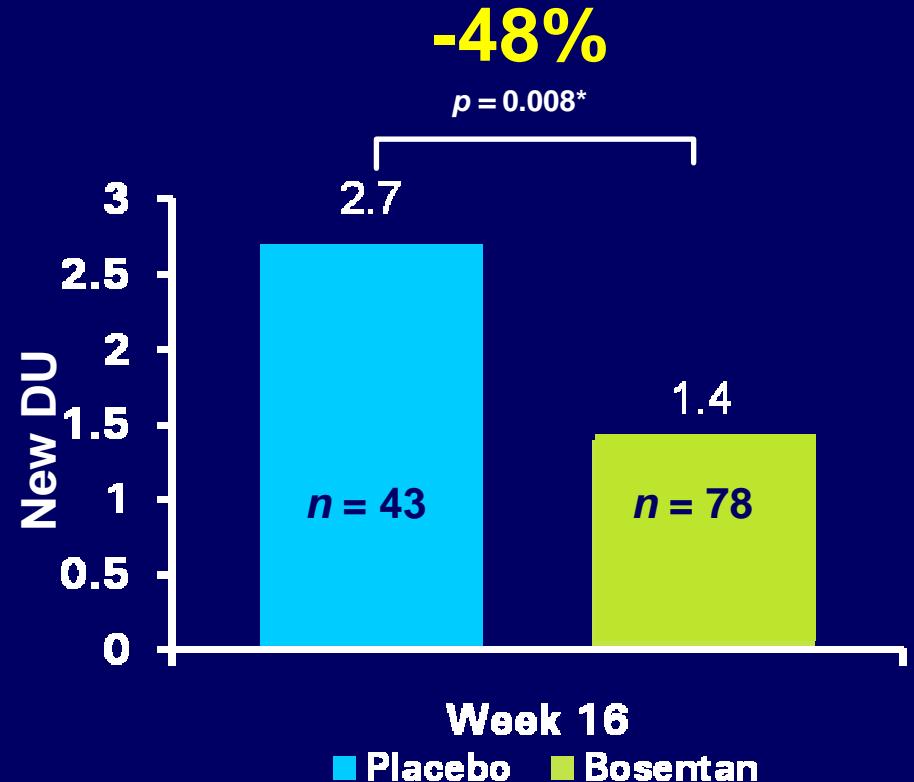
- Withdrawal of tobacco, cannabis, cocaine

D. Injuries

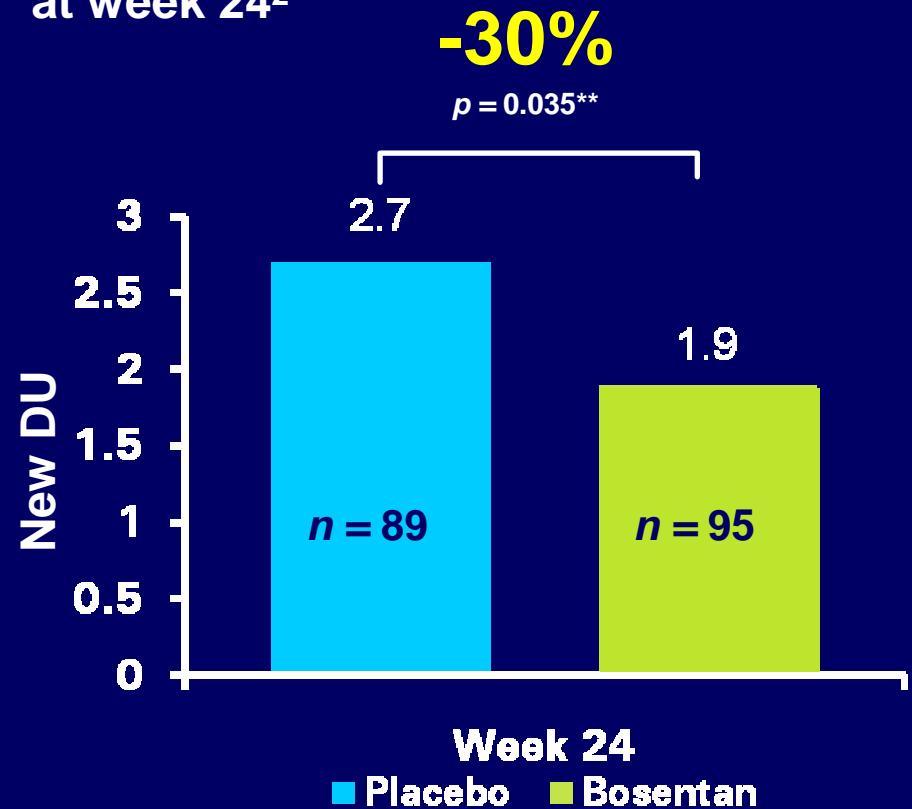
- Avoid hand injury, avoid repeated microtrauma
- Work-related trauma
- Occlusion

Effect of bosentan in reducing the number of new DU

RAPIDS-1: Occurrence of new DU at week 16¹



RAPIDS-2: Occurrence of new DU at week 24²



1. Korn JH, et al. *Arthritis Rheum* 2004; 50:3985-93.
2. Matucci Cerinic M, et al. *Ann Rheum Dis* 2011; 70:32-38.

Joint involvement in systemic sclerosis: Treatment

- ✓ Colchicine
- ✓ Low dose prednisone
- ✓ Methotrexate
- ✓ Biologics
 - ✓ Rituximab
 - ✓ Tocilizumab
 - ✓ Abatacept
- ✓ Surgical procedures
- ✓ Physiotherapy
- ✓ Occupational therapy

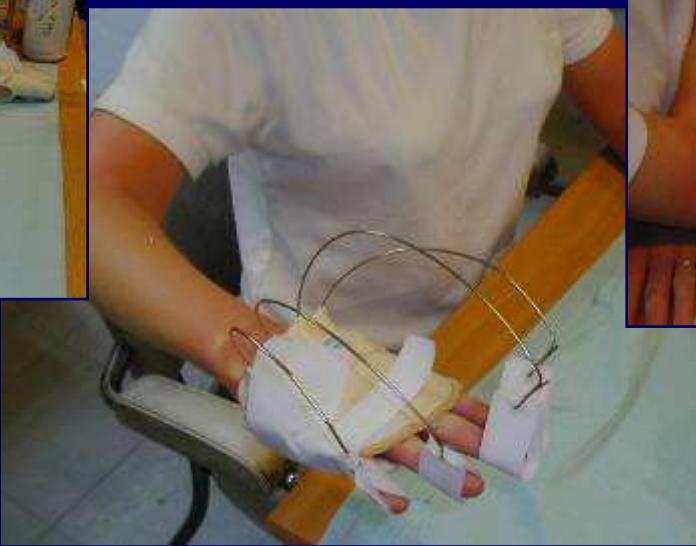
Rehabilitation in SSc patients with musculoskeletal involvement

- Increasing articular range of motion
 - Massotherapy
 - Active and passive mobilisation
 - Posture
 - Shoulders
 - Elbows
 - Wrists
 - Fingers
 - Hips
 - Knees
- Correction of microstomia posture
 - Massage
 - Active mobilisation
 - Gum chewing





Orthoses



Occupational therapy



Main sclérodermique: conclusions

- L'atteinte de la main est très fréquente, souvent précoce, et apporte des éléments très contributifs pour le diagnostic de la maladie ;
- L'atteinte vasculaire est au premier plan. Le phénomène de Raynaud peut se compliquer d'ulcères digitaux, de nécrose digitale à l'origine de douleurs, de surinfections et de la survenue d'un handicap marqué ;
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- Seule une prise en charge globale, prenant en compte la vasculopathie, l'atteinte cutanée et articulaire, incluant la rééducation fonctionnelle et l'ergothérapie, peut permettre d'améliorer la fonction de la main dans la sclérodermie systémique.

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