ORTHOPEDIC & SPORTS MEDICINE CENTER
OSMC

Complex Regional Pain Syndrome

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Complex Regional Pain Syndrome

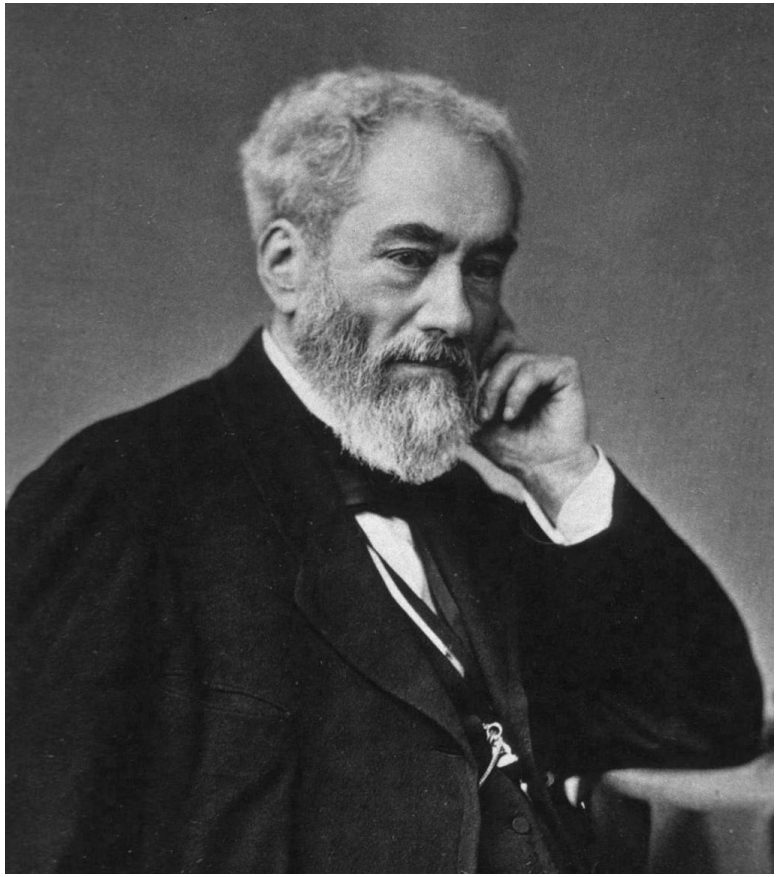
Background
Diagnostics
Subtypes/Stages
Etiology
Treatment
Example
Questions

Background

- Silas Weir Mitchell – 1864
- Neurologist
- Major contributor to hand surgery

- John Bonica – 1950s
- Anesthesiologist
- Coined "Reflex Sympathetic Dystrophy"

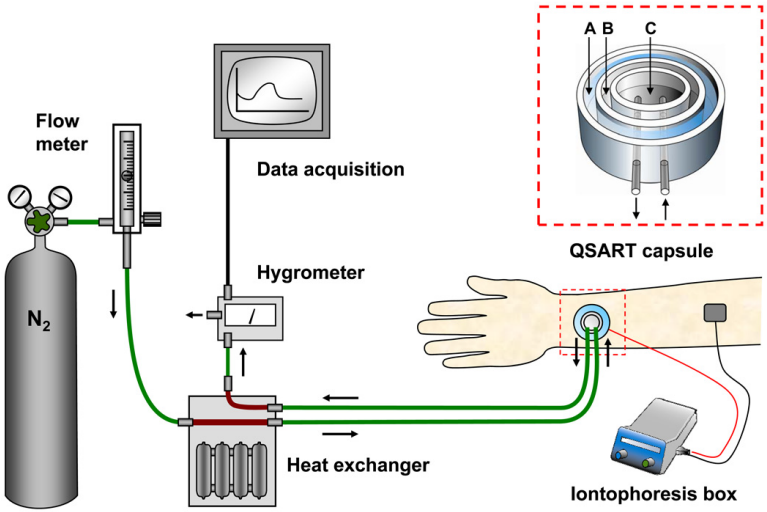
Well, well, well…



What do we know?

- Relatively rare – 1.2% of chronic pain diagnoses in the US
- Any age but more common in adults
- 2.3 : 1 female-to-male / Ages 46-70
- 2 : 1 upper-to-lower extremity – R = L
- Fractures are most common trigger, but have a more favorable course than soft-tissue injury
- Use of ACE inhibitors at time of trauma / history of migraines or asthma increase risk of developing
  - Imply neurogenic inflammation

Diagnostics



https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3046462/
Accessed 5/2/17

- EMG/NCV
  - Useful to determine for underlying nerve injury
- Autonomic testing:
  - Resting sweat output, resting skin temp
  - Quantitative sudomor axon reflex test (QSART)
- Three-phase bone scan
  - Validity in question
- Imaging not always required, but can support diagnosis and assess severity of case

Diagnostics

- Budapest Criteria
  - Continuing pain that is disproportionate to any inciting event
  - At least **1** *symptom* reported in **at least 3 of** the following **4** categories
    - Sensory – hyperesthesia or allodynia
    - Vasomotor – temperature asymmetry, skin color changes, skin color asymmetry
    - Sudomotor/edema – edema, sweating changes, or sweating asymmetry
    - Motor/trophic – decreased ROM, motor dysfunction(weakness/tremor/dystonia) or trophic changes(hair/nail/skin)
  - At least **1** *sign* must be displayed at evaluation in **at least 2** of the following categories:
    - Sensory – evidence of hyperalgesia (to pinprick), allodynia (to light touch, temp sensation, deep somatic pressure, or joint movement)
    - Vasomotor – evidence of temp asymmetry (>1° C), skin color changes, or asymmetry
    - Sudomotor/edema – evidence of edema, sweating changes, or sweating asymmetry
    - Motor/trophic – evidence of decreased ROM, motor dysfunction (weakness/tremor/dystonia) or trophic changes (hair/nail/skin)
  - No other diagnosis can better explain the signs and symptoms

- It is a Clinical Diagnosis -

Table 4

Comparison of the diagnostic efficiency of individual Budapest Criteria diagnostic components versus the combination of all diagnostic components.

Criterion	Sensitivity	Specificity
All sign/symptom factor scores	0.95	0.81
Sensory factor only	0.83	0.57
Vasomotor factor only	0.94	0.68
Sudomotor/edema factor only	0.85	0.71
Motor/trophic factor only	0.86	0.67

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2914601/
Accessed 5/2/17

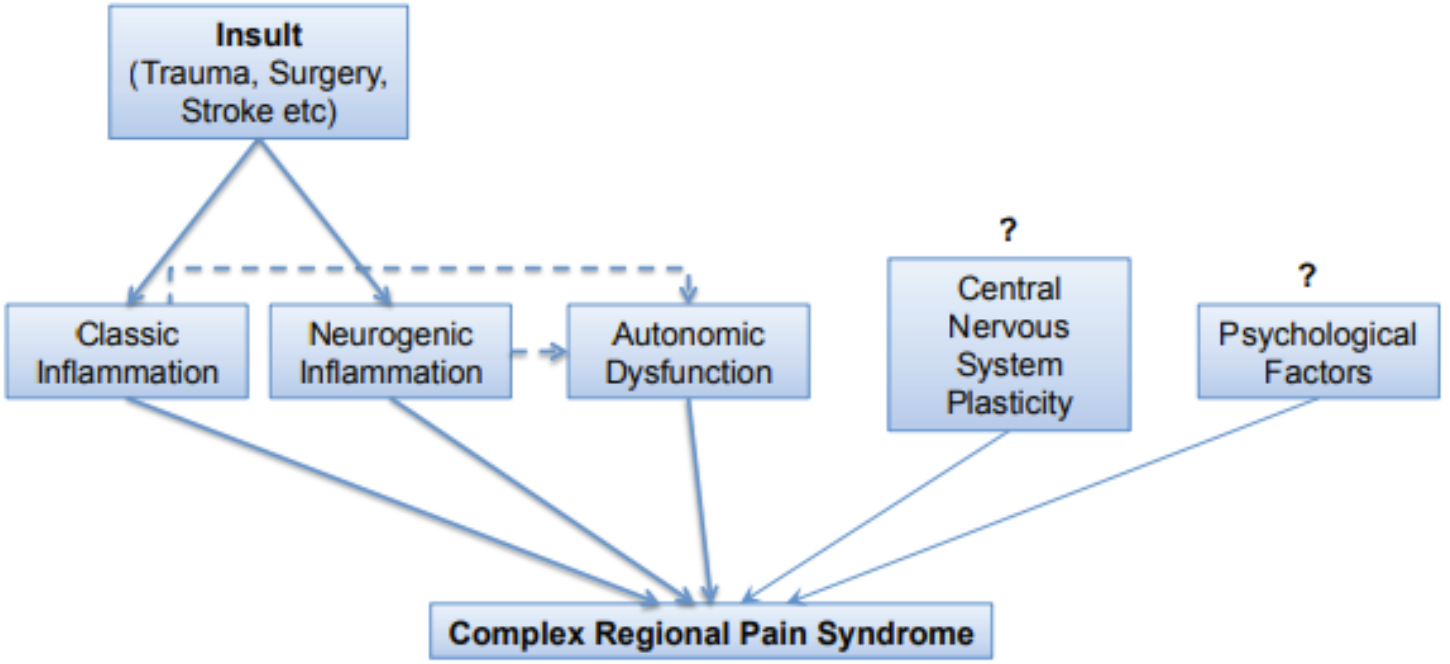
Subtypes and Stages

- CRPS – 1:
  - Develops and initiating event such as soft-tissue or crush injury, immobilization, tight cast, or surgery
  - "RSD"
- CRPS – 2:
  - Presence of defined nerve injury
  - "Causalgia"
- CRPS – NOS:
  - Partially meets CRPS criteria but no better explanation of any other condition

Subtypes and Stages

- Stage 1
  - 1-3 months duration
  - Skin temp changes, faster growth of nails/hair, muscle spasms and joint pain, severe burning or aching that worsens with slightest touch, skin becoming blotchy/purple/pale/red/thin and shiny/swollen/more sweaty
- Stage 2
  - 3-6 months duration
  - Skin changes continue, nails cracked and brittle, slower hair growth, stiff joints and muscle weakness, worsening pain
- Stage 3
  - >6 months duration
  - Irreversible changes seen, limited movement of limb due to tightened muscles and tendons (contracture), muscle wasting, pain in entire limb

Process



Complex Regional Pain Syndrome: An update

Christina Misidou, Charalampos Papagoras

Mediterr J Rheumatol 2019;30(1):16-25

Etiology

- Genetic
  - HLA system (B62 and DQ8, specifically / dystonia)
- Psychosocial
  - CRPS with allodynia can manifest clinical signs of special psychologic distress
  - Disability and pain severity were more strongly associated with psychologic factors in patients with CRPS compared with low back pain
- Immobilization
  - Produces many symptoms similar to CRPS after surgery
  - In setting of trauma → 47% of all CRPS sufferers with history of medically imposed limb immobilization
  - 8.3% after carpal tunnel surgery
  - >30% after distal radius fracture

Etiology

- CNS changes
  - Affects both central and peripheral CNS
  - * = sensitization of spinal dorsal horn cells via activation of postsynaptic N-methyl-D-aspartate receptor via chronic C-fiber input.
- Autonomic dysfunction
  - Distal edema (80%)
  - Skin temperature changes (80%)
  - Redness
  - Hyper/hypohydrosis.
  - Skin / hair / nails
  - Redistribution of blood flow and impaired capillary nourishment, hypoxemia, and acidosis = oxidative stress
  - **Early** vs. Late

Etiology

- Neurogenic Inflammation
  - C-fibers
    - Afferent in mediation of pain and pruritus / Efferent neurosecretory function (also occurring in conditions like Asthma and Migraines)
      - Substance P, calcitonin gene-related peptide → spontaneous pain behavior and nociceptor sensitization → allodynia
    - Efferents also responsible for inducing central sensitization
  - Little histologic evidence of inflammatory infiltrate in skin, joint, or muscle biopsies
- Autoimmunity
  - Injury → binding of preexisting autoantibodies to target structures →enhanced central sensitization
  - 1 patient was given IVIG for 10d straight after sciatic nerve compression and CRPS pain completely resolved.
  - ESIs with 60mg of methylprednisolone in patients with LONG-STANDING CRPS did not help at 6 weeks
- Deep-tissue Microvascular pathology hypothesis

Etiology

- Deep-tissue Microvascular pathology hypothesis
  - Microvascular injury → activation of muscle nociceptors and ectopic activation of sensory afferent axons secondary to endoneurial inflammation and ischemia
- Small-Fiber Neuropathy Hypothesis
  - Sense pain and temp and regulate tissue function via neuroeffector actions
  - Not detected by standard EMG/NCVs

Why it matters

Direct Health Care Cost and Work Incapacity Related to Complex Regional Pain Syndrome in Switzerland: A Retrospective Analysis from 2008 to 2015

Stefan Markus Scholz-Odermatt, PhD, François Luthi, MD, Maria Monika Wertli, MD, PhD, Florian Brunner, MD, PhD

Pain Medicine, Volume 20, Issue 8, August 2019, Pages 1559–1569, https://doi.org/10.1093/pm/pnz030

Published: 08 March 2019

- Switzerland review from 2008-2015
- 19 times higher insurance costs
- 13 times higher treatment costs
- 20 times higher number of days lost at work

Why it matters

ARTICLES

Epidemiology of complex regional pain syndrome: a retrospective chart review of 134 patients

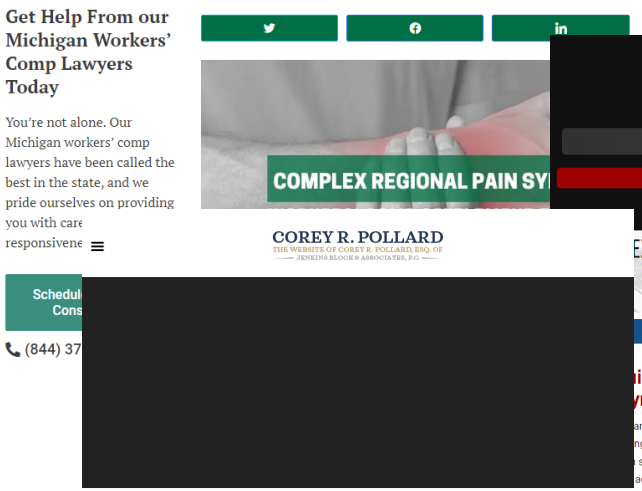
Allen, Ginger[a]; Galer, Bradley S.[b,*]; Schwartz, Lauren[c]

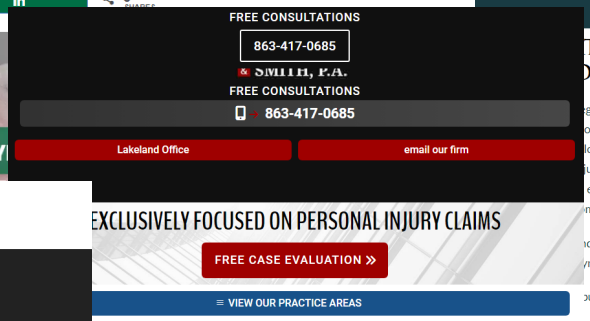
Author Information

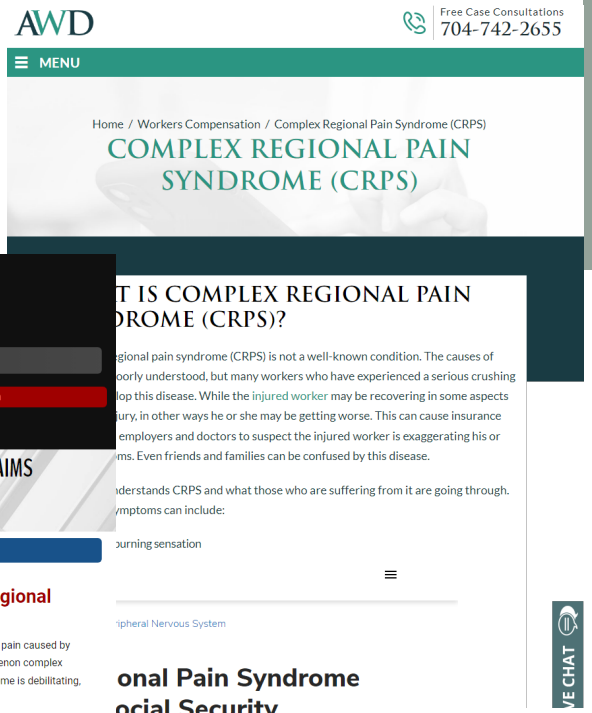
Pain 80(3):p 539-544, April 1, 1999. | *DOI:* 10.1016/S0304-3959(98)00246-2

- 134 patients at tertiary center
- 4.8 different physicians before being referred to a pain center
- Mean duration of treatment was 30mo before pain center eval
- 54% had worker compensation claim related to CRPS

Why it matters







How Much Compensation Do You Get for Complex Regional Pain Syndrome (CRPS) and Reflex Sympathetic Dystrophy?

A Guide to Workers Comp Claims and Settlements for CRPS

Complex regional pain syndrome (CRPS), previously called reflex sympathetic dystrophy (RSD), is a progressive medical condition that causes persistent, burning pain and dysfunction of the autonomic nervous system.

Unfortunately, CRPS is not widely known or understood by many doctors. And this results in difficulty receiving the correct diagnosis or treatment.

Combined with the permanent disability and high lifetime medical costs associated with CRPS, these factors explain why personal injury and workers compensation claims for CRPS are hard-fought by insurers but can result in high settlements and payouts.

This article explains multiple perspectives of workers comp claims and auto accident lawsuits for CRPS. The first part gives a medical overview of CRPS and how doctors' understanding of its causation and diagnosis has developed over time. And the second part focuses on the litigation of CRPS claims, including the workers comp benefits and tort damages you may recover.

Keep reading to learn more.

And if you have questions about CRPS after an occupational injury or motor vehicle crash, contact my office for a free consultation. We have helped many people with complex regional pain syndrome negotiate personal injury and workers comp settlements that help them and their families move forward. And we want to do the same for you.

Treatment

- Should be time-limited and functional goal-oriented
  - Realization that CRPS treatment can take time based on multitude of factors
  - However…the longer one is out of work, the worse the return-to-work rates are
- Identify psychological factors
- Avoid avoidance
  - Mild symptoms – encouraged to perform all duties as normally as possible
  - Moderate symptoms – may not be able to perform all duties. If unable, should be in therapy program
  - Severe symptoms – need to transition back into the work force. Typically starts with 2hrs/d with gradual return to normal time. Coordinate with employer. May take weeks to achieve
- Evaluate risk, capacity, and tolerance
- Communicate that restrictions will be progressively reduced
  - NO SURPRISES!!

Treatment

Table 3. Guidelines for Modification of Work Activities and Duration of Restrictions

Disorder	Activity Modifications and Accommodtion	Recommended Target for Duration of Restrictions*	
		Modified Duty Available	Modified Duty Not Available
Complex Regional Pain Syndrome (includes Types I and II)	Use extremity as normally as possible. Avoid aggravating activities involving extremity (e.g., forceful prolonged use, heavy lifting, walking or standing). Advance activities as soon as possible for better outcomes. Must be strongly individualized based on the severity of CRPS.	• Mild 0-30 days • Moderate 30-60 days • Severe 60-90 days	• Mild 0-30 days • Moderate 60-90 days • Severe 90-180 days

*Mild, moderate, and severe are defined by the degree to which the condition affects ADLs; e.g., mild involves little to no impairment in the impact on the patient's ability to perform ADLs, while severe involves marked impairment in the ability to perform ADLs. Durations of activity limitations may vary based on case-specific details.

Complex Regional Pain Syndrome (ny.gov) - accessed 2/15/23

Treatment – Severe cases

- Should be reassessed weekly
- Upper extremity
  - 2hr work day
  - 5lb weight restriction
  - Avoid repetitive movement/forces of the affected limb
- Lower extremity
  - 2hr work day
  - 10lb weight restriction
  - Avoid prolonged static positions, i.e. allow for alternating sit and stand as needed

Treatment

Pain Medicine

Pain Medicine 2013; 14: 180–229
Wiley Periodicals, Inc.

SPECIAL ARTICLE

Complex Regional Pain Syndrome: Practical Diagnostic and Treatment Guidelines, 4th Edition

R. Norman Harden, MD,*§¶ Ann Louise Oaklander, MD, PhD, Allen W. Burton, MD,†† Roberto S. G. M. Perez, RPT, PhD,*** Kathryn Richardson, MOTR,† Melanie Swan, OTR/L,‡‡ Jennifer Barthel, MS, CRC,‡ Brienne Costa, CTRS/R,§§ Joseph R. Graciosa,**

Disclosures: This work was sponsored by the Reflex Sympathetic Dystrophy Syndrome Association (RSDSA), on which Dr. Harden currently serves as the Chairman of the Research Committee and is on the Board of Directors. Dr. Bruehl serves on the RSDSA Scientific Advisory Board. Dr. Burton consults for

Treatment

- Medication
  - Most effective when used in combo with other treatments
  - Monotherapy is best
  - Gabapentinoids / anti-neuropathics / TCAs and SNRIs / Bisphosphonates and Calcitonin / vitamins / topicals / IV infusions
- Physiotherapy
  - Number of sessions hard to predict
    - Key is to document ongoing progress and objective functional gains. As long as gains continue, therapy should continue until it plateaus
    - 10-12 sessions are a good place to start (2-3x/wk for 4-5wks then reassess)
    - Remember, an increase in pain during therapy is not new damage
  - Functional Restoration Therapy / Desensitization therapy
    - Mirror visual feedback / graded motor imagery / reactivation / contrast baths /desensitization / exposure / therapy
    - Edema Control / Flexibility / isometric strengthening / postural correction / tx secondary myofascial pain
    - Stress loading / isotonic strengthening / ROM / aerobic conditioning / postural normalization and balanced use
    - Ergonomics / movement therapies / normalization of use / functional or vocational rehab

Treatment

- Sympathetic approach
  - Blockades
    - Controversial in the literature
  - Sympathectomy
    - Can be helpful
- SCS
  - Not a first line therapy but should not be ignored
  - Typically if no response to conventional treatment within 12 to 16 weeks.
  - Two studies show that it should be considered earlier in the treatment due to its efficacy and safety
- Psychiatric assistance

Summary

Treatment of complex regional pain syndrome

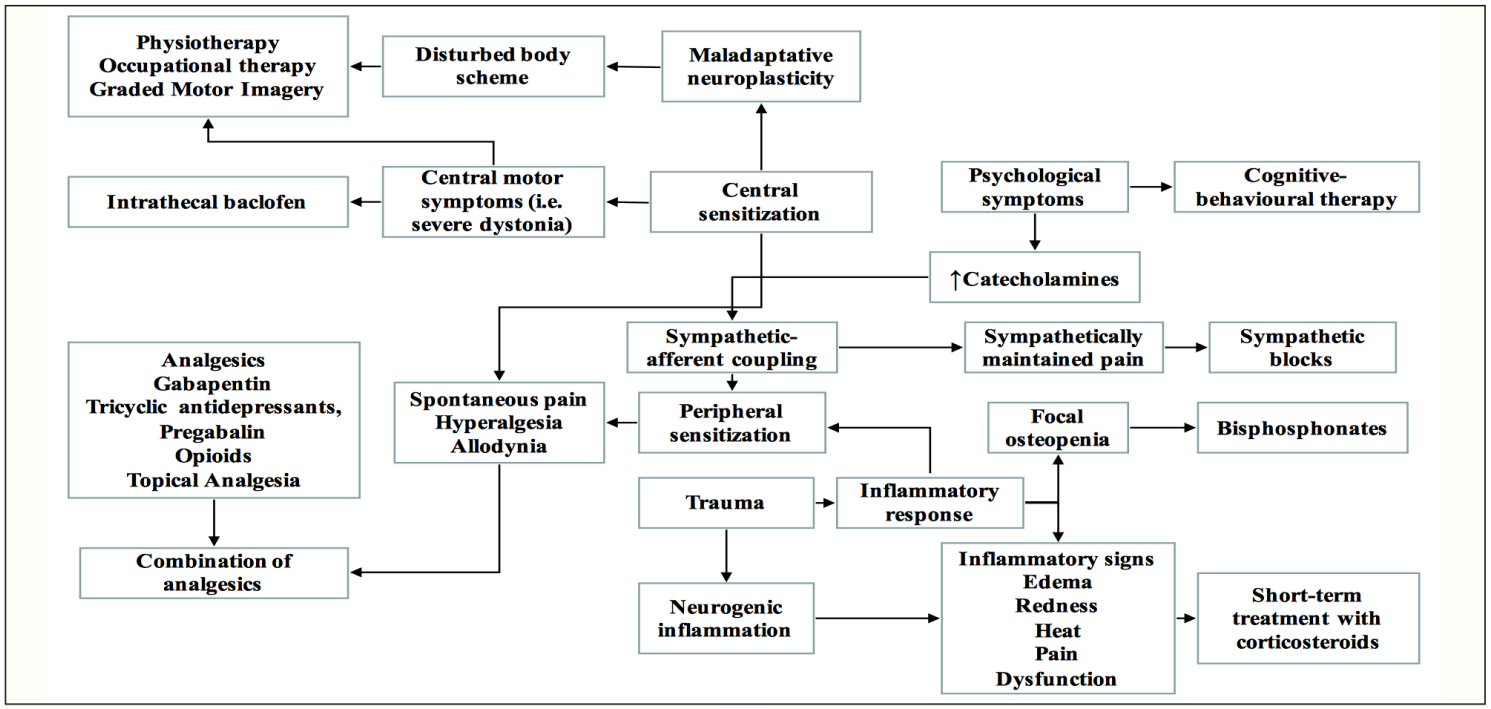
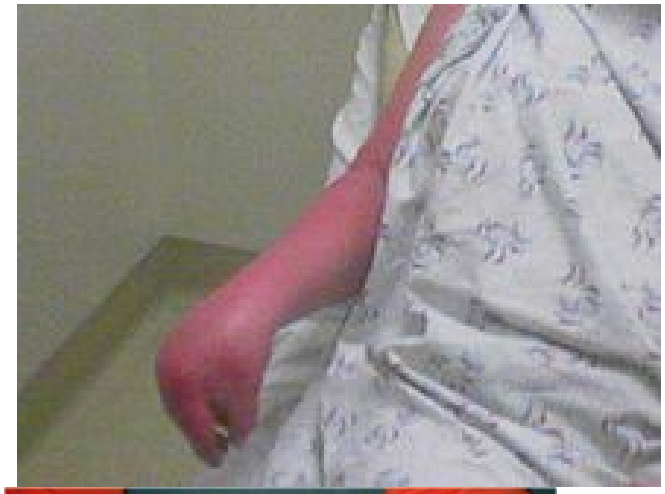
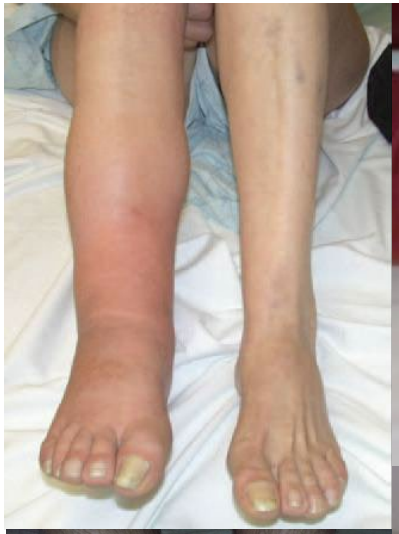
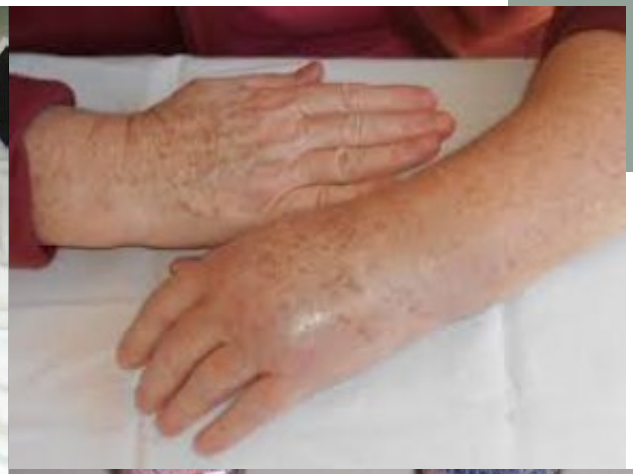


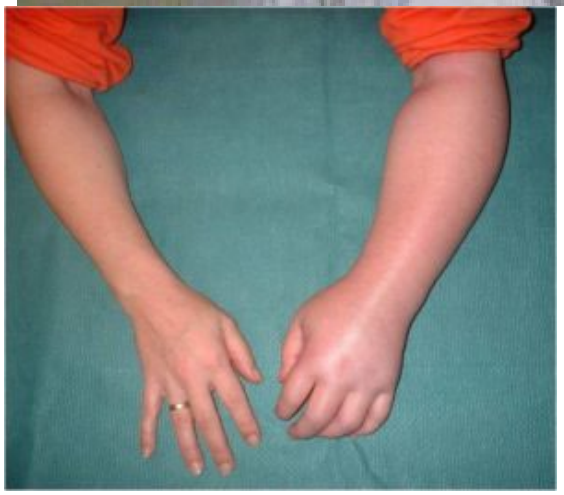
Figure 1 - Possible treatment on the basis of the pathogenic mechanisms (2).

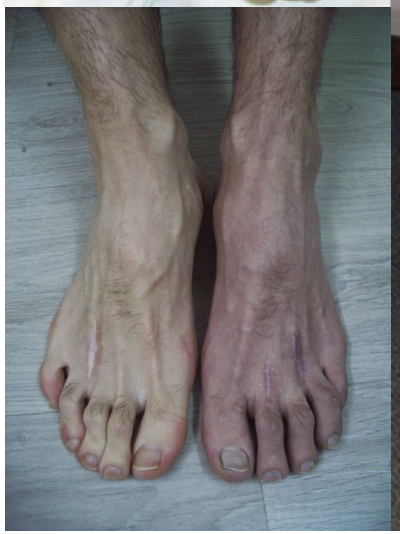
Examples

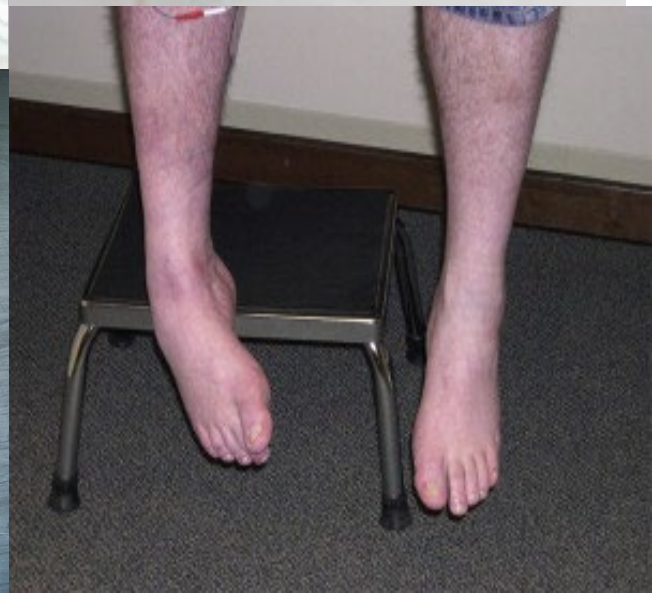












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Thank you!

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