

# Complex Regional Pain Syndrome I (Reflex Sympathetic Dystrophy) : Clinical Presentation AND Diagnostic Workup



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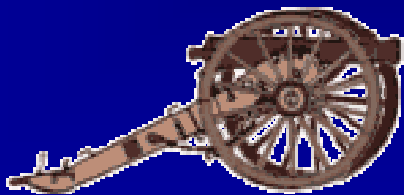
# RSD (CRPS I): Outline

- **History and Epidemiology**
- **Clinical presentation of RSD/CRPS**
- **Diagnosis and differential diagnosis of RSD/CRPS**

# CAUSALGIA



Silas Weir Mitchell  
1829 - 1914



## **GUNSHOT WOUNDS AND OTHER INJURIES OF NERVES**



by  
Silas Weir Mitchell, M.D.  
George Read Morehouse, M.D.  
and William Williams Keen, M.D.

Reprinted with Biographical Introductions  
by Ira M. Rutkow, M.D., Dr.P.H.

Philadelphia, Lippincott, 1864

## Causalgia- Weir Mitchell

- “Long after the trace of the effects of a wound has gone, ..neuralgic symptoms are apt to linger, and too many carry with them throughout long years this final reminder of the battle-field.”



# Nerve Injuries: Lesions of Sensation

- “Case 24: H.W. 42, shot in left arm, injured ulnar nerve
- 50 days later- Pain below elbow down into the hand, burning and tingling .. It is intense and increasing.
- Entire hand sore to touch.. but tact is unimpaired.
- The hand is swollen .. the palm is red.
- The patient has kept the hand wet ever since he was hurt.”

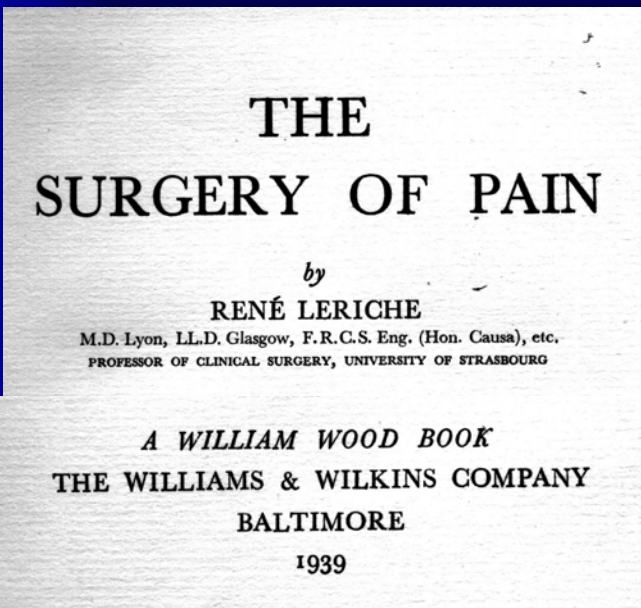
- Hyperaesthetic conditions
- Anesthetic conditions
- Neuralgia. Burning



# Post-traumatic Spreading Neuralgia

- A lady, aged 37, receive a gift of a hare. She cut it up, with a view to make a well-know marinade, .. she pricked her index finger with a spicule of bone.

By next day, all trace of injury had vanished and it was forgotten. The hare was eaten, but it had its revenge!



# Post-traumatic Spreading Neuralgia

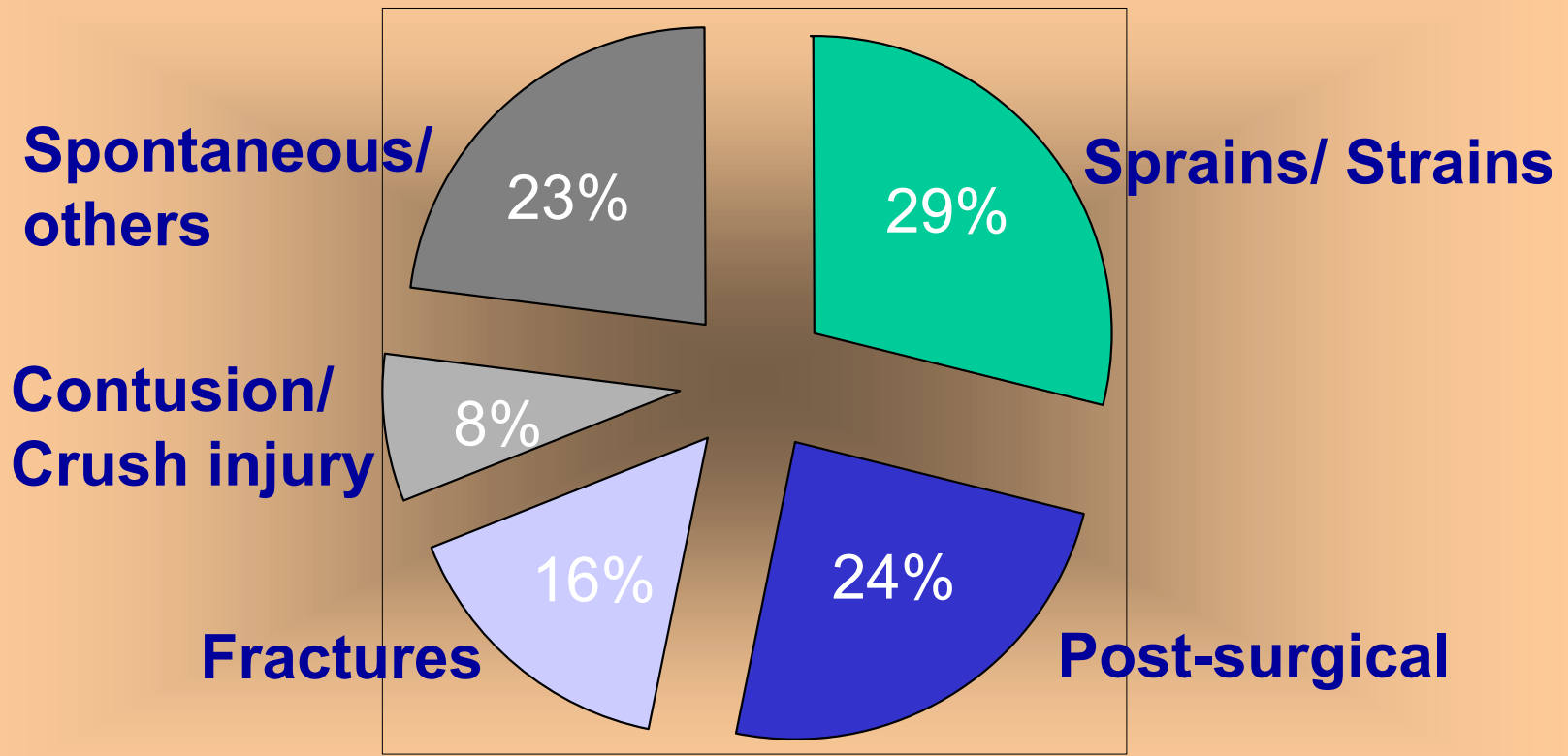
- At the end of the week the pricked finger became painful. It felt as if on fire, yet there was no sign of inflammation..
- The slightest touch gave a disagreeable sensation.
- 2 m- She was in continuous pain, .. had undergone a complete change in her general character. She slept badly and ate very little.

# Post-traumatic Spreading Neuralgia

- The hand was moist and somewhat cold.
- The pricked finger .. was rather redder than that of the other hand, and somewhat atrophied.
- Radiographically, there was .. decalcification of the first phalanx.
- On several occasions I have made use of infiltrations of the stellate ganglia ..

# CRPS- Inciting event

## Retrospective review - UW pain center



# Epidemiology

- Common in younger adults
  - Mean 41.8 years
  - Mean age at time of injury 37.7 years
- 2.3 - 3 times more frequent in females than males
- Usually involves a single limb in the early stage
- Mean duration of symptoms before pain center evaluation = 30 months

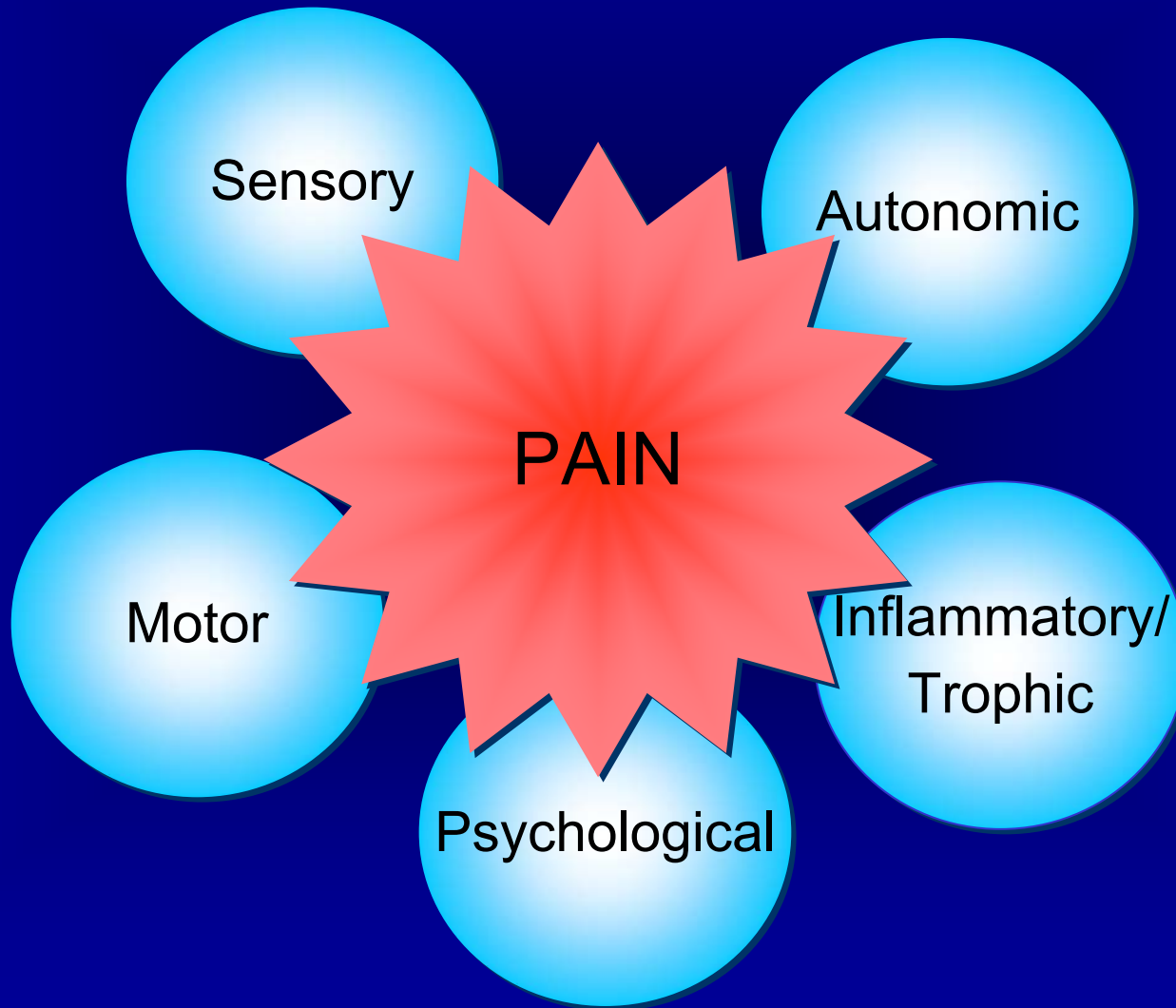
# Estimated CRPS cases per year after orthopedic surgery

Procedure	Number/yr	Rate	CRPS /yr
Arthroscopic Knee surgery	657,000	2.3-4%	15-26,000
Carpal Tunnel	366,000	2.1-5%	8-18,000
Ankle fracture	257,000	13.6%	35,000
Total knee replace.	247,000	0.8-13%	2-32,000
Wrist fractures	194,000	7-37%	14-72,000
Fasciectomy-Dupuytren's contra.	20,000	4.5-40%	1-8,000
<b>TOTAL</b>	<b>1,741,000</b>	<b>4.3-11%</b>	<b>74-191,000</b>

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# Clinical Aspects of CRPS



# Sensory Changes in CRPS

- **Allodynia**
- **Hyperalgesia**
- **Hyperesthesia**
  - Increased sensitivity to a sensory stimulation
- **Hyperpathia**
  - Abnormally exaggerated subjective response to painful stimuli

# Autonomic Signs in CRPS

Edema

Color change

Temperature

(warmer or cooler)

Sweating (↑ or ↓)



# Motor Symptoms and Signs in RSD



Other Sx or Signs: tremor, weakness, contractures

# Trophic Changes

Altered nail growth  
Altered hair growth  
Skin changes



# Signs and Symptoms in Early and Late RSD

Inflammatory S &S	2-6 months	>12 months
Pain	88 %	97 %
Color difference	96 %	84 %
Edema	80 %	55 %
Temperature diff.	91 %	91 %
Limited movement	90 %	83 %
↑pain with exercise	95 %	97 %

Total= 829 pts.

Veldman et al. Lancet 1993;342:1012

# Severe Complications of RSD

(74 patients)

van der Laan et al, 1998

7.4%	N (total)	Upper extremity	Lower extremity
Infection	30	30%	70%
Ulcers	26	11%	89%
Chronic edema	27	11%	89%
Dystonia	50	38%	62%
Myoclonus	21	43%	57%
All complications	154	28%	72%

# Psychological Changes

**Fear**

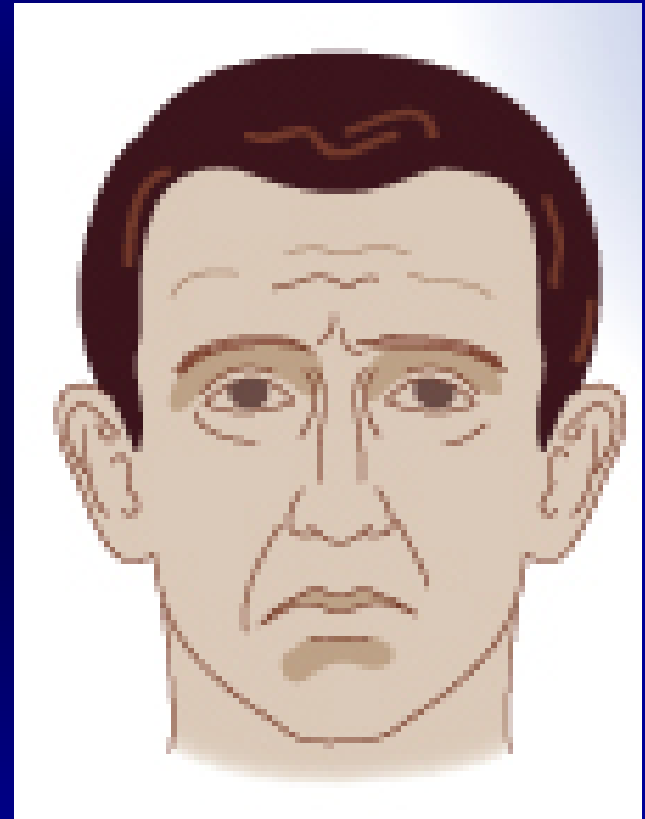
**Anxiety**

**Anger**

**Suffering**

**Depression**

**Failure to Cope**



# RSD and the Psyche

## Facts and Fallacies

- RSD is a psychiatric illness
- RSD causes psychiatric illness
- Psychiatric illness or personality disorder are predisposing factors for RSD
- Psychological factors modify the course of RSD
- Adjustment and function in RSD are worsened by maladaptive behavior

# CRPS can Spread

- **Patterns of spread**
  - **Contiguous spread**

Gradual, significant enlargement of the affected area
  - **Independent spread**

CRPS appears in a distant, non-contiguous area
  - **Mirror-image spread**

Symptoms appear on the opposite side in an area that closely matches size and location of original side

# Is RSD a systemic disease?



A patient with both upper and lower extremity being affected with CRPS at different times about 2 years apart.

# RSD (CRPS I): Outline

- **Epidemiology**
- **Clinical presentation of RSD/CRPS**
- **Diagnosis and differential diagnosis of RSD/CRPS**

# Clinical Features of RSD (CRPS I)

## Autonomic

Skin color changes  
Sweating ↑ or ↓  
Edema/swelling  
Skin temperature ↑ or ↓



## Psychological

Suffering  
Fear  
Anxiety  
Anger  
Depression  
Failure to cope  
Behavioral illness



## Sensory

Allodynia  
Hyperalgesia  
Hyperesthesia  
Hyperpathia  
Hypoesthesia



## Motor

Weakness  
Tremor  
Dystonia  
Myoclonus



## Inflammatory/ Trophic

Nail growth  
Hair growth  
Glossy skin  
Hyperkeratosis

CRPS I (RSD)  
Pain



# CRPS I - IASP Diagnostic Criteria

- Too vague
- How many symptoms?
- How many signs?
- Some classic signs and symptoms not included
  - Burning pain
  - Dystrophic changes
  - Motor abnormalities

# Proposed New CRPS Research Criteria

- Continuing pain disproportionate to inciting event
- At least 1 symptom in each of the 3-4 categories
  - Vasomotor (skin temp.; skin color)
  - Sensory (allodynia, hyperesthesia)
  - Motor / Trophic (weakness, tremor, neglect, trophic)
  - Sudomotor / Edema (edema, sweating)
- At least 1 sign in 2 or more of the 4 categories
  - Vasomotor; Sensory; Motor / Trophic;  
Sudomotor / Edema

# RSD: A diagnosis of exclusion

## Rule out other conditions

- **Vascular:** Deep vein thrombosis, vascular insufficiency
- **Inflammatory:** Cellulitis, Trauma, Lymphedema
- **Neuropathies:** Diabetic and small-fiber neuropathies
  - Entrapment neuropathies, thoracic outlet syndrome
- **Erythromelalgia**
- **Plexopathies and diseases of the spine**
- **Tumors:** Pancoast tumor

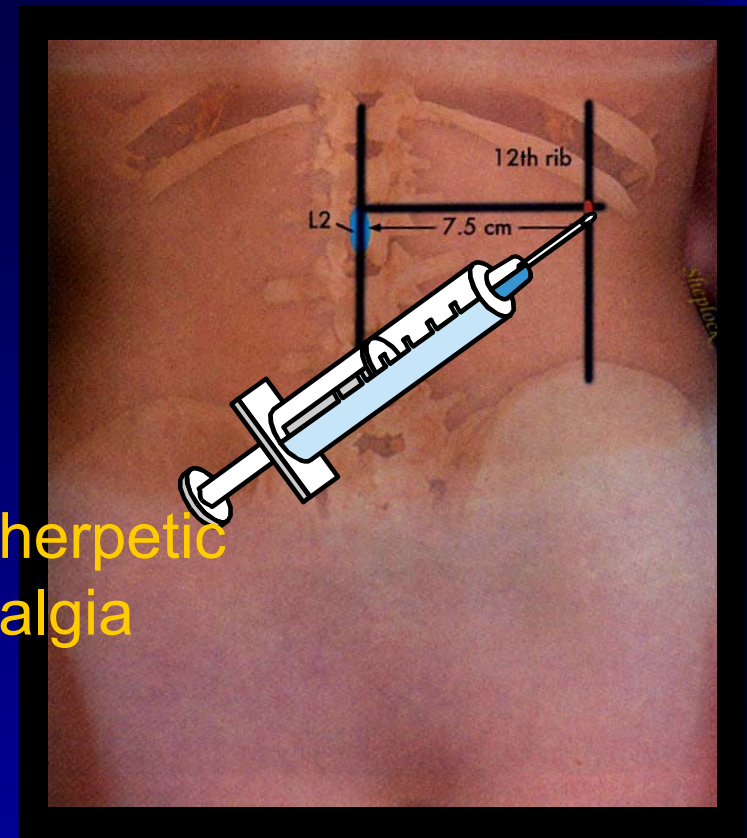
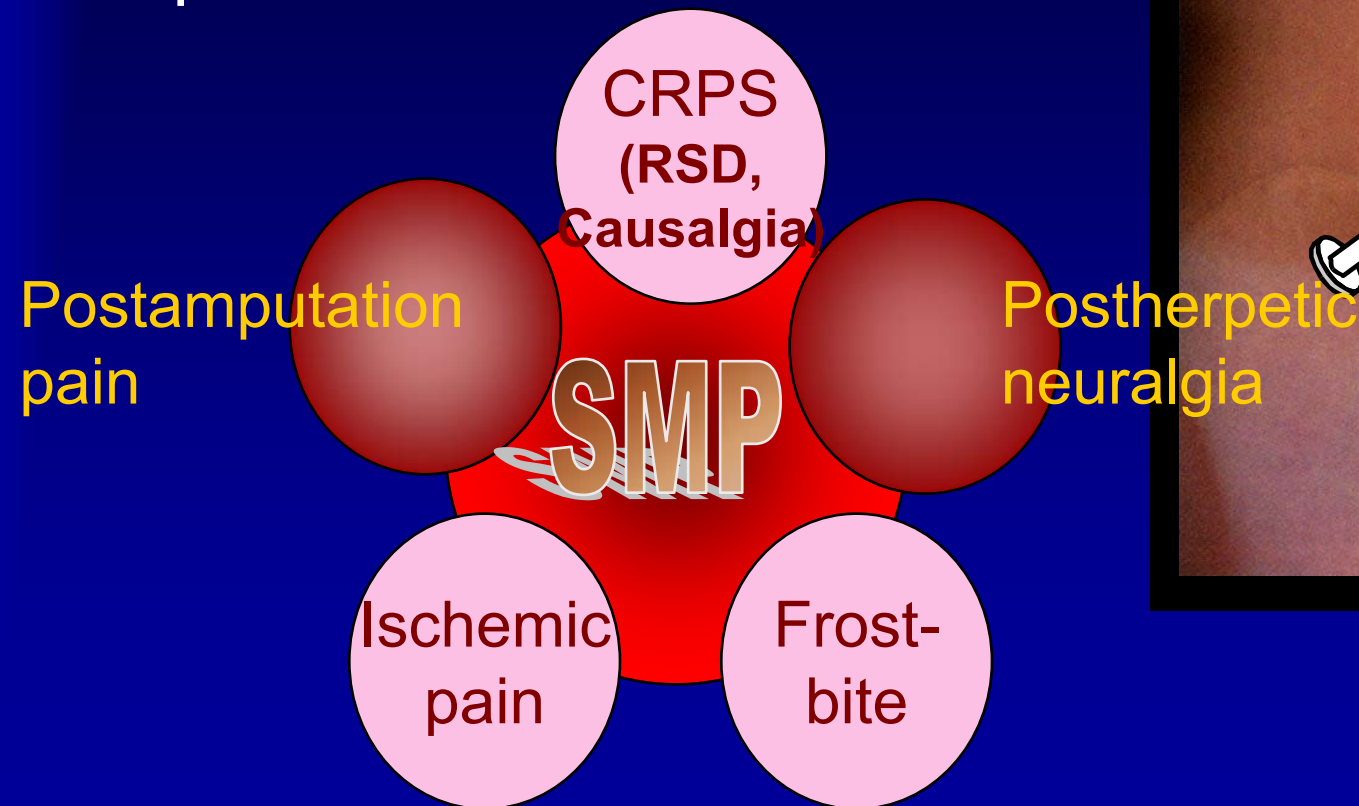
# Other Diagnostic Studies for RSD

- Laboratory Results
  - Thermometry/ thermography
  - Bone X-ray
  - 3-Phase bone scan
  - Quantitative sweat test
  - Response to sympathetic blockade

Gibbons & Wilson, Clin J Pain 8:260-263, 1992

# Do nerve blocks help in diagnosis of RSD?

- Sympathetic nerve blocks help identify the subset of patients with SMP



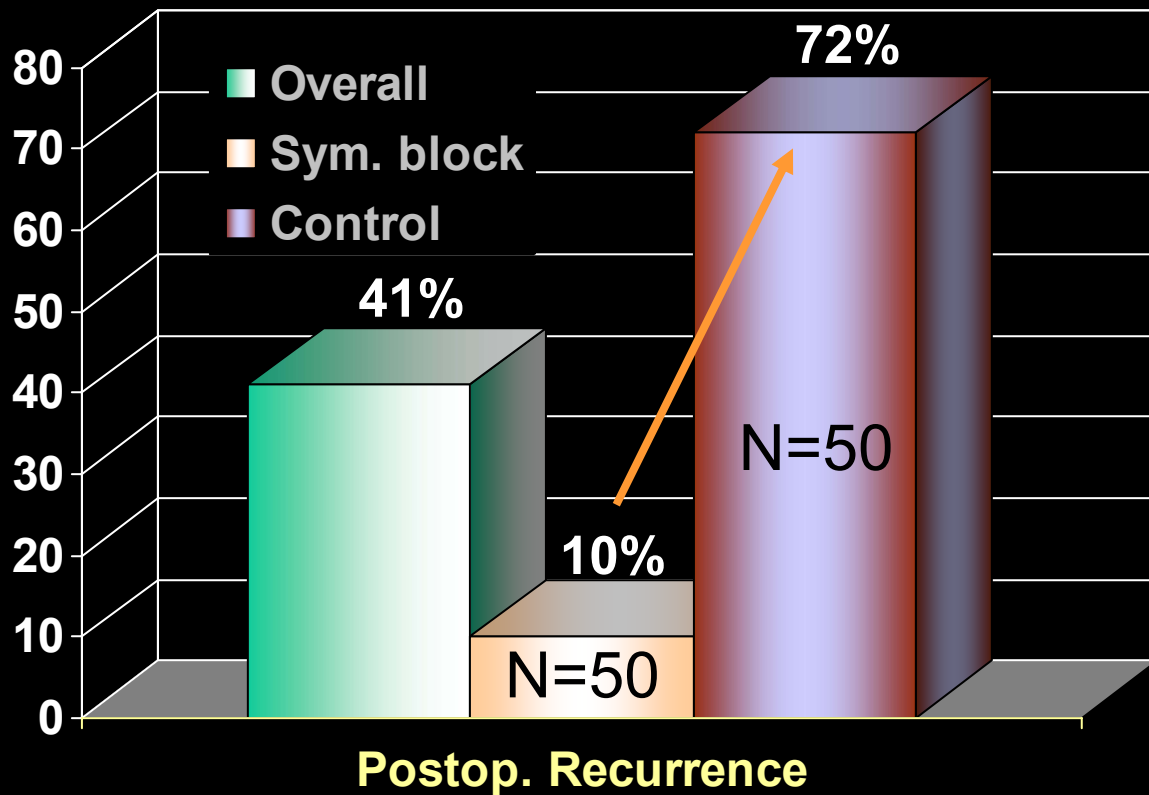
# Prevention of CRPS

## Vitamin C (antioxidant) and Wrist fracture

- 127 wrist fractures- 500mg Vit. C or placebo for 50 days
- 1 year followup- 4/54 (7%) in Vit C gp vs 14/65 (22%) in placebo developed CRPS; F:M = 94:6 %

	Odds ratio	P-value
Fracture type	0.09	0.0037
Complaints in plaster cast	0.1	0.0002
Vit C therapy	4.22	0.04

# If I have RSD can I undergo surgery without recurrence of the disease?



Retrospective analysis  
4-16 m after RSD  
2 separate surgeons  
S.G. block post surgery  
1 yr follow up

# Conclusions

- RSD/CRPS is a chronic neurologic syndrome
- Not all patients have the same set of symptoms
- Only a subset of patients have SMP
- Workup to rule out other conditions that may mimic CRPS

# What can I do to contribute to development of new treatments?

- NIH requests for proposals
- Pharmacy interested in investigating new drugs
- A plea for volunteering and participation in controlled clinical studies
- RSD survey – RSDSA website