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COMPLEX REGIONAL PAIN SYNDROME

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COMPLEX REGIONAL PAIN SYNDROME

- An uncommon pain syndrome, often seen following some inciting traumatic event
 - Most commonly fracture
 - Can occur following surgery, infection or even spontaneously
- Clinically can vary widely from mild to significantly disabling

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COMPLEX REGIONAL PAIN SYNDROME

- May have minimal trauma as antecedent
- Symptoms often spread outside the region of initial incident
- Pain in limb or regional distribution, not peripheral nerve/root

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COMPLEX REGIONAL PAIN SYNDROME

- Former names:
 - Reflex sympathetic dystrophy (RSD, CRPS type I)
 - Causalgia (CRPS type II)
 - Sudeck's dystrophy
 - Shoulder-hand syndrome
 - Algodystrophy

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DEFINITION

- An array of painful conditions that are characterized by a continuing (spontaneous and/or evoked) regional pain that is seemingly disproportionate in time or degree to the usual course of any known trauma or other lesion.
- The pain is regional (not in a specific peripheral nerve territory or dermatome).
- Usually has distal predominance of abnormal sensory, motor, sudomotor, vasomotor, and/or trophic findings.
- The syndrome shows variable progression over time.

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TRIAD OF SYMPTOMATOLOGY

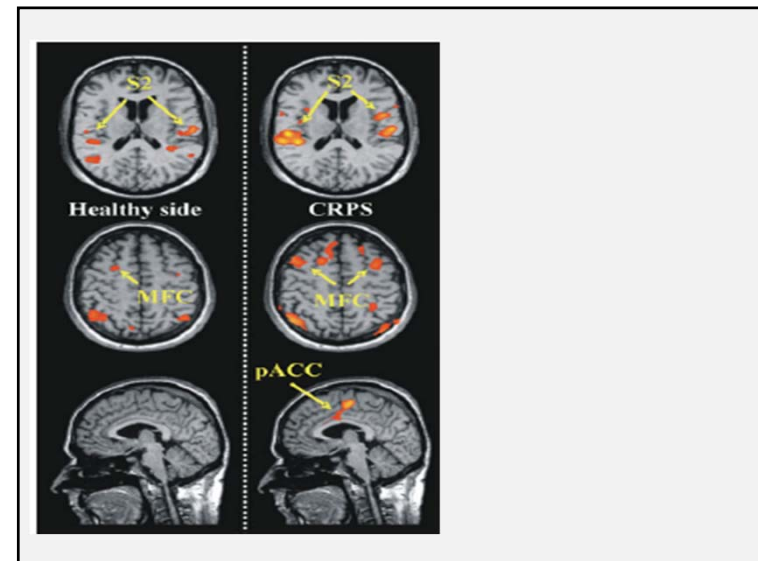
- Autonomic
 - Temperature
 - Color
 - Sweating
- Sensory
 - Pain
 - Hyperalgesia
 - Allodynia
- Motor
 - Paresis
 - Tremor

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PATHOPHYSIOLOGY

- Autonomic dysfunction
- Inflammation
- CNS involvement
 - Reorganization of motor circuits, increased activation
- Dystonia

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TWO DESIGNATIONS

- CRPS I
 - No nerve injury
- CRPS II
 - Known nerve injury

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EPIDEMIOLOGY

- Incidence varies: 5-26/100,000
- Peaks in 5th-7th decade of life
- Most patients can identify trauma preceding
 - 40% - surgery or fracture prior
 - 10% - minor trauma
 - 5-10% - develop spontaneously

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EPIDEMIOLOGY

- More common in women than in men
- 4:1 ratio
- More commonly affects the upper extremity
- Kids more common – lower extremity

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DIAGNOSIS – CLINICAL

- Budapest criteria
 - Sensitivity 0.85
 - Specificity 0.69
- Continuing pain, disproportionate to any inciting event
- No other diagnosis better explains signs/symptoms

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DIAGNOSIS – CLINICAL

- Must report at least one symptom from at least three out of the four following categories:
 - Sensory
 - Hypoesthesia
 - Allodynia
 - Vasomotor
 - Skin temperature asymmetry
 - Skin color asymmetry
 - Skin color changes
 - Sudomotor/edema
 - Edema
 - Sweating changes
 - Sweating asymmetry
 - Motor/trophic
 - Decreased ROM
 - Motor dysfunction (weakness, tremor, dystonia)
 - Trophic changes (hair, nails, skin)

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DIAGNOSIS – CLINICAL

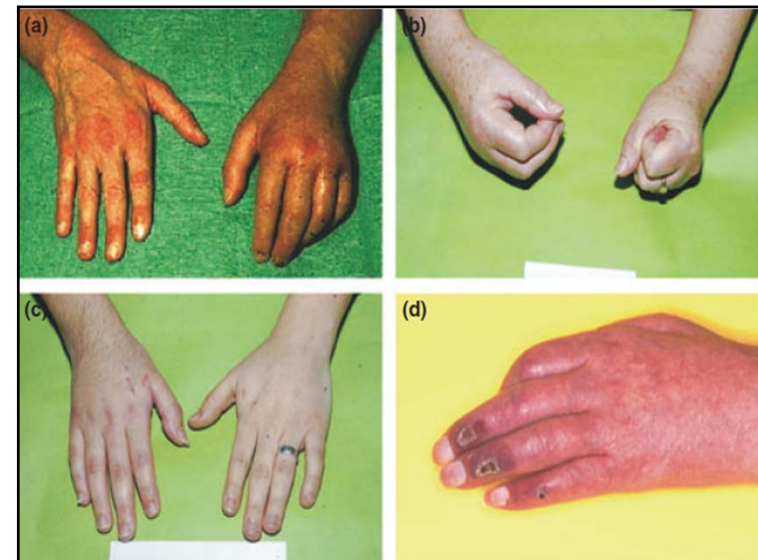
- Must display at least one sign at the time of evaluation from two or more of the four following categories:
 - Sensory
 - Evidence of hypoesthesia to pinprick
 - Evidence of allodynia to light touch/deep palpation/joint range of motion
 - Vasomotor
 - Evidence of skin temperature asymmetry
 - Evidence of skin color asymmetry
 - Evidence of skin color changes
 - Sudomotor/edema
 - Evidence of edema
 - Evidence of sweating changes
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 - Motor/trophic
 - Evidence of decreased ROM
 - Evidence of motor dysfunction (weakness, tremor, dystonia)
 - Evidence of trophic changes (hair, nails, skin)

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DIAGNOSIS – CLINICAL

- Must be present for at least 1 year prior to being ratable
- Diagnosis must be verified by at least 1 other physician
- A comprehensive differential diagnostic process must have been undertaken to clearly rule out all other processes
- No gold standard diagnostic feature of CRPS that reliably distinguishes it from presentations that are clearly not CRPS

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DIAGNOSIS – RADIOGRAPHIC

- X-rays
 - Sudeck's atrophy – patchy osteopenia, ground glass appearance
- Triple phase bone scan
 - Phases one and two – nonspecific, osteopenia
 - Third phase – enhanced uptake in peri-articular structures

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THREE PHASES

- Acute – weeks to 6 months following inciting event
 - Allodynia, hyperpathia, swelling, vasomotor changes
 - Increased bloodflow – temp and skin color changes
 - Hyperhidrosis

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THREE PHASES

- Dystrophic – 3 to 6 months
 - Persistent pain, disability, atrophic skin changes
 - Decreased bloodflow, decreased temp
 - Hypohidrosis

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THREE PHASES

- Atrophic – >6 months
 - Atrophy
 - Contractures
 - Skin is glossy, cool, dry

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RISK FACTORS

- Prolonged immobilization
- Longer than normal healing time
- Lack of weightbearing on lower extremities
- Tobacco use (can delay fracture healing)
- Nerve damage
- Avoidance behaviors

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TREATMENT – CONTROVERSIAL

- Steroids
 - Initial dose 30mg/ day for 2-12 weeks, then gradual taper
 - Best evidence
- NSAIDs
- Cation channel blockers
- Antidepressants
- Bisphosphonates/Calcitonin
- Alpha adrenergic
- NMDA receptor antagonists

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TREATMENT – CONTROVERSIAL

- **Therapy!**
- **Physical modalities**
 - TENS
 - Biofeedback
- **Topical ointments**

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TREATMENT – CONTROVERSIAL

- Stellate/Lumbar ganglion block
 - Successful stellate block
 - Ipsilateral Horner's
 - Anhidrosis
 - Conjunctival injection
 - Nasal congestion
 - Increased skin temperature
 - Vasodilation
- Spinal Cord Stimulator
 - Pain reduction up to two years
 - Effective when conventional therapies are ineffective
 - DRG Stimulation
- Intrathecal baclofen
 - Can decrease dystonia associated with CRPS

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TREATMENT – CONTROVERSIAL

- Dorsal Root Ganglion Stimulation (DRG)
 - Recent study demonstrated 82% patients achieved >50% improvement in pain on visual analogue scale at 12 months
 - Less postural variation
 - More expensive up front
 - Both SCS and DRG cost effective compared to comprehensive medical management

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TREATMENT EFFICACY

- Sandroni, et al 2003

<u>Treatment</u>	<u>% Received</u>	<u>% Effective</u>
Therapy	93	87
Prescription medication	49	80
Sympathetic block	45	79

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RECOVERY, DISABILITY, AND RETURN TO WORK

- Sandroni, et al 2003
 - 2/55 patients (3.6%) had total disability from CRPS
 - 4/55 (7.2%) had partial disability
 - 34/55 patients (62%) had no disability
 - 11/55 (20%) had disability due to sequelae from original event

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DETERMINING WORK-RELATEDNESS

- Need to have had another accepted work-related condition
- Diagnosis of CRPS that meets criteria

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DETERMINING WORK-RELATEDNESS

- Need to have had another accepted work-related condition
- Diagnosis of CRPS that meets criteria
- CRPS involves the same body part as the prior accepted, work-related condition

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SELECTED REFERENCES

- Deer, T. R., Levy, R. M., Kramer, J., Poree, L., Amirdelfan, K., Grigsby, E., ... & Scowcroft, J. (2017). Dorsal root ganglion stimulation yielded higher treatment success rate for complex regional pain syndrome and causalgia at 3 and 12 months: a randomized comparative trial. *Pain, 158*(4), 669.
- Harden, R. N., Oaklander, A. L., Burton, A. W., Perez, R. S., Richardson, K., Swan, M., ... & Bruhl, S. (2013). Complex regional pain syndrome: practical diagnostic and treatment guidelines. *Pain medicine, 14*(2), 180-229.
- Mekhail, N., Deer, T. R., Poree, L., Staats, P. S., Burton, A. W., Connolly, A. T., ... & Levy, R. M. (2020). Cost-Effectiveness of Dorsal Root Ganglion Stimulation or Spinal Cord Stimulation for Complex Regional Pain Syndrome. *Neuromodulation: Technology at the Neural Interface*.

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