

Acute on Chronic Complex Regional Pain Syndrome After Contralateral Surgery in a Patient with a Spinal Cord Stimulator

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Background

Chronic regional pain syndrome (CRPS) is a chronic pain affecting patients after injury or surgical intervention. The condition characterized by allodynia, hyperalgesia, fluctuations in skin temperature, swelling, and sudomotor/vasomotor dysregulation

- Type 1 (reflex sympathetic dystrophy) Type 2 (causalgia)

CRPS diagnosis requires:

- Continuing pain disproportionate to inciting event
- No other diagnosis explains clinical presentation

The Budapest Criteria	
	Sensory
1	Allodynia (aka pain normally not painful situations such as touch, temperature, or movement) Hyperalgesia (heightened pain intensity)
	Vasomotor
2	Differences in skin temperature (greater than 1°C) Differences in skin colouration between different sides of the body
	Sudomotor/oedema
3	Changes or asymmetry in swelling Changes or asymmetry in sweating
	Motor/trophic
4	Decreased movement Motor symptoms (weakness, tremors etc) Changes in hair/skin/nails

CRPS is peripherally and centrally mediated

- Variable presentation, sx evolve/change over time
- Ideal treatment is early, aggressive, and multimodal

Case

55y.o M w/ PMHx PTSD, b/l UE CRPS, R shoulder pain s/p rotator cuff repair (1/2023), R knee pain, tinnitus

- Initial CRPS dx 2012 after wrist fracture & surgery
- Presented to JBVA w/ aggravation of LUE CRPS pain clinic after R shoulder surgery
- s/p cervical SCS (2014, revised 2022)
- No relief from neuropathic meds, stellate ganglion blocks, topical agents
- Pt states that LUE sx improved after series of Bier blocks previously performed at OSH

Discussion

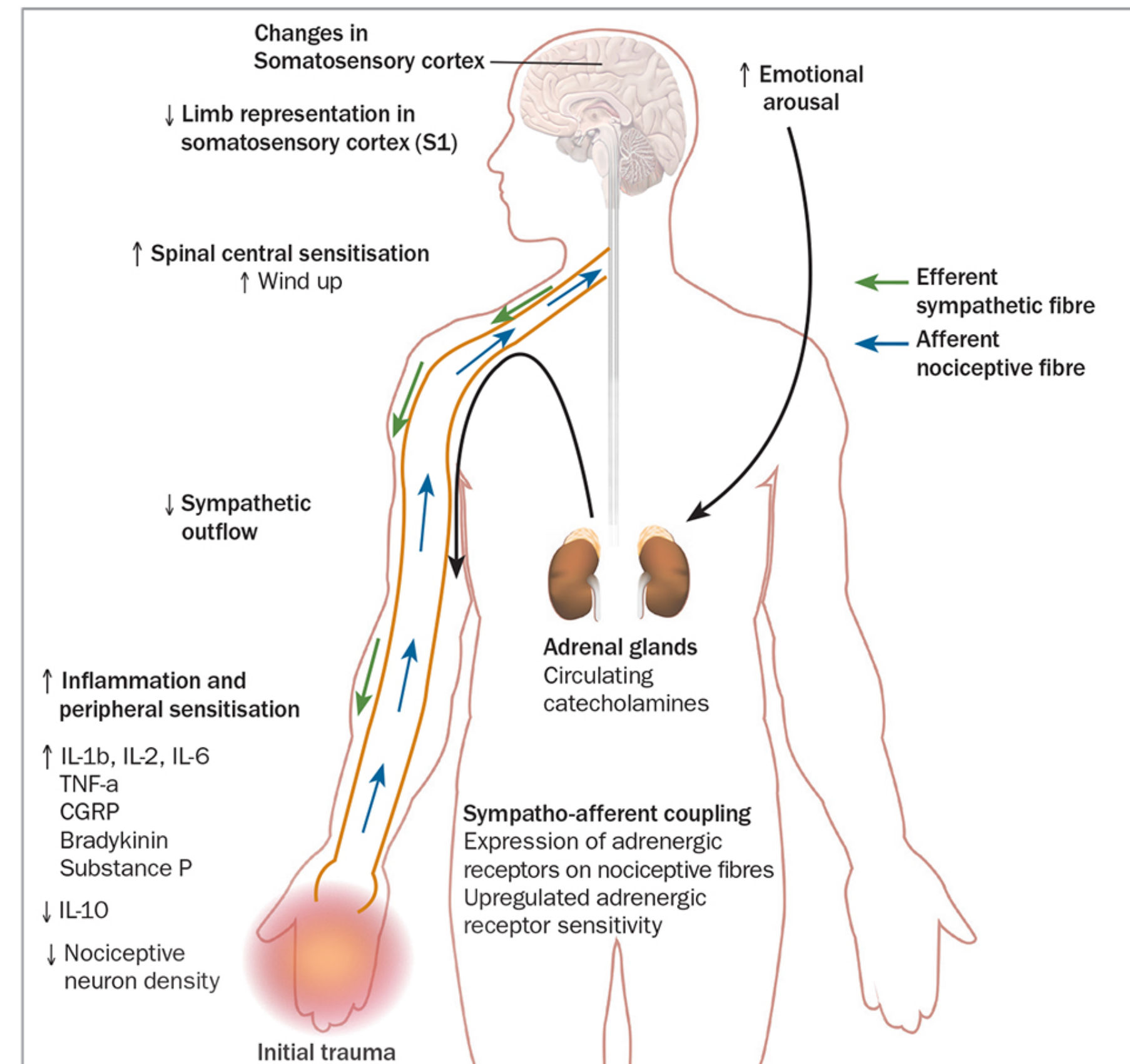
CRPS Pathophysiology:

Neurogenic inflammation and sensitization peripherally with sympathicoafferent coupling

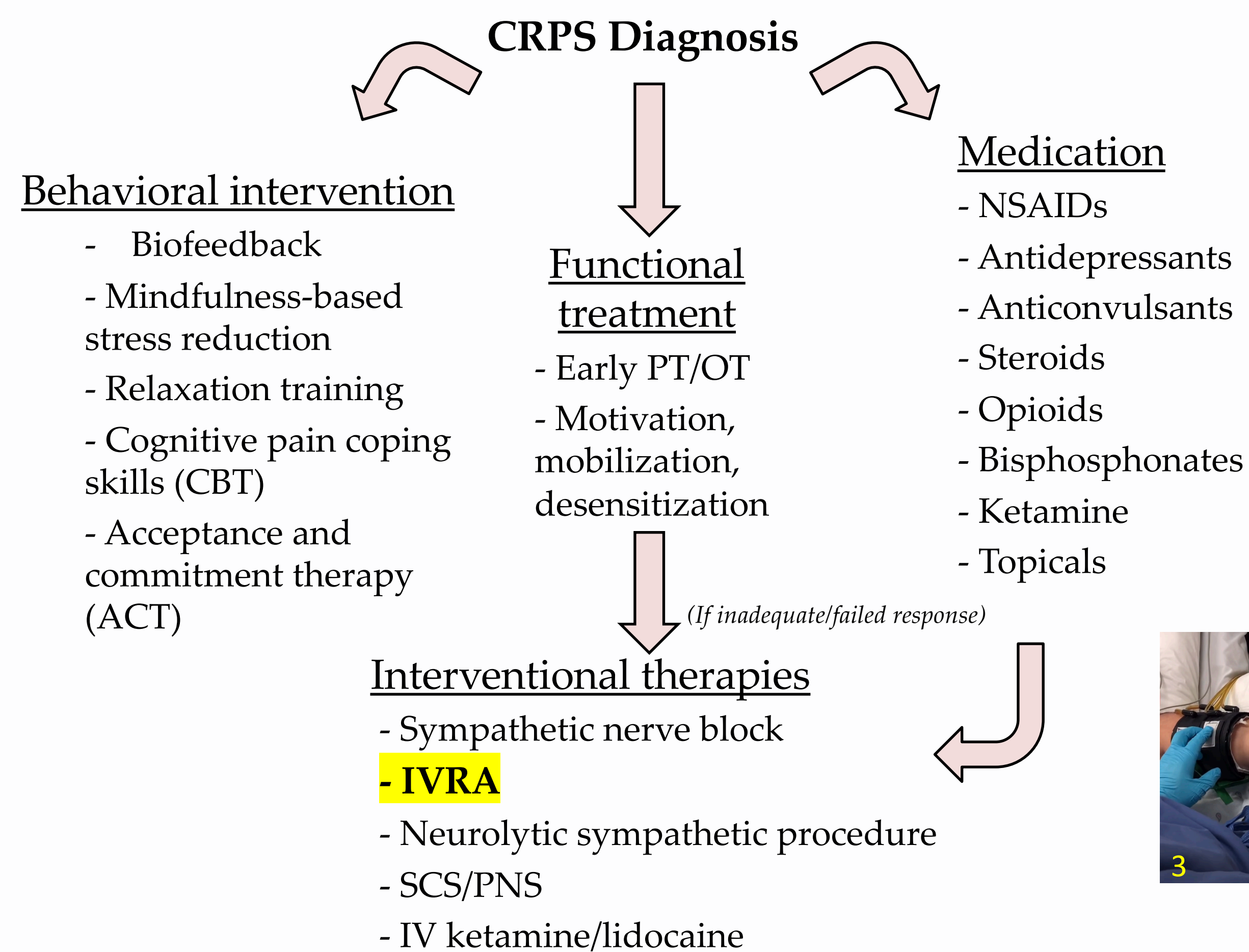
- Neurogenic inflammation: substance P signaling → vasodilation/interstitial edema
- TNF- α , IL-1 β , IL-2, IL-6 ↑ in CSF
- Pronociceptive neuropeptides → hyperalgesia/allodynia
- ↑ Sympathetic efferent → ectopic nociceptive excitation

fMRI, SPECT, and EEG mapping highlight central somatosensory, motor processing alteration in CRPS

- Possible spinal cord sensitization via activated glial cells
- fMRI shows maladaptive cortical reorganization
 - ↑ activation primary/supplementary motor cortices, ↓ activation of primary somatosensory cortex
 - Bilateral motor/somatosensory cortex disinhibition
- Disturbed body representation
 - Difficulty recognizing laterality, discriminating tactile stimuli



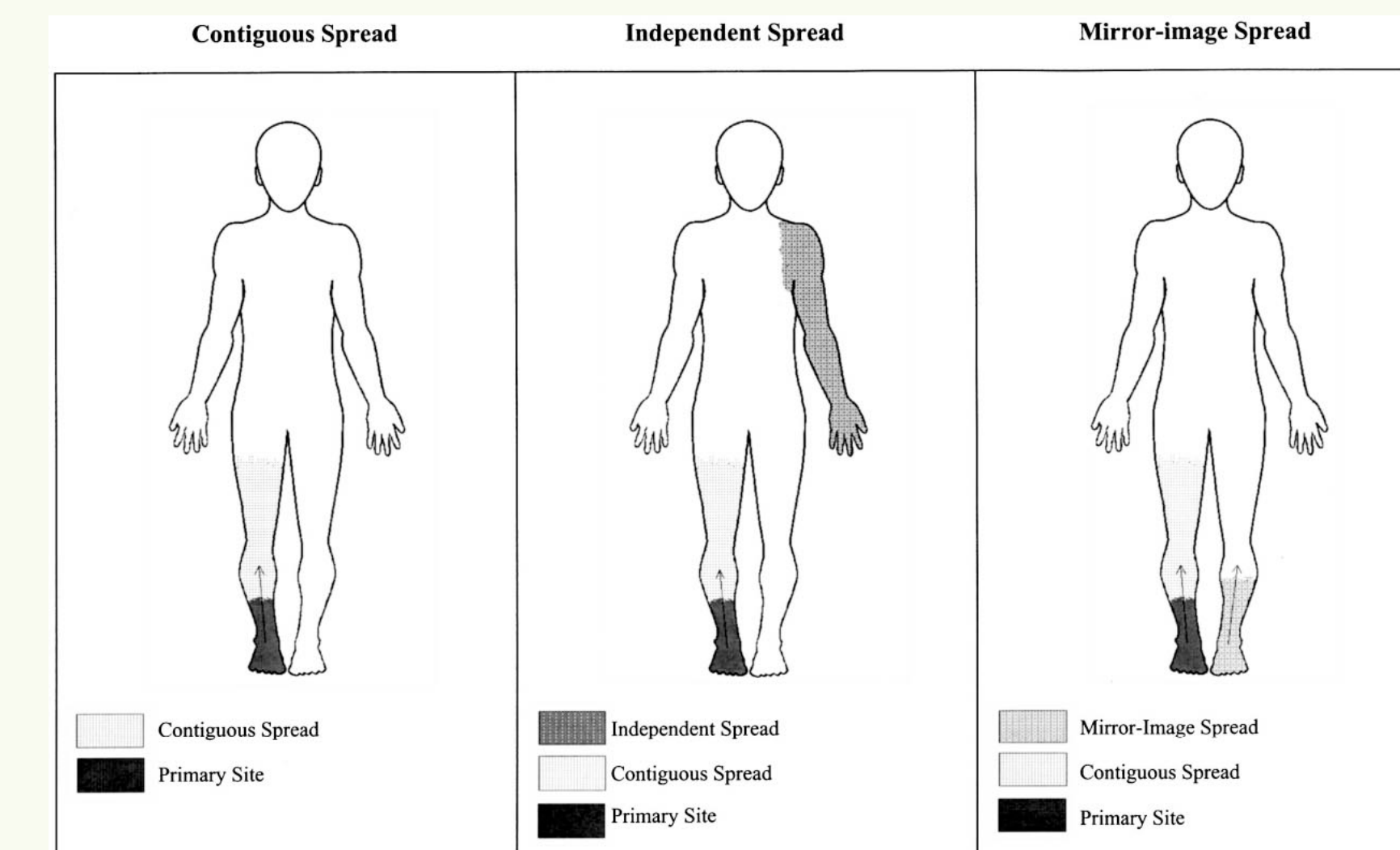
CRPS Management:



Conclusion

Central dysregulation can offer an explanation for CRPS symptom spread

- Centrally mediated interneuron crosstalk via spinal cord, brainstem, & contralateral dorsal horn
- Most CRPS pts have symptoms outside of original injury



- This case highlights the complexity of treating CRPS; both ongoing spinal and central dysregulation may decrease treatment efficacy due to continual spread

Case Conclusion

The patient continues to undergo 3x LUE Bier blocks q2 weeks that offer limited relief

- Pt's previous weekly blocks were more beneficial
- Pt amenable to Pain School & PT for R shoulder
- Possible connectivity/charging issue with SCS per Boston Scientific rep

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