DISTINCT SPINAL AND SUPRASPINAL PAIN MODULATION IN HUMAN SPINAL CORD INJURY

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INTRODUCTION / AIM
Accompanying spontaneous and evoked neuropathic pain (NP) symptoms in dermatomes at and below the level of spinal cord injury (SCI), impaired sensation has been variably reported in otherwise intact dermatomes above the level of injury. The present study aimed to extend these observations, examining endogenous pain modulation above the level of injury in individuals with and without neuropathic pain.

METHODS
In a crossover-designed study, 34 individuals with SCI (19 with NP) and 15 healthy control individuals underwent two experimental sessions. Topical capsaicin (0.075%) was applied for 30 minutes on the left hand in the C6 dermatome followed by 10 minutes of either homotopic (left C6, ipsilateral) or heterotopic (right C6, contralateral) transcutaneous electrical nerve stimulation (TENS). Thermal and electrical detection and pain thresholds, rating of perception to capsaicin, and contact heat pulses and electrical stimuli were assessed before, after 30 minutes of capsaicin application (pre-TENS) and post-TENS.

RESULTS
In individuals with SCI and NP, behavioral responses to capsaicin and contact heat were significantly lower compared to pain-free individuals (i.e., SCI and healthy controls). Individuals with SCI and NP also demonstrated reduced habituation to contact heat stimulation, and were unable to modulate perception to capsaicin and contact heat stimulation in response to heterotopic TENS. The extent of modulation achieved through heterotopic TENS correlated with the intensity of ongoing NP symptoms.

DISCUSSIONS / CONCLUSIONS
The presence of NP after SCI was associated with effective spinal pain modulation (i.e., homotopic TENS) to noxious stimuli above the level of injury, while supraspinal pain modulation was reduced.

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