Self-Reported Pain Sensitivity and Quantitative Sensory Testing in Trauma Survivors

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Introduction

Many trauma survivors report physical pain symptoms following trauma exposure, and a large proportion later develop a variety of chronic pain conditions. Unfortunately, the current understanding of this relationship is limited. Quantitative Sensory Testing (QST) involves applying standardized experimental stimuli to activate Aδ and C fibers within pain pathways to allow more objective determination of sensory processing. Previous QST research suggests central nervous system pain amplification is present in trauma survivors, however these studies implement various QST measures and have limited sample sizes. Electric pain threshold, heat pain tolerance, and electric pain tolerance are three commonly used QST measures that assess pain perception. Perceived (self-reported) pain sensitivity, or how painful a person imagines everyday situations to be, is correlated with QST measures of pain perception. However, the impact of trauma exposure on this relationship has not been assessed. It is possible that persons who experience multiple traumas may view themselves as more sensitive to painful events and exhibit pain amplification. The presented results are preliminary findings, as data collection is still ongoing.

Objective

To investigate if trauma exposure is related to perceived pain sensitivity and QST measured pain sensitivity.

Participants

Healthy, pain-free men and women N=28
Characteristics: Females = 51.4%, Average Age = 24.6 yrs (SD = 10.44), White/Caucasian non-Hispanic = 71.4%, Single = 87.1%, Partial College = 45.2%, and Employed Part Time = 32.3%

Exclusion criteria:
- < 18 years of age
- BMI > 35
- Current acute illness or chronic pain condition
- Cardiovascular, neurological, and/or circulatory problems
- Recent use of analgesic, antidepressant, anxiolytic, antihypertensive medications

Procedure

Overview, Informed Consent & Eligibility Determination (Health Status Screening)
- Part of a larger study investigating the relationship between risky behaviors, trauma, and pain risk
- Health screen conducted to assess for exclusion criteria

Stimulating Electrode Applied
- Placed over the sural nerve of the left ankle

Heat Thermode Probe Applied
- Placed on the volar surface of the left forearm

Heat Tolerance Paradigm
- 5 trials with a 2 minute break and probe moved in between trials

Electric Pain Threshold and Electric Pain Tolerance Paradigm
- Electrical stimulations delivered in varying intensities (up to 50mA)

Pain Sensitivity Questionnaire Administered
- Self-report measure that assesses how painful a person imagines everyday situations to be
  - Example: “imagined you burn your tongue on a very hot drink”

Life Events Checklist Administered
- Self-report measure that indicates the number of traumatic events an individual has experienced in their lifetime

Methods: Life Events Checklist and Trauma

Trauma Demographics: Participants completed the Life Events Checklist (LEC) for the DSM-5
- Self-report measure assessing the number of traumatic events a participant endorsed
- 16 items are summed based on the following types of direct exposure (i.e., endorsed the event “happened to me”)
  - Painful situations occurring in daily life
  - Scores across all 17 items were averaged to compute a mean PSQ score

Methods: Pain Sensitivity Questionnaire

Pain Sensitivity: Participants completed the Pain Sensitivity Questionnaire (PSQ) via a computer during a break in between experimental procedures
- Participants instructed to imagine themselves in certain painful and non-painful situations and decide their perceived pain ratings using a Likert scale ranging from 0 (not at all painful) to 10 (most severe pain imaginable)
- Self-report measure assessing the pain intensity ratings of painful situations occurring in daily life

Methods: Electric Pain Tolerance

Electric Threshold Paradigm
- Electric stimulations delivered in alternating pattern of ascending stimulations and random stimulations
  - Electric threshold is defined as the lowest stimulus intensity to elicit a pain rating ≥ 30

Electric Tolerance Paradigm
- Electric stimulations delivered in alternating pattern of ascending stimulations and random stimulations
  - Electric tolerance is defined as the lowest stimulus intensity to elicit a pain rating of 100

Methods: Heat Pain Tolerance

Heat Tolerance Paradigm
- Thermode begins at 32°C and increases at 0.5°C/s until maximum tolerance achieved
- 5 trials with a 2 minute break and probe moved in between trials

Data Analysis

Univariate outliers identified according to Wilcox’s MAD-Median procedure and replaced with the nearest neighbor value
Pearson’s correlations were conducted between the number of traumatic events experienced and perceived pain sensitivity, electric threshold, electric tolerance, and heat tolerance

Results

Pain Sensitivity and Trauma Exposure

Results show trauma exposure is positively related to pain sensitivity (r = .46, p = .01)

Electric Threshold and Trauma Exposure

Results show trauma exposure is not related to electric pain threshold (r = .06, p = .77)

Electric Tolerance and Trauma Exposure

Results show trauma exposure is not related to electric pain tolerance (r = .18, p = .34)

Heat Tolerance and Trauma Exposure

Results show trauma exposure is not related to heat tolerance (r = .16, p = .41)

Conclusions

- These preliminary results suggest that persons who experience multiple traumas may report greater pain sensitivity, however their QST-measured pain sensitivity may not mirror this report
- This may have implications for treatment of pain in trauma survivors
- Data collection is ongoing, therefore these analyses may be under-powered to detect relationships between QST measures