

# Pain modulatory phenotypes differentiate chronic pancreatitis patients with distinct clinical pain profiles

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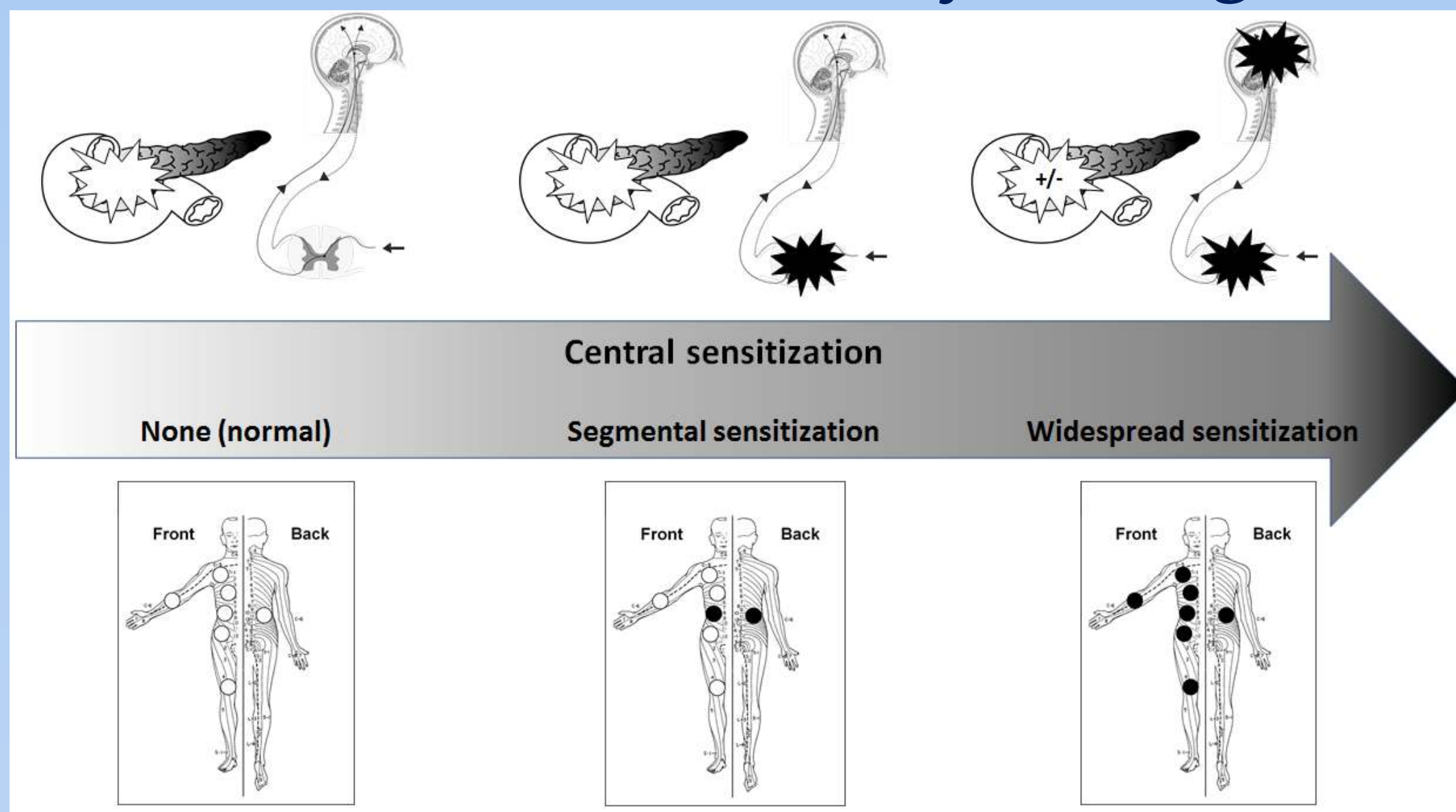
## INTRODUCTION

- Pain affects > 80% of patients with chronic pancreatitis (CP).<sup>1</sup>
- Effective therapy remains a considerable challenge.<sup>2</sup>
- Mechanism is poorly understood.
- Methods based on quantitative sensory testing (QST) provide information on pain modulation and have demonstrated promise in predicting future pain status and the efficacy of analgesics.<sup>3</sup>

## AIMS

- Explore the existence of CP subgroups with different pain modulatory phenotypes using Pancreatic Quantitative Sensory Testing (P-QST)
- Investigate associations with patients' clinical pain and psychological profiles.

## Pancreatic Quantitative Sensory Testing (P-QST)

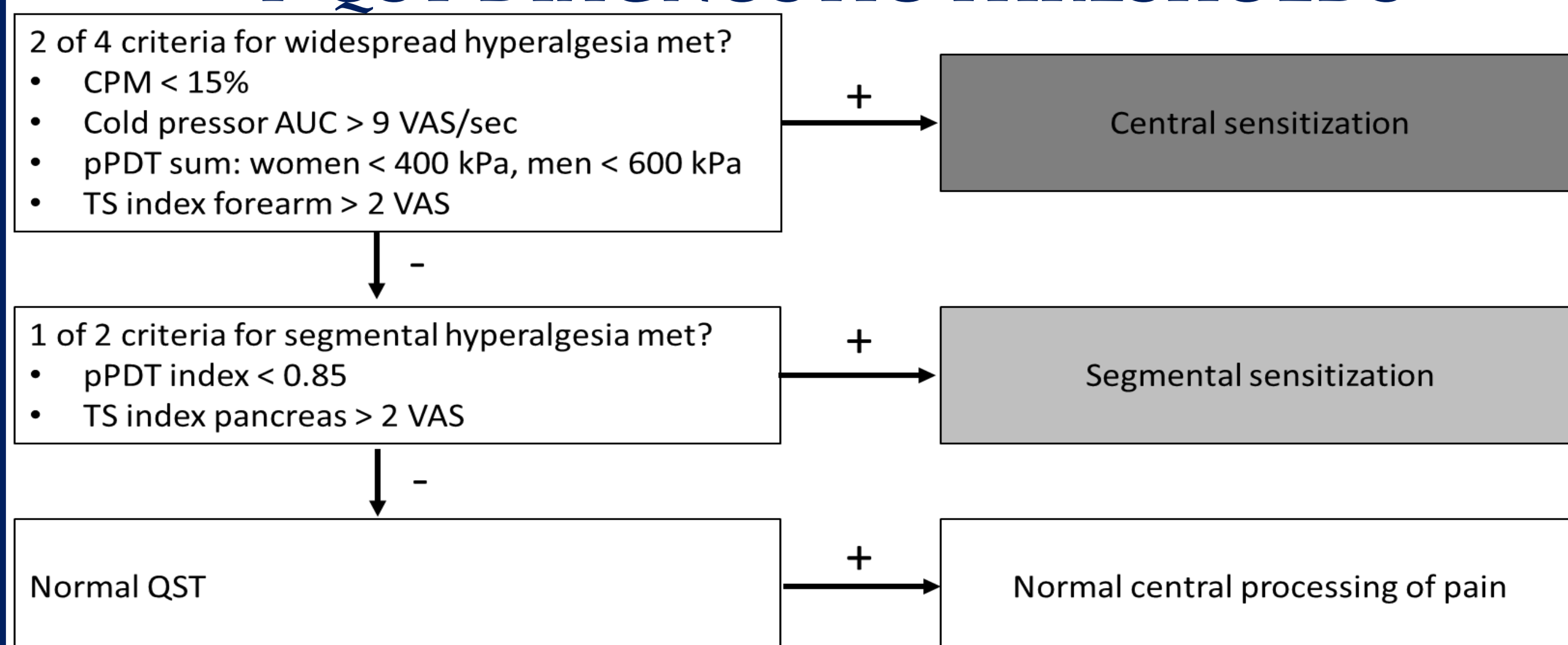


## METHODS

- Cross-sectional, multicentre study
  - Aalborg University Medical Center
  - Johns Hopkins University Medical Center
  - University of Pittsburgh Medical Center
- CP patients
  - Cambridge III or IV, or with pancreatic calcifications
- Patients completed questionnaires:
  - modified Brief Pain Inventory short form (BPI)
  - Hospital Anxiety and Depression Score (HADS)
  - Conditional and situational Pain Catastrophizing
  - European Organization for the Research and Treatment of Cancer Quality of Life Questionnaire form C-30 (EORTC-QLQ C-30)
- P-QST performed with pinprick simulator, pressure algometer and cold pressor test
- Pain detection thresholds (pPDTs): Kilopascal level at which patients first felt pain in response to increasing muscle pressure stimulation
- Pain tolerance thresholds (pPTT): Kilopascal level at which patients reached maximal tolerance to muscle pressure stimulation
- Temporal summation (TS): increase in discomfort following repeated same-site fine sensory stimulation measured on scale from 1-10
- Conditioned Pain Modulation (CPM) was assessed by measuring maximal pressure tolerance before and after a 2 minute cold water hand immersion test
- Ratios and sum scores were calculated to accommodate interindividual differences in absolute thresholds and create clinically useful scoring system

Segmental Sensitization	Central Sensitization
pPDT Index	pPDT Sum
TS Index (Abdomen)	TS Index (Forearm)
	AUC Cold Pressor Test
	CPM Index

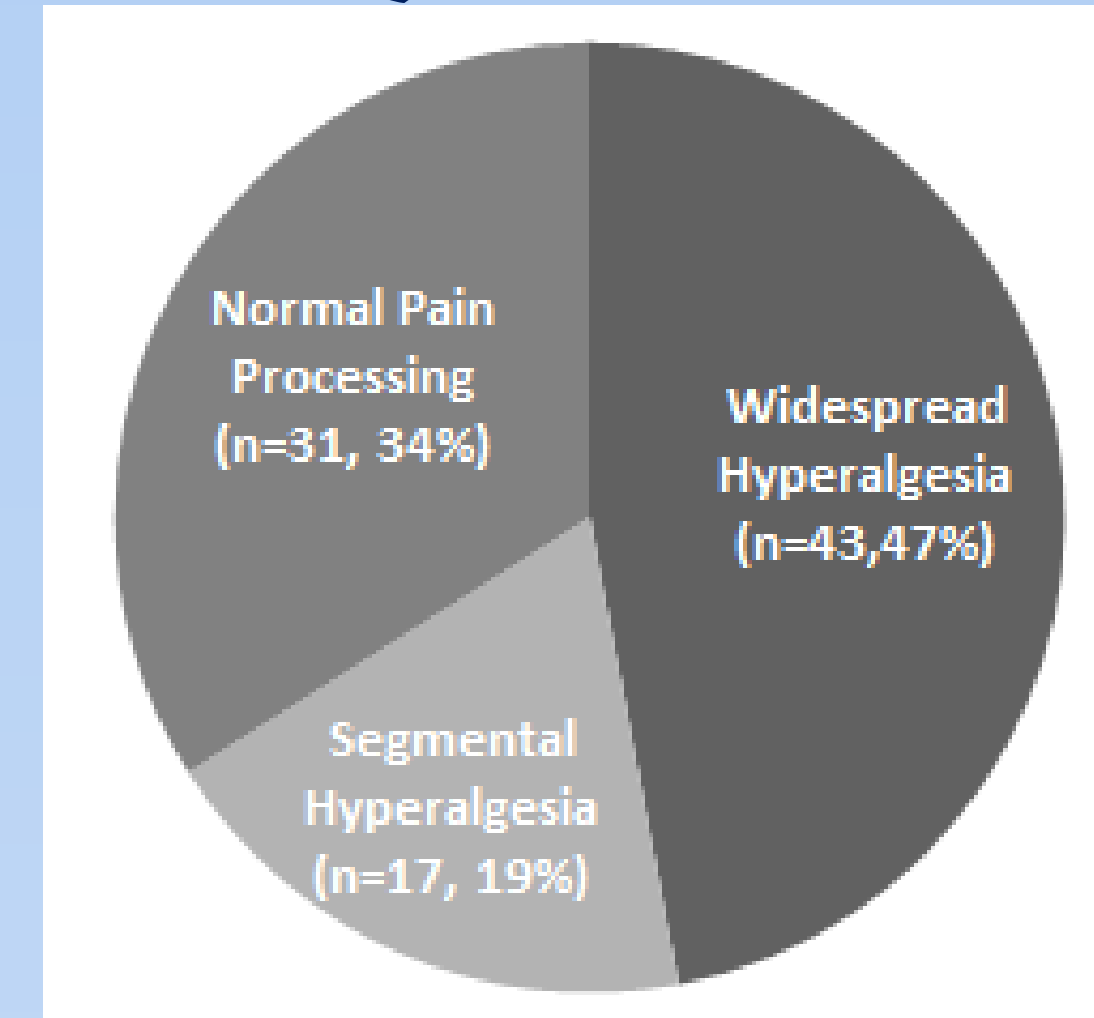
## P-QST DIAGNOSTIC THRESHOLDS



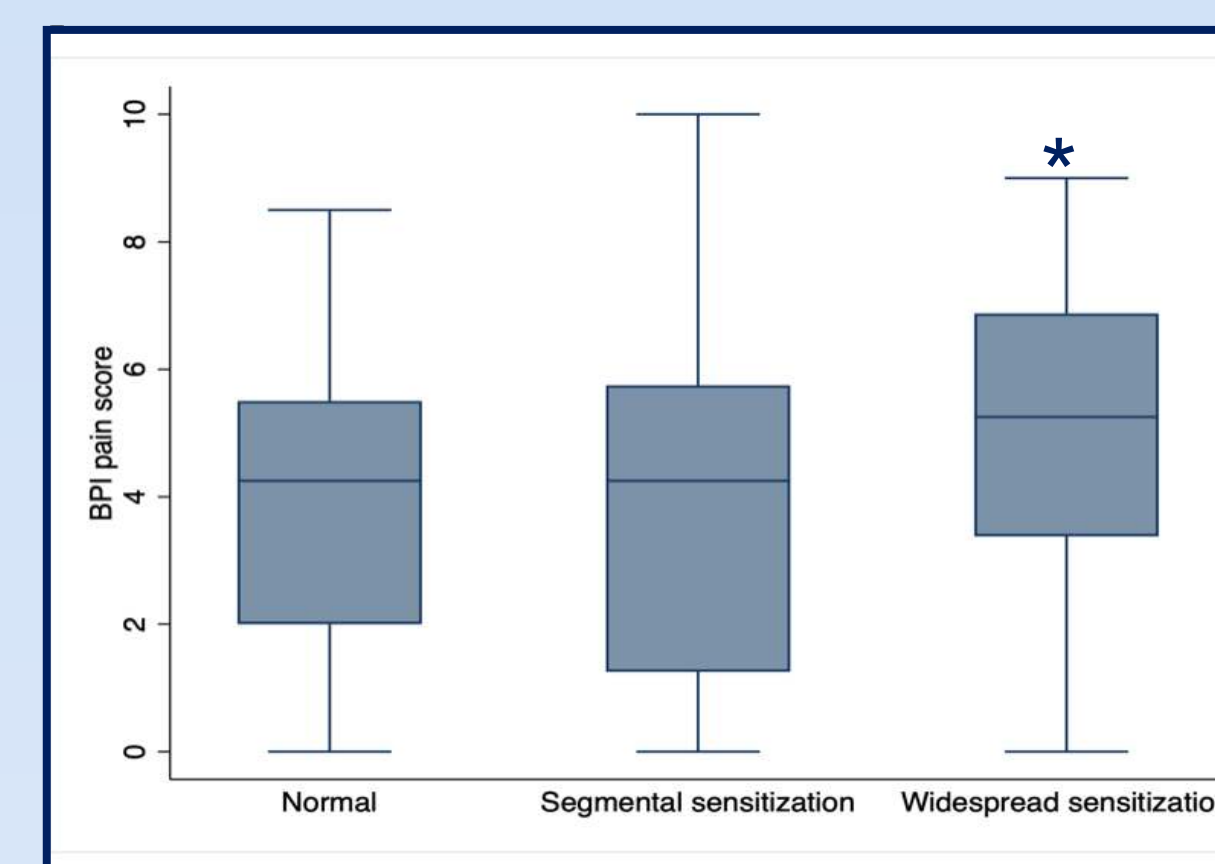
## RESULTS

	N=91
Gender, Male (n,%)	56 (62)
Age (mean years ± SD)	53.1±12.7
Race (n, %)	
White	83 (91)
Black	5 (5)
Others	3 (3)
Etiology (n, %)	
Alcohol/smoking	59 (65)
Idiopathic	21 (23)
Other (Meds, Genetic, etc)	9 (10)
Undetermined	2 (2)
History of recurrent acute pancreatitis	66 (73)
BMI (n, %)	
Low	10 (11)
Normal	45 (49)
Overweight or obese	36 (40)
Exocrine pancreatic insufficiency (n, %)	54 (59)
Diabetes (n, %)	31 (34)

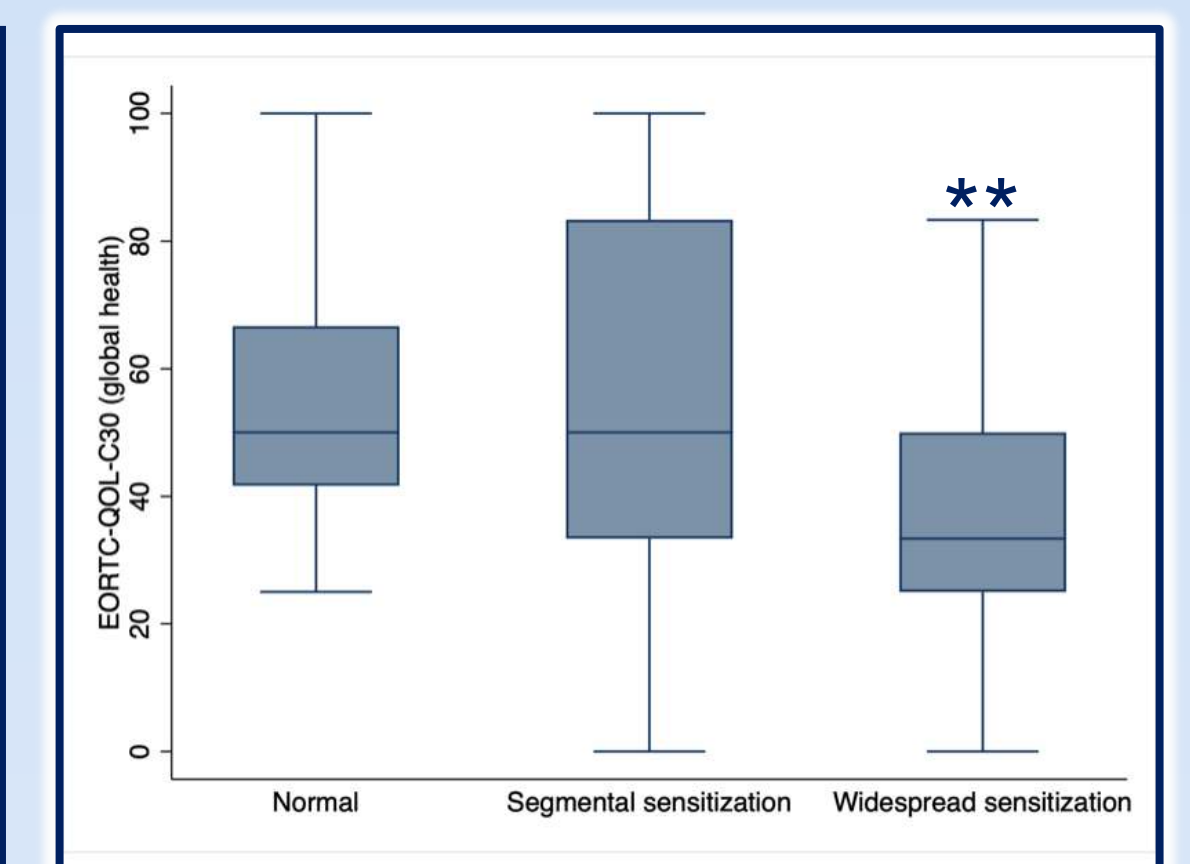
## DISTRIBUTION OF QST PHENOTYPES



QST phenotype	All patients (n=91)	Normal (n=31)	Segmental sensitization (n=17)	Widespread sensitization (n=43)
<b>Clinical pain variables</b>				
BPI pain score	4.5 (2.3-6.3)	4.3 (2.0-5.5)	4.3 (1.3-5.8)	5.3 (3.4-6.9) *
BPI interference score	4.1 (1.3-6.3)	4.0 (0.6-6.0)	2.1 (0-6.1)	4.9 (2.9-6.6)
EORTC-QOL C30 (global health)	50.0 (33.3-66.6)	50.0 (41.7-66.7)	50.0 (33.3-83.3)	33.3 (25.0-50.0) **
<b>Pain catastrophizing</b>				
Conditional	26.0 (15.0-33.0)	22.0 (17.0-32.0)	24.0 (11.0-33.0)	28.0 (17.0-37.0)
Situational	22.0 (11.0-33.0)	21.0 (10.0-31.5)	18.0 (7.0-37.0)	24.0 (14.0-33.5)
<b>HADS</b>				
Depression score	7.0 (4.0-10.0)	7.0 (2.0-10.0)	5.0 (2.0-9.0)	8.0 (6.0-10.0)
Anxiety score	8.0 (5.0-12.0)	7.0 (5.0-10.0)	7.0 (4.0-10.0)	9.0 (6.0-12.0)



BPI score stratified by phenotype (\*p<0.01)



QOL score stratified by phenotype (\*\*p<0.05)

## CONCLUSIONS

- Chronic pancreatitis patients with widespread sensitization have significantly higher levels of pain and lower QOL
- QST characterizes the sensory profiles independently of psychological status and thus provides an unbiased proxy of pain processing
- Future directions: Determine whether pre-procedural QST pain phenotypes predict outcomes after intervention in painful chronic pancreatitis.