Does Pain In Retired Professional Athletes With A History Of Repetitive Head Impacts Contribute To Cognitive And Neurobehavioural Changes That May Account For Symptoms Attributed To TES?

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Background

Traumatic Encephalopathy Syndrome is a set of criteria proposed to diagnose Chronic Traumatic Encephalopathy (CTE) during life. Diagnostic Criteria for Traumatic Encephalopathy Syndrome (TES) include:

- ✓ Neurobehavioural symptoms
- ✓ Cognitive change

Pain is common in this population but its independent contribution to these symptoms has not been systematically investigated.

Objectives

To investigate whether pain in retired professional athletes with a history of repetitive head impacts contributes independently to cognitive and neurobehavioural outcomes.

Methods

Retired professional contact sport athletes at risk for repetitive head impacts (RHI)
Seen through a brain health monitoring program at the Canadian Concussion Centre
Demographic information included: age, age of exposure to contact sports (AOE), total years played professionally post-secondary school (TYP) and number of concussions (NC)

Outcome measures:

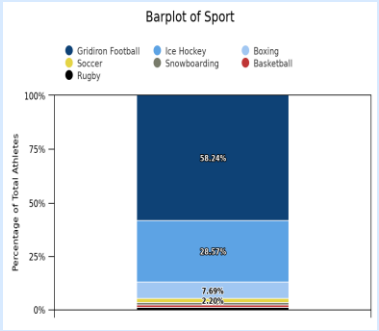
- ✓ painDETECT Questionnaire (average of first 3 questions Pain Score)
- ✓ Personality Assessment Inventory (PAI) Questionnaire (Depression, Anxiety, Paranoia and Aggression T-Scores)
- ✓ Neuropsychological battery (verbal memory, visual memory, processing speed, executive function, working memory, fine motor speed & attention)

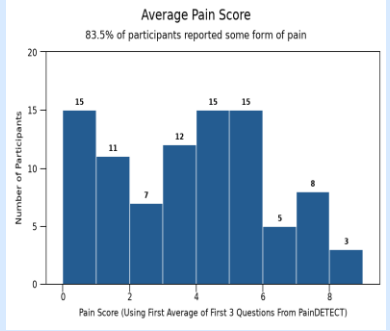
MANCOVA was used to assess the multivariate effect of pain, age, NC, AOE and TYP to neurobehavioural outcomes and cognitive outcomes.

Those variables that met significance ($p = <0.05$) proceeded to individual linear regression.

Results

Risk Factors	Mean	Min	Max
Age	53.49	24	84
Average Pain Score	3.94	0.00	8.33
Number of Concussions	7.35	0	45
Age of Exposure	10.41	3	20
Total Years Played	11.51	1	25



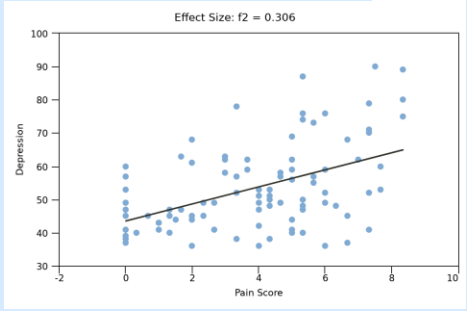


MANCOVA comparing Pain, Age, NC, AOE & TYP on Neurobehavioural Outcomes & Cognitive Performance

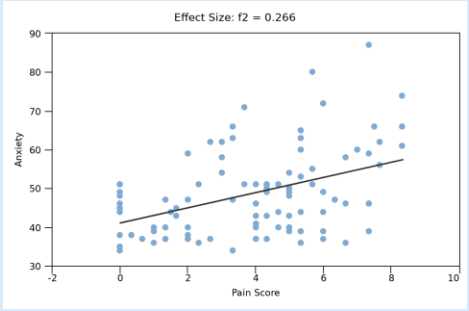
Neurobehavioural Symptoms		
Predictor	Pillai's Trace	p
Pain Score	0.236	<.001
Age	0.084	.122
NC	0.010	.938
AOE	0.063	.249
TYP	0.101	.066
Cognitive Performance		
Pain Score	0.061	.520
Age	0.152	.035
NC	0.133	.070
AOE	0.016	.970
TYP	0.059	.543

Only pain compared to neurobehavioural symptoms progressed to linear regression as age was considered a covariate

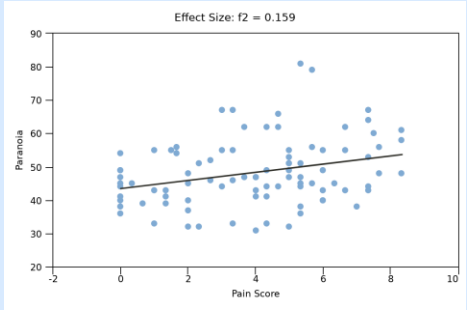
Pain vs Depression



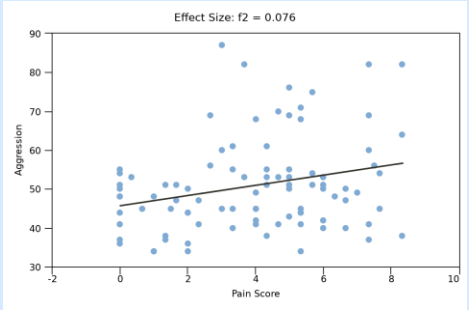
Pain vs Anxiety



Pain vs Paranoia



Pain vs Aggression



Conclusions

- Pain in retired athletes with RHI is significantly associated with depression, anxiety, paranoia, and aggression.
- The effect size of pain on depression was medium to large, anxiety and paranoia were medium and aggression was low.
- Based on PAI Meaningful Detectable Change thresholds, a 6.1-point reduction in pain corresponded to a clinically meaningful change in anxiety, while a 5.5-point reduction corresponded to a clinically meaningful improvement in depression.
- Pain did not impact cognitive performance.
- Given that neurobehavioural symptoms are core to TES diagnostic criteria, pain may be a confounder and should be considered.
- Pain assessment should be routine in this population — it is a modifiable and under-recognised treatment target.