



Centre for the Study of Pain





**Division of** Neurosurgery University of Toronto

<sup>1</sup>Division of Brain, Imaging & Behaviour, Krembil Research Institute, University Health Network, <sup>2</sup>Institute of Medical Science, Temerty Faculty of Medicine, University of Toronto, <sup>3</sup>Division of Neurosurgery, University of Toronto

### INTRODUCTION

**Trigeminal neuralgia (TN)** is a chronic facial pain condition<sup>1</sup> with grey matter abnormalities in the hippocampus (HPC). Microvascular decompression (MVD) surgery effectively relieves pain from TN and serves as a valuable platform to study how the brain recovers from chronic pain. Previously, we have observed that reduced HPC volume normalized following pain-relieving surgery<sup>2</sup>. However, the effects of age and sex on HPC normalization remain unclear.

### **OBJECTIVES**

To investigate the role of age and sex on the HPC in 50 patients who have undergone MVD for TN and 50 age- and sex-matched healthy controls.

### METHODS

#### Criteria: CTN diagnosis (ICHD) Surgically naïve MVD X Neuropsychiatric diagnoses (n = 50) Pre-Sx Age: 51.0 ± 1.8 years Range: 27 – 74 years Acquisitions 3 T GE Signa HDx MRI 8-channel coil • TE = 5 ms • TR = 12 ms • TI = 300 ms 256 x 256 matrix Voxels: 0.3 x 0.3 x 1 mm 5 T1-Weighted Images **Hippocampal Segmentation** n = 41 (13 M | 28 F) 1. Run "recon-all", then "segmentHA\_T1.sh" Age: 54.2 ± 3.2 | 49.36 ± 2.3 years 2. Run "quantifyHAsubregions.sh hippoSf" • Range: 36 – 71 27 – 70 years 3. Normalize volumes with subcortical GM volume Abbreviations: CTN, classical trigeminal neuralgia; ICHD, International Classification of Headache Disorders; Sx, surgery; MVD, microvascular decompression; Cam-CAN, Cambridge Centre for Ageing and Neuroscience; MRI, magnetic resonance imaging; ms, milliseconds; TE, time to echo; TR, repetition time; TI, inversion time; mm, millimetres; GM, grey matter; FDR, false discovery rate

Fig 1. Data analysis process<sup>3</sup>. Age is reported as mean ± standard error of the mean. Results analyzed in R and validated in Python.

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# Age and Sex Dependence of Hippocampal Normalization **Following Microvascular Decompression for Trigeminal Neuralgia**

Jerry Li<sup>1,2</sup>, Kaylee Sohng<sup>1</sup>, Timur Latypov<sup>1-3</sup>, Alborz Noorani<sup>1-3</sup>, Patcharaporn Srisaikaew<sup>1</sup>, Peter SP Hung<sup>1,2</sup>, Daniel Jorgens<sup>1</sup>, Mojgan Hodaie<sup>1-3</sup>





females approached age 50; no effects observed in males of all ages. \*q < 0.05; \*\*q < 0.01.

 An inflection point was found in females at the age of 50, after which HPC normalization was no longer observed, despite successful MVD; laterality effect present, likely in dominant hemisphere

CONCLUSIONS Regional HPC volume may assist in predicting surgical outcomes in TN patients. Normalization was seen in females 50 years of age and younger, with a gradient of normalization, and a bias for the contralateral hemisphere in right-sided female TN patients. As women experience greater delays before receiving TN treatment<sup>4</sup>, there is a pressing need to expedite their clinical timelines.



108	q-values									q-va	lues
	Left Hemisphere			<b>Right Hemisphere</b>				Left Hemisphere			
	CTRL vs. PRE	PRE vs. POST	CTRL vs. POST	CTRL vs. PRE	PRE vs. POST	CTRL vs. POST	<b>Hippocampal ROI</b>	CTRL vs. PRE	PRE vs. POST	CTRL vs. POST	CTRL vs.
	0.004	0.101	0.044	0.017	0.120	0.149	Subiculum	< 0.001	0.334	0.020	0.005
	0.025	0.052	0.175	0.172	0.202	0.219	CA1	0.008	0.100	0.103	0.107
	0.017	0.025	0.278	0.026	0.197	0.182	CA3	0.008	0.038	0.242	0.015
	0.024	0.011	0.182	0.052	0.197	0.268	CA4	0.008	0.038	0.136	0.028
	0.025	0.018	0.182	0.056	0.166	0.219	Dentate Gyrus	0.008	0.039	0.136	0.028
r	0.017	0.025	0.149	0.080	0.128	0.182	Molecular Layer	0.005	0.061	0.075	0.041
ad	0.025	0.020	0.175	0.116	0.033	0.182	Hippocampal Head	0.008	0.076	0.103	0.068
dy	0.017	0.037	0.149	0.030	0.308	0.182	Hippocampal Body	0.005	0.122	0.075	0.015
ail	0.286	0.136	0.979	0.052	0.873	0.163	Hippocampal Tail	0.196	0.030	0.938	0.025
pus	0.025	0.020	0.175	0.063	0.136	0.182	Whole Hippocampus	0.008	0.038	0.107	0.032
e discovery rate-adjusted p-values							* <i>a</i> -values are false discovery rate-adjusted <i>p</i> -values.				

#### REFERENCES

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**CONTACT: jerbear.li@mail.utoronto.ca** or jerry.li3@uhn.ca