



Hypersomnia and pain after mild TBI

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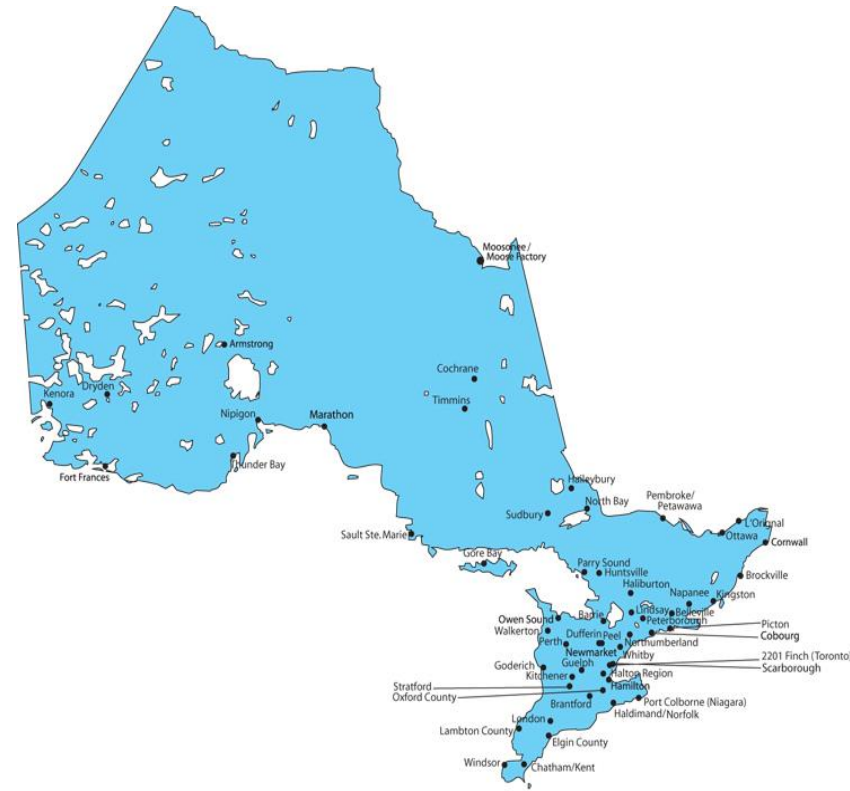
Brain Injury Canada Annual Conference - 2016

Mild TBI in Ontario

About 15,000 individuals sustain a mTBI annually

Sleep complaints found in 30-70% of mTBI

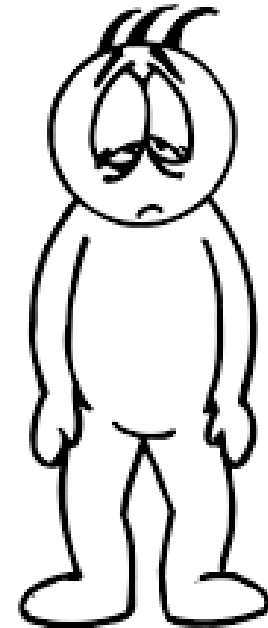
But, their causes remain elusive...



Brief overview

Sleep disturbances after TBI

1. Insomnia
2. Circadian rhythm disturbances
3. Increased sleep need



Post-traumatic hypersomnia

Excessive sleepiness that occurs within 18 months of a traumatic event

Encyclopedia of Sleep and Sleep Disorders (2009)

1-2 hours increase in sleep need per day compared to pre-TBI condition

Baumann and colleagues (2007)

Estimated to affect 20-30% of TBI individuals

Imbach colleagues (2015)

Etiology and co-occurring disorders

Depression (9%)

Restless legs syndrome (6%)

Narcolepsy (3%)

Obstructive sleep apnea (2%)

In 75% of patients, no cause other than TBI could be identified

Baumann and colleagues (2007)

Potential causes

Limitations of previous studies

Total sleep time based on subjective reports

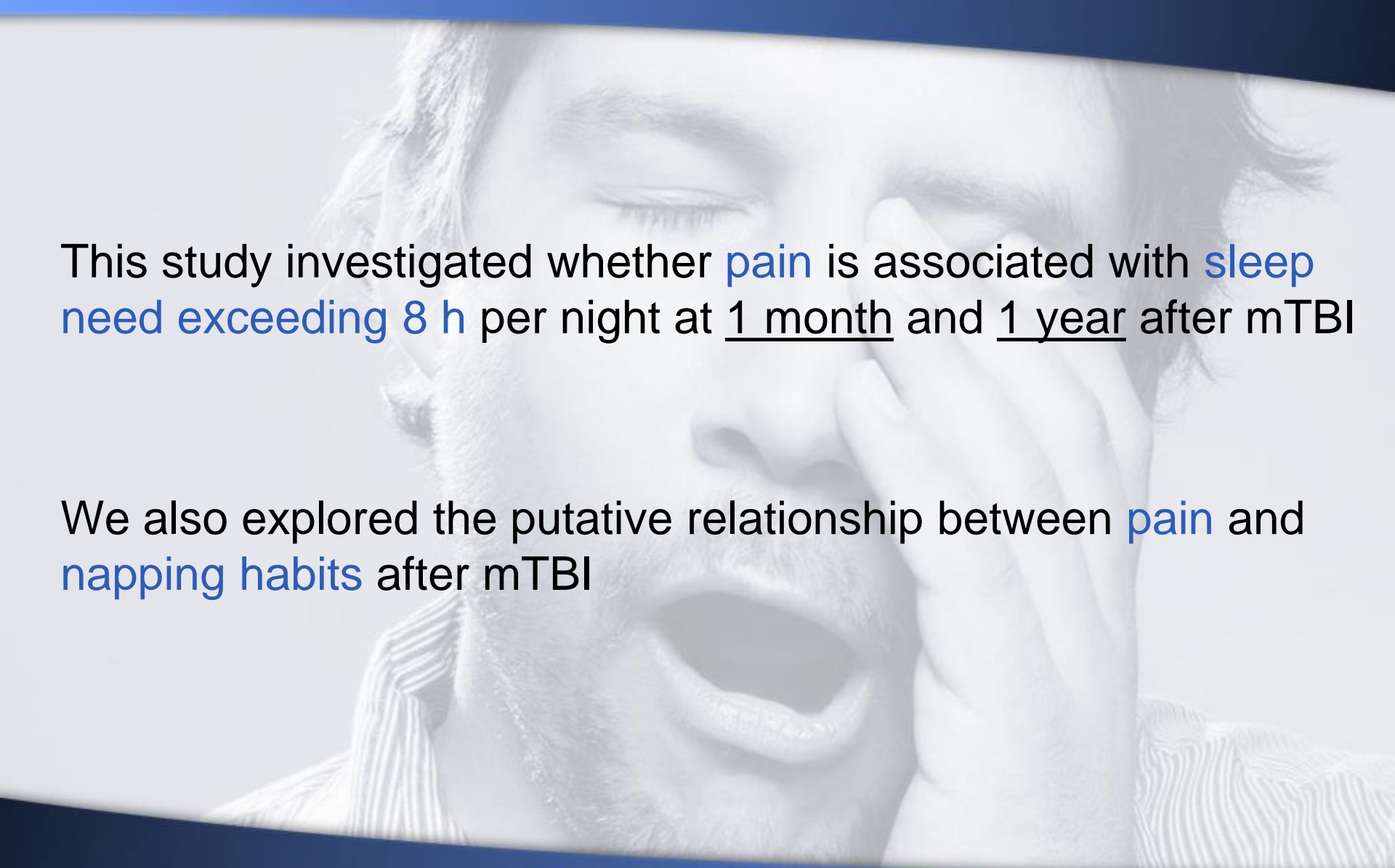
The sleep we get does not always represent the sleep we need

Additional risk factors remain to be identified

Pain is highly prevalent after mTBI

Pain could induce a hypervigilance state during sleep

Khoury and colleagues (2013)



This study investigated whether **pain** is associated with **sleep need exceeding 8 h** per night at 1 month and 1 year after mTBI

We also explored the putative relationship between **pain** and **napping habits** after mTBI

Study aim

Setting: Sacred Heart Hospital of Montreal

mTBI participants (n=56)

1 month: 68% male

38±12 years

84% employed

1 year: 58% male

44±11 years

96% employed

Healthy controls (n=20)

50% male

37±12 years

80% employed



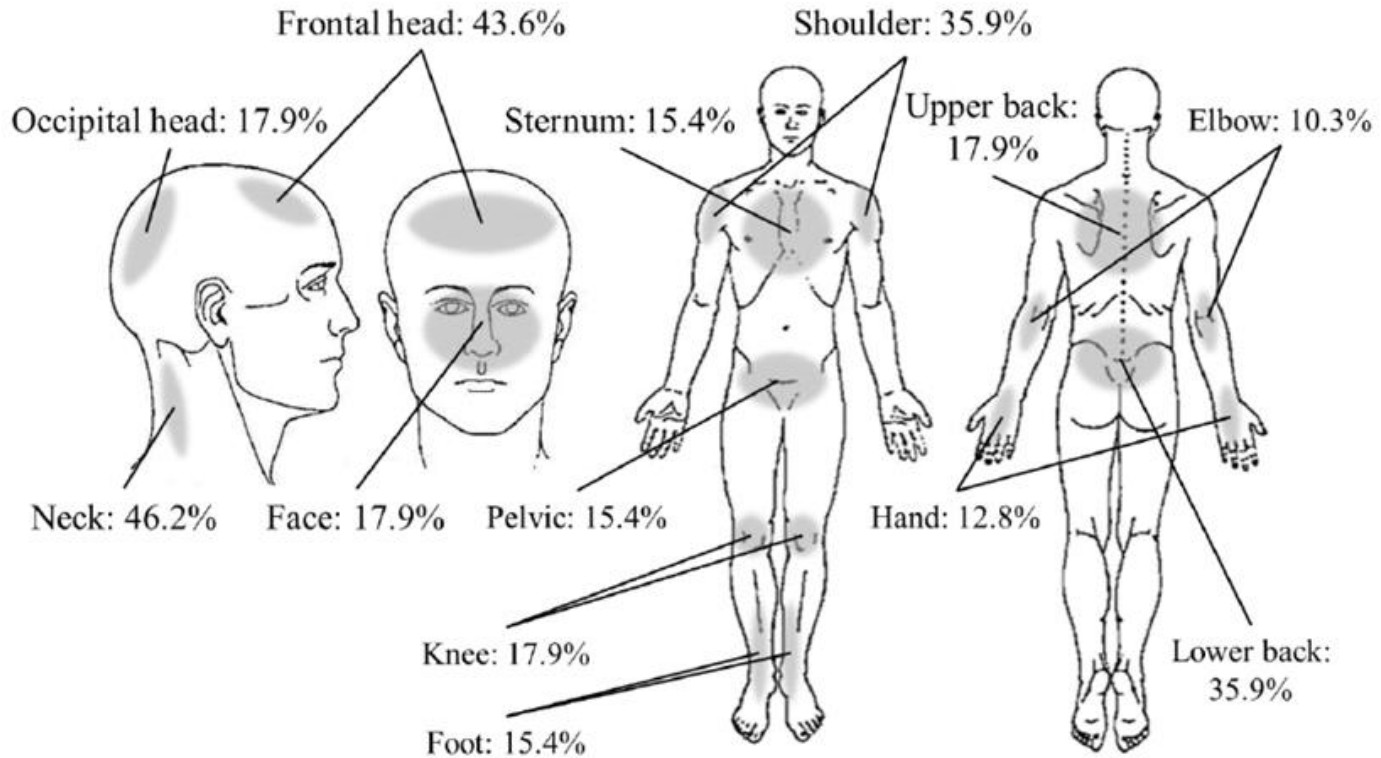
PHILIPS RESPIRONICS

Prospective cohort study

	mTBI at 1 month (n=56)	mTBI at 1 year (n=24)	Controls (n=20)
Pain subgroup (0-100 VAS)			
Mild or no pain	16 (32%)	9 (38%)	20 (100%)
Moderate-to-severe pain	38 (68%)*	15 (62%)*	0 (0%)
SF-36 bodily pain subscale	47 ± 25	50 ± 30	--
Comorbidity			
Depression (BDI-II score)	11 ± 8*	10 ± 9*	5 ± 5
Anxiety (BAI score)	8 ± 8	7 ± 7	3 ± 3

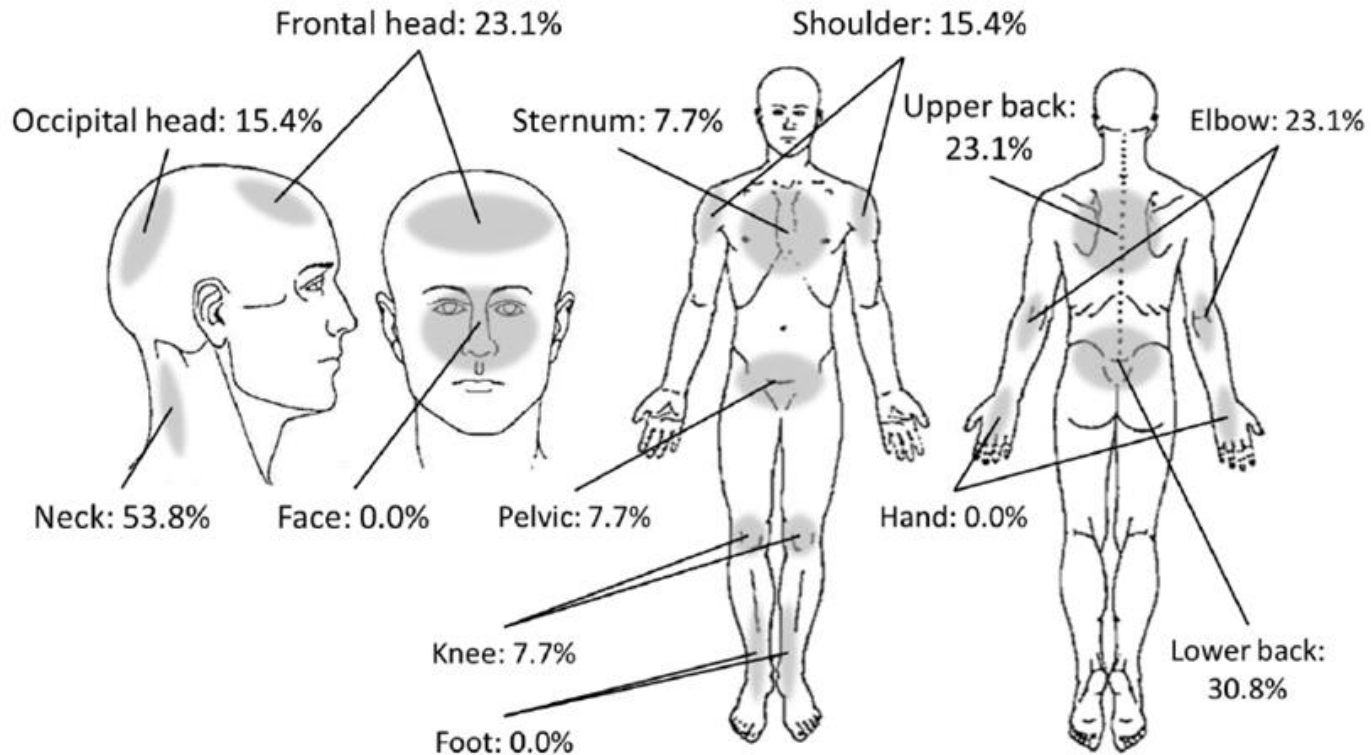
Pain and comorbidity

1-month post-mTBI (n=38)



Pain distribution at 1 month post-injury

1-year post-mTBI (n=15)



Pain distribution at 1 year post-injury

	mTBI at 1 month (n=56)	mTBI at 1 year (n=24)	Controls (n=20)
Actigraphy monitoring			
Work or school day (No.)	5 ± 1	5 ± 1	5 ± 1
Non-work day (No.)	2 ± 1	2 ± 0	2 ± 1
Night sleep schedule			
Bedtime (24 h clock time)	23:33 ± 0:18	22:54 ± 0:06	22:56 ± 0:11
Wake time (24 h clock time)	7:47 ± 0:22	7:06 ± 0:06	7:23 ± 0:17
Sleep duration and quality			
Sleep exceeding 8 h	17 (30%)	9 (38%)	5 (25%)

Night-time sleep

	mTBI at 1 month (n=56)	mTBI at 1 year (n=24)	Controls (n=20)
Daytime napping			
Nap days per week (No.)	2 ± 2*	1 ± 1	1 ± 1
Nap duration (h:min)	0:50 ± 0:27	0:43 ± 0:23	0:42 ± 0:25
Napping habits			
Big nappers	20 (36%)*	3 (13%)	4 (20%)

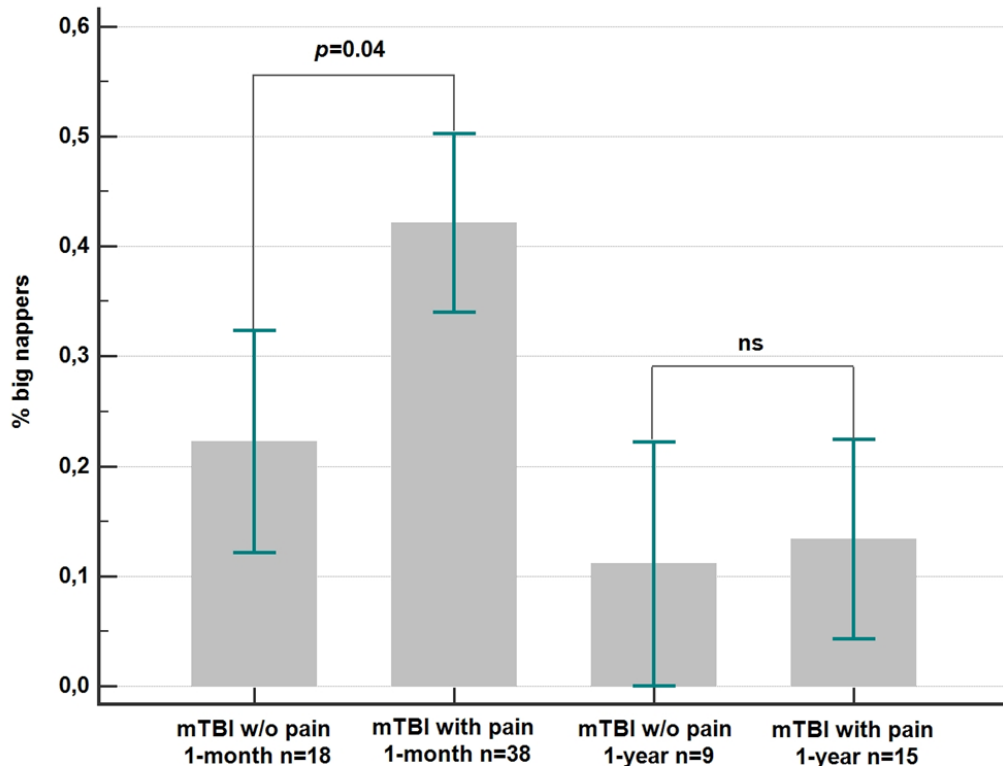
Napping habits

Predicting night sleep exceeding 8 h

37% of TBI with pain slept more than 8 h per night compared to 11% of TBI without pain ($X^2=3.17$; $p=0.04$)

Predictor	OR	95% CI	p value
Age	1.01	0.95-1.06	ns
BDI-II score	0.94	0.85-1.03	ns
SF-36 bodily pain score	0.95	0.92-0.99	0.01

1 month after mTBI



At 1 month, 42% of participants with pain were found to be big nappers

Prevalence of big napping habits

Main findings

Increases in sleep need affect 20-30% of TBI individuals

Pain could be a contributing factor in 37-42% of patients

Pain should be assessed in all mTBI patients complaining of new onset of sleep disorders...

Not only those reporting signs of insomnia

Conclusions

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Acknowledgments

Centre intégré
universitaire de santé
et de services sociaux
du Nord-de-
l'Île-de-Montréal

Québec 

We would like to thank the study participants, as well as the nurses and physicians of Sacred-Heart Hospital ED

Funding agencies



Fondation
Ronald Denis



Acknowledgments

This study is in press in Sleep Medicine

Individuals with pain need more sleep in the early stage of mild traumatic brain injury

Follow our work at the Center of Advanced
Research in Sleep Medicine

<http://www.ceams-carsm.ca/>



Questions