Savoirs partagés
RECHERCHE CIUSSS NÎM

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Short-term changes in M1 intracortical inhibition following head impact exposure in Canadian football

An observational study

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STAR Lab

Head impacts

Concussive and subconcussive

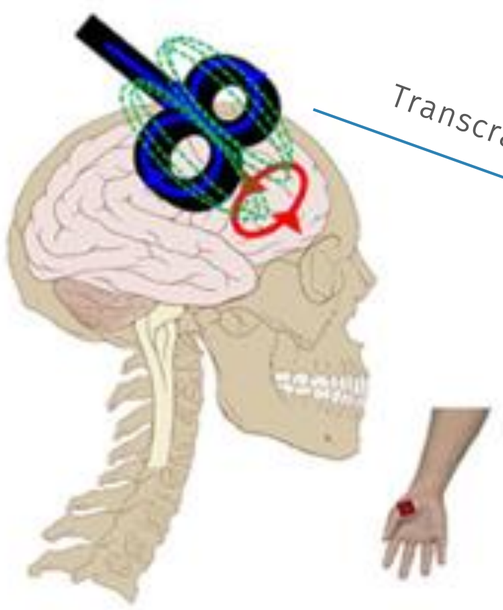
Heterogeneous symptoms

Sport-related concussions: ~4 millions year USA

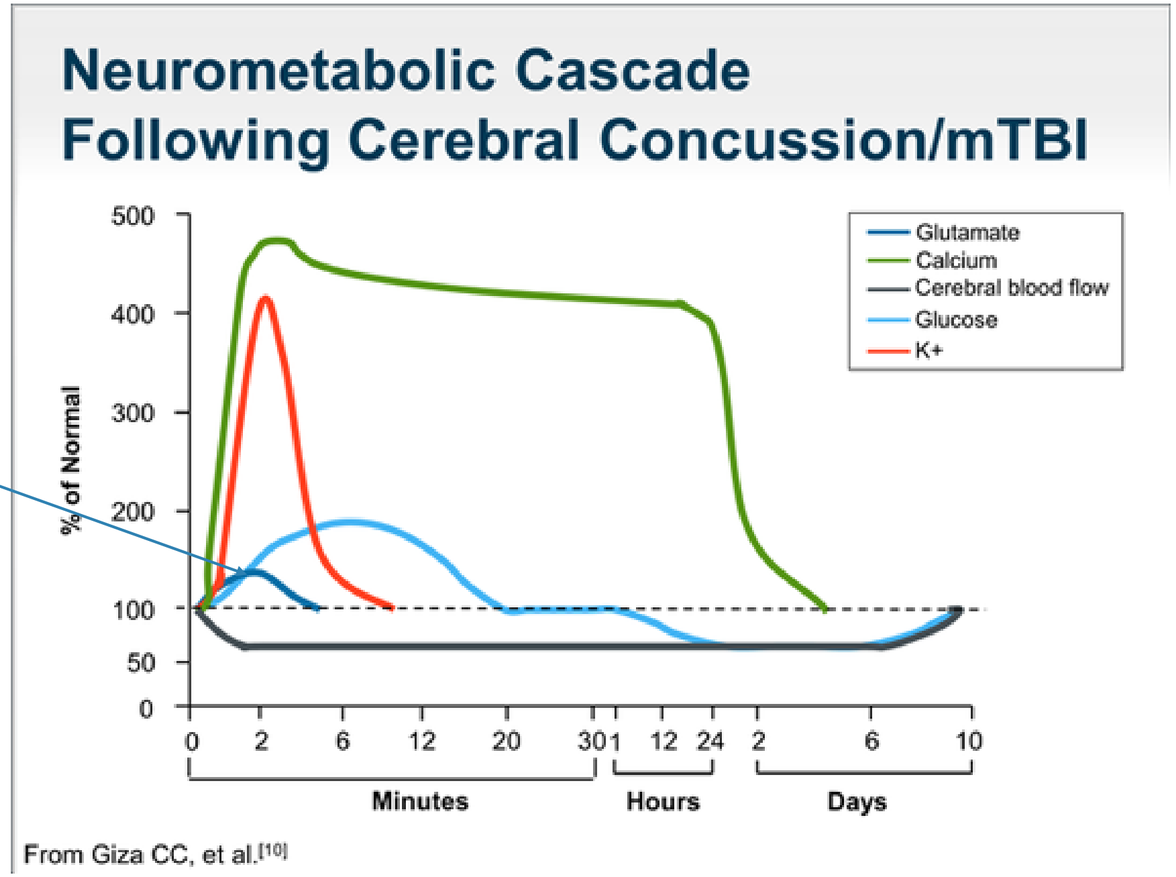
Langer et al 2020 JHTR

Brain metabolism

Cortical excitability



Transcranial magnetic stimulation (TMS)



Study objectives

Observational trial

Influence of head impacts on brain metabolism?

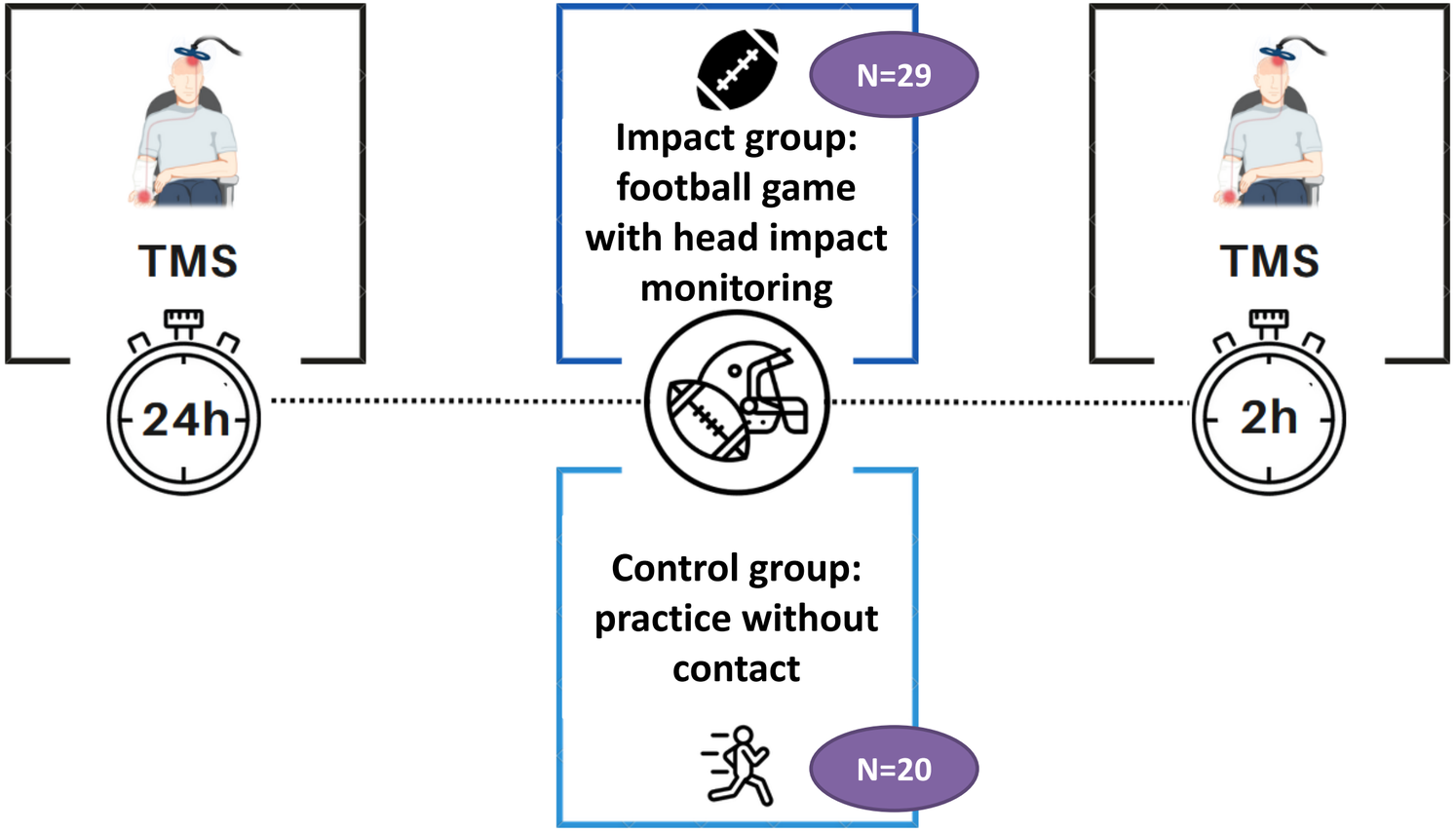
- Head impact exposure during a game (number, magnitude)
- Intracortical inhibition (TMS) post game (impacts) versus post training (without impacts)
- Relationship impacts – TMS ?

Study protocol

Male athletes
Varsity football
McGill & UdeM
2021-2022 seasons
Random assignment

23 years
185 cm
95 kg

Two groups – two days

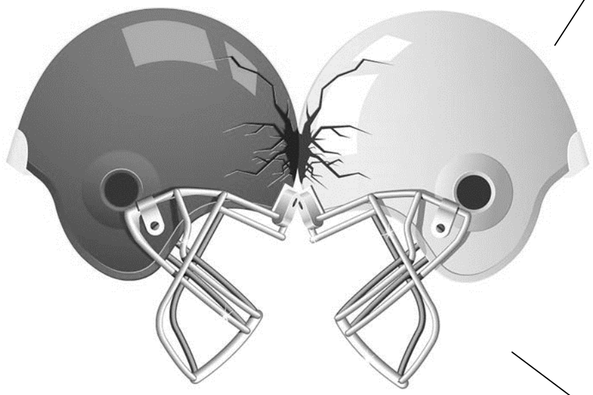


Results

Head impact exposure (game)

n = **11,6** impacts / player

10*g*+

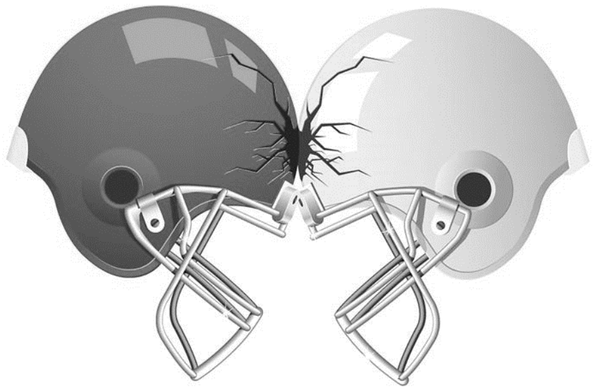


F = **18,9** *g* / impact

F tot = **234** *g* / player

Results

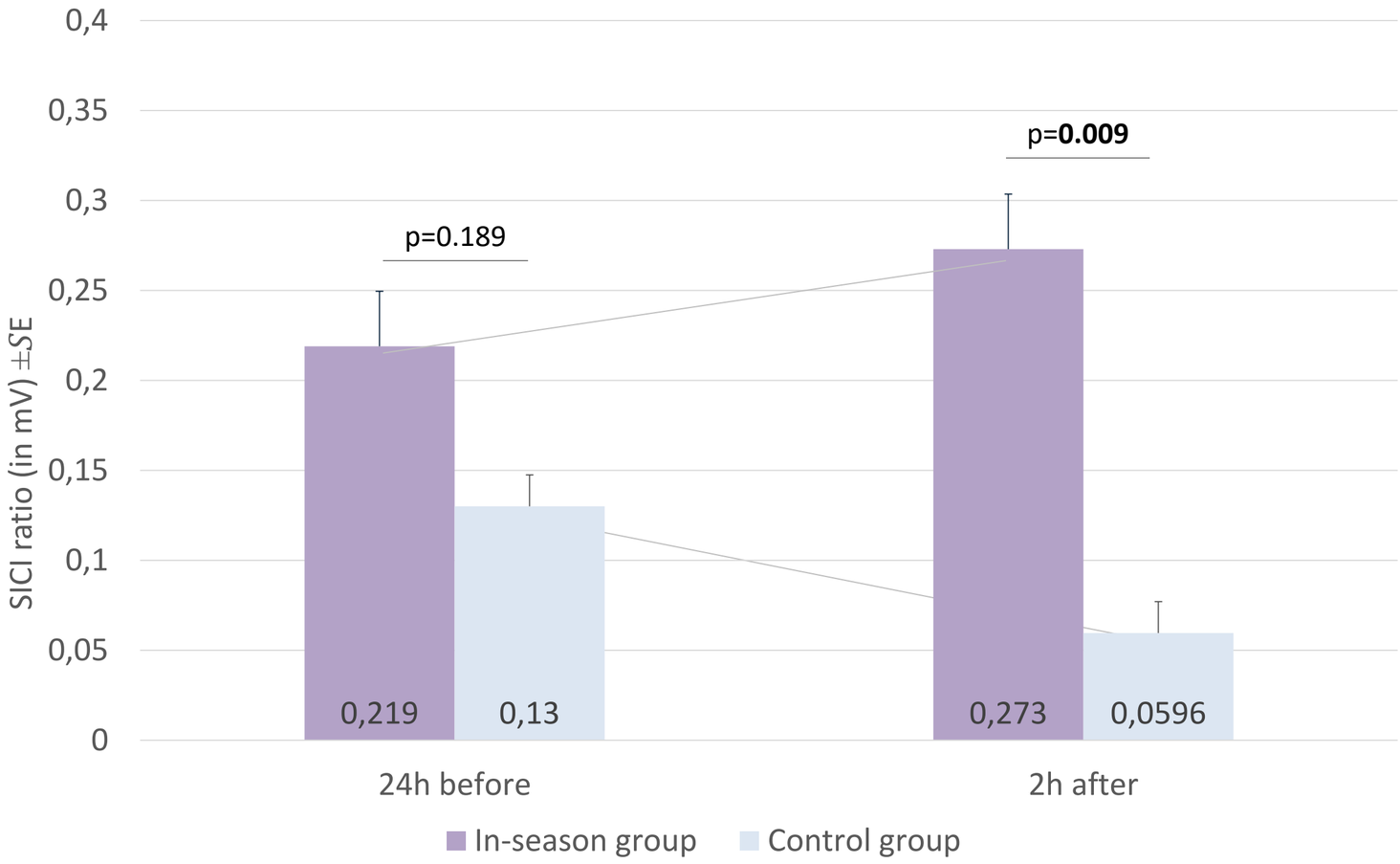
Head impact exposure (game)



Impact category	N players	N impacts
10 – 24 *g*	29	9
25 – 39 *g*	25	2
40 – 59 *g*	14	1
≥ 60 *g*	5	1

Results

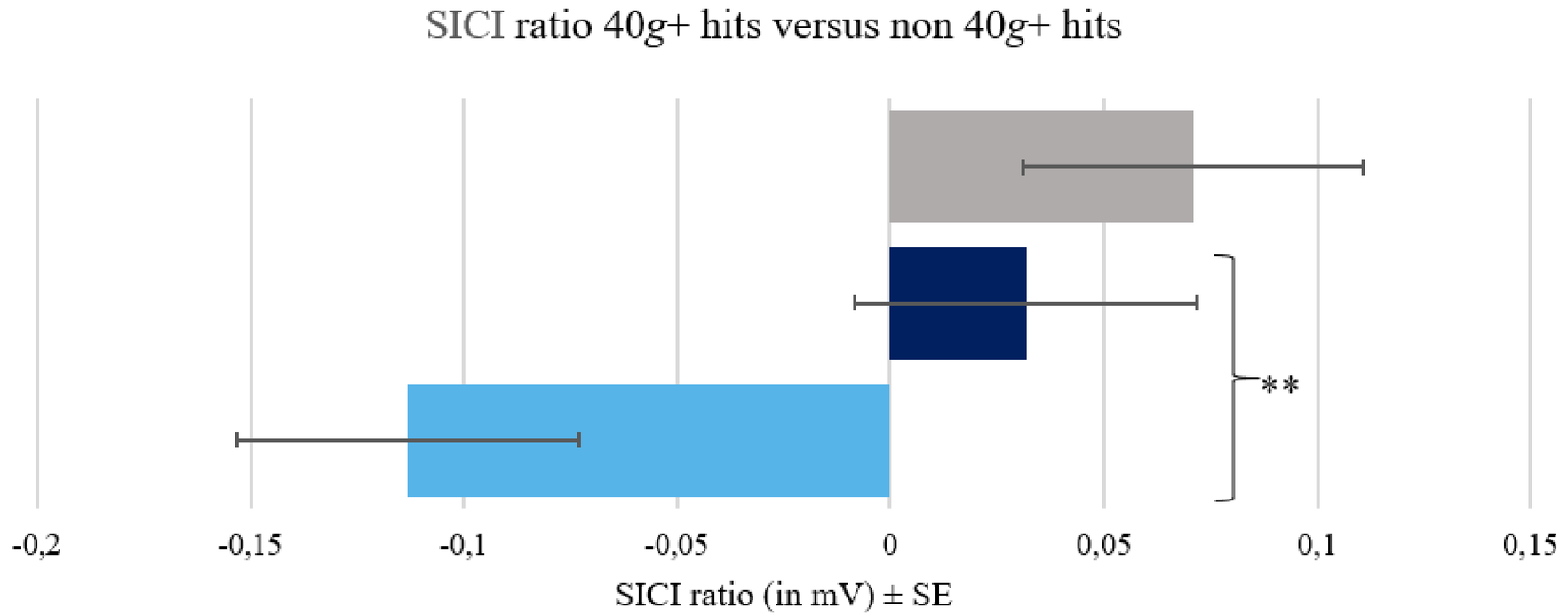
Intracortical inhibition (TMS)



2x2 mixed ANOVA
Time * Group
F (1, 44) = 5.19
p = **0.028**
η^2 = 0.106

Results

Impacts – TMS relationship



- Players exposed to 40*g*+ hits
- Players not exposed to 40*g*+ hits
- Control group

Conclusions

- *Short term changes in cortical excitability following head impacts during games*
- ***Deleterious** intracortical disinhibition with 40+g impacts (neurometabolic cascade)*
- *40g threshold for neurometabolic disturbances?*
- *Perspectives: entire season follow-up, more teams*

Limitations:

- Sample size
- Game versus practice: different intensities (stress, motivation, attention…) -> impacts control condition
- Playing position?

Take home messages

Possible long-term sequelae

Reduce contacts during practice

Prevent injuries during games ➔ head impact monitoring

Thank you!

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