FEASIBILITY OF EARLY ACTIVE REHABILITATION FOR CONCUSSION RECOVERY IN YOUTH: A RANDOMIZED TRIAL

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McGill University Health Centre
POTENTIAL CONFLICT OF INTERESTS DISCLOSURE

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We do not declare any potential conflict of interest
ACTIVE REHAB INTERVENTION

Structured, prescribed exercise for youth with symptoms

Progressive, individualized

Gagnon I et al., 2009©
Active rehabilitation for children who are slow to recover following sport-related concussion

A pilot study of active rehabilitation for adolescents who are slow to recover from sport-related concussion

I. Gagnon¹,²,³, L. Grilli¹, D. Friedman²,³,⁴, G. L. Iverson⁵,⁶,⁷,⁸
Brain Injury

Evaluation of an active rehabilitation program for concussion management in children and adolescents

Danielle M. Dobney, Lisa Grilli, Helen Kocilowicz, Christine Beaulieu, Meghan Straub, Debbie Friedman & Isabelle Gagnon
WHY IS THE TIMING IMPORTANT?

Exercise too soon/too late in animals had negative implications (Griesbach, 2007)

No study had addressed timing in humans (McCrory, 2016; Lau, 2017)

Our previous work identified there might be an optimal time frame (Dobney et al., 2017)
Is There an Optimal Time to Initiate an Active Rehabilitation Protocol for Concussion Management in Children? A Case Series

Danielle M. Dobney, CAT (C), MSc; Lisa Grilli, BSc, MSc pht; Helen Kocielnicz, BScN; Christine Beaulieu, BSc, PT; Meghan Straub, BSc, MSc, A. Pht; Debbie Friedman, BSc pht, M. Mgmt; Isabelle J. Gagnon, phr, PhD
FEASIBILITY OBJECTIVES

1. Recruitment rate
2. Acceptability of “early” exercise (patients & clinicians)
3. Utility of data collection method
4. Safety of home program
5. Adherence
6. Potential efficacy
METHODS

**Methods:** Recruited from MCH Concussion Clinic

1. Diagnosis,
2. Symptomatic 2 weeks post-injury,

**Outcome Measures:**

1. Online survey to monitor safety and home program
2. Post-concussion symptoms
INCLUSION/EXCLUSION

Inclusion
1. Physician diagnosed concussion,
2. Presence of symptoms 2-weeks post-concussion,
3. 6 to 17 years old,
4. Spoke English or French.

Exclusion:
1. Previous concussion within 6 months of the current injury,
2. Co-existing injury preventing participation in the intervention,
3. Patient engaged in moderate to vigorous physical activity/exercise/sport prior to enrolment.
STUDY TIMELINE

10 DAYS

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Online survey

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eligibility

Assess symptoms

Clinical visit

Assess symptoms

Clinical visit

Assess symptoms

Start active rehab

Progress active rehab

Symptom limited activity

---

Clinical visit

Assess symptoms

Start active rehab

Progress active rehab

Symptom limited activity

---

Online survey

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Hello,

Thank you for participating in the active rehabilitation for concussion study. Here is the link for the online survey:


We will stop sending online surveys when you become symptom free for 5 days in a row. We will still call you at 6 and 8 weeks to follow-up.

If you have any questions or concerns about the research study please contact
RESULTS
RECRUITMENT RATE = 56%

504 introduced
54 became ineligible
25/44 = 56%
20 participants
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Early (n=10)</th>
<th>Usual (n=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean, SD)</td>
<td>15.6 (1.8)</td>
<td>14.3 (2.7)</td>
</tr>
<tr>
<td>History of Concussion (n)</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>History of Anxiety (n)</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>History of Migraines (n)</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Learning Disability (n)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>History of Sleep Disorder (n)</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>
ACCEPTABILITY

Good acceptability by clinicians and patient/parents

Except

• 1 patient and 1 parent were concerned about early exercise.
UTILITY OF DATA COLLECTION

Symptom measure completion rate = 98%

Online questionnaire response rate = 68%
RESPONSE RATE DEPENDS ON RECEIVER

• Online questionnaire answered 326/478 times
  • response rate of 68%

<table>
<thead>
<tr>
<th>Email delivered to</th>
<th>n =</th>
<th>Response rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent</td>
<td>6</td>
<td>73</td>
</tr>
<tr>
<td>Both</td>
<td>10</td>
<td>67</td>
</tr>
<tr>
<td>Participant</td>
<td>4</td>
<td>53</td>
</tr>
</tbody>
</table>
SAFETY

98.8% of home exercise sessions tolerated

• 168/170 sessions
ADVERSE EVENT DEFINITION

An increase in the 7-symptom online scale reported during or following aerobic exercise;

1) an individual symptom greater than one point (6-12 years, or two points (13-18 years),

2) a total severity score increase of two points (6-12 years), or three points (13-18 years).

A stopping rule was implemented if an adverse event occurred on three subsequent aerobic exercise sessions.
**SYMPTOM ASSESSMENT**

**Active rehabilitation after concussion**

<table>
<thead>
<tr>
<th>0%</th>
<th>100%</th>
</tr>
</thead>
</table>

**Symptoms Before Activity**

Select the number to describe your symptoms. How much of a problem is it?

<table>
<thead>
<tr>
<th>0 - Not a problem</th>
<th>1</th>
<th>2</th>
<th>3 - moderate problem</th>
<th>4</th>
<th>5</th>
<th>6 - Severe problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td></td>
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<tr>
<td>Nausea</td>
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<tr>
<td>Balance Problems</td>
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<tr>
<td>Dizziness</td>
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<tr>
<td>Fatigue</td>
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<tr>
<td>Sadness</td>
<td></td>
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<tr>
<td>Nervous/Anxious</td>
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</tbody>
</table>
### ADHERENCE

Compare chart and online surveys

<table>
<thead>
<tr>
<th>Variable</th>
<th>Early (n=10)</th>
<th>Usual care (n=7)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescribed</td>
<td>Reported</td>
</tr>
<tr>
<td>Frequency (days)</td>
<td>7</td>
<td>3.7</td>
</tr>
<tr>
<td>Intensity /10 (P-CERT)</td>
<td>2.7</td>
<td>2.5</td>
</tr>
<tr>
<td>Duration (minutes)</td>
<td>16.1</td>
<td>18.5</td>
</tr>
</tbody>
</table>
HOME EXERCISE?

Active rehabilitation after concussion

0% 100%

Exercise

*Did you do your exercise home program today?

Yes  No

Exit and clear survey  Resume later  Next >>
TYPE & DURATION

What did you choose as your activity? (eg. bike, walk, elliptical)

How long did you exercise for? (in minutes)

Only numbers may be entered in this field
EXERCISE INTENSITY

How hard was the activity you just completed?
POTENTIAL EFFICACY

Level of symptoms in healthy teens
(Hunt, 2016)
TAKE HOME MESSAGE

1. Full clinical trial is feasible

2. Early exercise may lead to favorable outcomes
ACKNOWLEDGEMENTS

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