Restricted Environmental Stimulation Therapy for the Treatment of Acute Concussion

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Can induction of deep relaxation through sensory deprivation have beneficial recovery properties in concussed individuals?
Definition: Concussion is a traumatically induced transient disturbance of brain function that involves a complex pathophysiologic process— It is a subset of mild traumatic brain injury, which is classified based on acute injury characteristics at the less severe end of the brain injury spectrum (1)

Mechanism: Disruptive stretching of neuronal cell membranes and axons resulting in a complex cascade of ionic, metabolic, and pathophysiologic events.

Epidemiology: 2.8 million traumatic brain injuries were reported in 2013, however, estimates suggest up to 3.8 million occur annually (2)

Leading cause:
1— Falls
2— being struck by an object or against an object and motor vehicle crashes.
> 25% during sporting activities (Females > males) (2)
REST or Restricted Environmental Stimulation Therapy

https://www.youtube.com/watch?v=3KQm9WsZSx8
REST has shown benefits in the adjunct treatment of stress (1), anxiety (2), depression and difficulty sleeping (3) symptoms from chronic whiplash injury (4), and blood lactate levels and perceived pain after eccentric exercises (5).
The Hypothesis

Does REST for one hour improve symptoms of acute concussion?
### Ongoing Prospective Pilot Study

**Population:**
Adult subjects with new concussion (<6 wks) from Weber State Athletics and McKay-Dee Sports medicine clinic

**Inclusion Criteria**
- concussion within the past 6 weeks
- Ages 18+* Sport and non-sport related injuries*
- Initial symptom score > 20 (as indicated by the SCAT 5)

**Exclusion Criteria**
- Open sores
- Current Menstrual flow
- Mental health disability that will not allow for laying in the pods for at least 1 hour
- Epilepsy
- Renal clearance conditions
- Severe TBI – more than a concussion

- Pre and post float symptoms survey
REST in Concussion

Pre/Post Form

1. REST information (may be filled out by subject or staff)
   - Subject ID:
   - Date of session:
   - Hours of sleep last night:

2. Medications (may be filled out by subject or staff)
   - Have you taken any medications in the last 24 hours?

3. Symptom Score (to be filled out by subject) (0=None, 6=severe)
   - Headache
   - Pressure in head
   - Neck pain
   - Nausea or vomiting
   - Dizziness
   - Blurred vision
   - Balance problems
   - Sensitivity to light
   - Sensitivity to noise
   - Feeling slowed down
   - Feeling like in a fog
   - Don’t feel right
   - Difficulty concentrating
   - Difficulty remembering
   - Fatigue or low energy
   - Confusion
   - Drowsiness
   - More emotional
   - Irritability
   - Sadness
   - Nervous or anxious

4. Problems (may be filled out by subject or staff)
   - Did you experience any problems during your REST session?
     - [No]
     - [Yes] Explain:

   - How did you “feel” during and after the session?
     - [Better]
     - [I don’t know]
     - [The same]
     - [Other] Explain below:
     - [Worse]

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Intermountain Healthcare
Demographics

Ages 18-45 years old
Average 1 previous concussion
No serious brain injuries
Median 2 days from accident to diagnosis
### Results

#### Pre-Float

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Average Symptom Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>3</td>
</tr>
<tr>
<td>Pressure in head</td>
<td>1</td>
</tr>
<tr>
<td>Neck Pain</td>
<td>2</td>
</tr>
<tr>
<td>Nausea and Vomiting</td>
<td>3</td>
</tr>
<tr>
<td>Dizziness</td>
<td>2</td>
</tr>
<tr>
<td>Blurred Vision</td>
<td>1</td>
</tr>
<tr>
<td>Balance Problems</td>
<td>0</td>
</tr>
<tr>
<td>Sensitivity to Light</td>
<td>1</td>
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<tr>
<td>Sensitivity to Noise</td>
<td>0</td>
</tr>
<tr>
<td>Feeling Slowed Down</td>
<td>0</td>
</tr>
<tr>
<td>Feeling like in a Fog</td>
<td>0</td>
</tr>
<tr>
<td>Don's Feel Right</td>
<td>0</td>
</tr>
<tr>
<td>Difficulty Concentrating</td>
<td>1</td>
</tr>
<tr>
<td>Difficulty Remembering</td>
<td>0</td>
</tr>
<tr>
<td>Fatigue or Low Energy</td>
<td>0</td>
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<tr>
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<td>0</td>
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<tr>
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<td>0</td>
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<td>More Emotional</td>
<td>0</td>
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<tr>
<td>Irritability</td>
<td>0</td>
</tr>
<tr>
<td>Sadness</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Post-Float

- Cumulative Symptoms Score: 340
- Average Symptoms Score: 25.5

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Diagram showing the comparison of symptoms scores before and after a float session. The symptoms are categorized into specific groups such as headaches, pressure in the head, neck pain, etc., with bars indicating the average scores ranging from 0 to 4.
Results

![Graph showing symptom score over days since injury for Pre-Float and Post-Float phases.](image-url)
Results

Pre-Float

Post-float

Average Symptom Score

Median Diff = 25

Median Diff = 25

Median Diff = 15

Float session Pre/Post

p<0.001
IN SUMMARY:

In this Ongoing Prospective Pilot Study, Restricted Environmental Stimulation Therapy lead to improvement in concussion symptoms.

100 % of the subjects:

Have gone back to school and work

Said they have fully recovered from their concussion

Denied any negative side effects from float

Would recommend to another individual suffering with concussion symptoms
Continuation of this Prospective Pilot study to be presented at 2020 Ogden Surgical Conference:

Haleigh Emerson, MD
Medical School: University of Utah School of Medicine
Undergraduate: University of Utah
Hometown: Roy, Utah

Future questions to be addressed through planned randomized controlled trial:

- What is the rate of recovery using float vs sitting in a quiet place for 1 hour?

- Can float sessions improve chronic post concussive symptoms?

- Is it helpful for young athletes?

- Are the effects of REST different in sport vs non-sport related concussions?
REFERENCES


The Brains:
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