

Researching Effects of Repetitive Subconcussive Impacts in Sports

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IDS 12 1-4

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## **Introduction**

Ever since I was young, I've been trying and researching all different types of sports. Sports have always been really interesting to me and have been a big factor in my personal growth throughout the years due to the important qualities and traits I've developed because of sports. Recently, I came across the subject of brain damage in sports. Specifically, brain damage caused by repetitive subconcussive blows to the head. I've been playing soccer since the age of eight and in soccer, heading the ball is prevalent so this further developed my interest in this project. So essentially, the question that will be guiding me throughout this project is how can I prove that repeated subconcussive impacts to the head in sports affect the brain's cognitive functions using experiments, the engineering design cycle and the scientific method?

During this project, my goals are to improve my research and experimentation skills, increase awareness in the community, fulfill my educational interests, and research and brainstorm possible ideas that can help reduce brain damage in sports. I want this project to help me develop and improve my personal skills and help me grow as a person.

## **Significance**

Since my project is based on my passion, my interest levels will always be there and this will facilitate the completion of my objectives. My goals are important because they will help me become a better critical and creative thinker, they will help me become more educated on something that has been in my life for a long time, they will help raise awareness amongst the community, and they will help me increase my network and make more connections. Every member of the community will have an interest in my project because sports have always been apart of our culture and many people are participating in them. More specifically, the people who will be most interested are current and ex-athletes, along with parents that have children in sports. This issue wasn't as big of a deal a while ago and it has recently come into the spotlight and is of big relevance today. Because of this, a lot of scientists and professionals are currently researching this very deeply and they have way more knowledge than me. These people have dedicated a lot of time to develop articles about these studies. Along with fulfilling my

educational interests, I will be educating others and raising awareness in the community about these issues, I will be conducting interviews and making connections with people related to my project to increase my network and lastly, I will try to use experimentation to prove the effects of repeated blows to the head on a person's cognitive abilities. These things will help me contribute to this subject, especially in our community.

### **Project Plan**

As mentioned before I plan on accomplishing these goals by researching, conducting interviews, and experiments. But the biggest factor that will help me accomplish my goals and complete this project is time management. To accomplish this and be successful, I will make a timeline with general deadlines. This will help me manage my time and make things less spontaneous which will also immensely help with stress management. While doing this, I will have to think about working around my extracurricular and volunteer activities so I can maximize the effort I put in and minimize stress.

### **Core Competencies**

**Communication:** I will share my knowledge and what I have learned with other members of the community and the school at the IDS fair. I will be teaching them about brain damage in sports and increasing awareness. I will also be exchanging information and exploring different ideas as I conduct interviews for my community connections.

**Creative Thinking:** I will need to be innovative and creative when thinking about the details of my experiments and how I'm going to conduct my experiments. I will also need to be creative when thinking of possible ways to reduce brain damage and the possible development of CTE (chronic traumatic encephalopathy) in sports.

**Critical Thinking:** I will need to think critically when I'm analyzing the data and drawing conclusions from the results and observations of my experiment. I will also need to apply critical thinking to check if the research and information I acquire are from legitimate sources and not influenced by personal opinion.

Positive Personal and Cultural Identity: Sports are a big part of our culture today and they are also a big part of my life. I've been playing sports from a young age and they have positively influenced my identity. These factors will help me during this project because they will give me the motivation to continue to accomplish my goals. My knowledge of sports will also assist me throughout this project.

Personal awareness and responsibility: During this project, I will need to have excellent time management and be aware of all of the activities and homework happening to meet my goals on time. I will need to meet the deadlines I set for myself to minimize stress levels and maximize the effort I put into this project.

Social Responsibility: I will contribute to the community by raising awareness about this issue and educating members of the community. I will brainstorm ideas that can be implemented into sports to decrease the amount of brain damage and pitch them to members of the community. I will also need to make connections with professionals in the neuroscience/psychology field and maintain relationships with them.

December:

- Talk to a professional in this field and learn more about the issue (community connection)
- Research, read articles and studies to educate me on this topic
- Research about CTE
- Post updates of my blog about what I've learned so far

January:

- Research possible ways to reduce brain damage and development of CTE in sports
- Watch interviews and read personal account stories about athletes in contact sports and analyze their behaviour, speech patterns, and take note of how CTE and brain damage has affected their lives
- Post updates on my blogs

### February:

- Brainstorm possible experiment ideas and finalize my experiment idea
- Apply the scientific method to my experiment
- Continue to research more about CTE and brain damage in sports
- Perform an interview with another person or organization related to this field (scientist, athlete, concussion clinic) - community connection
- Post updates on my blog

### March:

- Perform my experiment and record the observations/results
- Continue to research the topic
- Post updates on my blog

### April:

- Write my lab/science report on my experiment
- Make a community connection
- Continue to do research and learn more
- Post updates on my blog

### May:

- Get someone to revise and review my report
- Make a presentation, poster board and prepare for the IDS fair
- Get models and objects to make my booth look appealing (model of the brain, a piece of sports equipment, etc.)
- Post updates on my blog

Final Product: I will have a report and a presentation that shows the effects of repeated sub-concussive impacts to the head in sports with evidence that includes experiments and interviews I've carried out, and research. There will also be a poster board/presentation that outlines my progress throughout the project and shows ideas that can be implemented to reduce brain damage in sports.

### **Resources**

I plan on finding community connections by looking up professionals in the community and contacting them. More specifically, I will try to contact a concussion clinic in Vancouver, a neuroscience Ph.D. candidate that I met while participating in a research study she ran that studied adolescent brains, and potentially a current or former professional athlete that has been affected by brain damage from their sport. I will also talk to my parents and friends to see if they know anyone in the community who has expertise in this field.

#### Costs:

Brain model: 30-50 dollars on amazon

Poster Board: 1 dollar

Total Cost - 30-50 dollars

### **Conclusion**

All in all, I believe this project is very relevant to sports today and deserves much more awareness in the sports community. A lot of people participate in sports and put their children in sports so this project and information will be of use to many different people. I will use this project to improve my research and experimentation skills, fulfill my educational interests, and increase awareness amongst our community. I hope this project will help me improve my personal skills and grow as a person.