Concussions in Football and the Effects it has on the Body
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Abstract:
When it comes to football, injuries have been very common within the sport. Concussions have been associated with the game of football for several years, and recently has developed into one of the most alarming injuries a football player can face. When the term “concussion” is brought up to any individual, usually the first idea that would pop-up would be headaches and brain injury. Although this assumption would be correct, new studies have discovered that concussions not only have a major effect on the brain, but researchers have also proven how concussions effect other important systems in the body. The goal of this independent project is to bring to light the other body systems that are affected around the upper and lower extremities of the body, examples would be the respiratory and cardiovascular system. This claim would be supported by several different medical research and sports medicine articles. The articles addressing the specific body system would further explain the different effects concussions would have on that exact body system. Such as, the Hormone Health Network stating how TBI (traumatic brain injury) can injure the pituitary and hypothalamus, causing hormone problems. To further support the objective of this project, other research papers addressing different retired and active NFL players suffering from concussions will also be used. Articles such as npr.org, who spoke about Aaron Hernandez, who was a successful athlete turned into a murderer and later on proven to have been showing signs of severe CTE. By covering the other major systems affected by concussions and the impact it leaves on the body, it may lead to further advancements on prevention and treatment methods for this injury.

Introduction:
Concussions are a type of head injury caused by a bump or blow that causes the head and brain to move back and forth rapidly. The sudden movement can cause the brain to bounce around or twist in the skull, which creates chemical changes in the brain and damages brain cells. Concussions or TBIs are common within the game of football. Players often undergo cases of headaches, dizziness, or loss of consciousness. Because this injury has non-life threatening symptoms in the beginning, it is often overlooked by other severe injuries in football, such as broken legs, broken arms, and damages to the vertebrae. Although these injuries are serious, concussions leave a long lasting effect on the body overtime. Traumatic brain injuries have been known to leave a permanent effect on your central nervous system. Furthermore, concussions can leave lifelong effects on your endocrine system, cardiovascular system, and respiratory system. Cases from retired and active NFL players have shown how repetitive hits to the head have caused some players to have problems in their body after playing, or after they have announced their retirement.

Method:
- The results and information for this project were directly taken from medical research and sports medicine articles
- Retired and active NFL players who have dealt with concussions will be used as supportive evidence

Objective
- Introduce other body systems that are affected around the upper and lower extremities of the body.

Result:
Concussions leave a lifelong effect on the body and if it is not treated it could lead to permanent damage on the body and mind. This effect has developed into one of the most alarming injuries known to football. The results and information for this project were directly taken from medical research and sports medicine articles. Cases from retired and active NFL players have shown how repetitive hits to the head have caused some players to have problems in their body after playing, or after they have announced their retirement.

Discussion:
Several ex-NFL players fight through concussions during their career and later suffer from the drastic changes in their body, caused by concussions. By exploring different areas of the body that are affected by concussions, we can begin to understand just how much football players suffer from this brain injury. Figure 2 depicts an affect concussions can have on the respiratory system. Acute respiratory distress syndrome develops, causes alvooli to swell and fill up with liquid, which makes it harder to breathe. Figure 3 shows hormonal changes caused by TBIs and leads to affecting sexual functions of the patient. Figure 1a and 1b show differences in HRV because of concussions causing irregular heartbeats to occur. Retired NFL players such as Mike Wesbter and Aaron Hernandez had their lives change drastically because they suffered from concussions and TBI. Specifically Aaron Hernandez’s drastic change from NFL upcoming star to becoming a murderer, and was proven to have signs of severe CTE.

New treatment methods are being developed in order to lessen the impact concussions have on football players. New tests and assessments are used to treat concussions, such as CST, VM, and NIM.

Conclusion:
- Concussions leave a lifelong effect on the body and if it is not treated it could lead to permanent damage on the body and mind
- The cardiovascular system, respiratory system, endocrine system, and central nervous system are some of the few systems that are directly affected by concussions
- By bringing forth these effects concussions leave on not only the brain, but on other systems in the body as well, can creates awareness to whether we need to have more precautions when it comes to the game of football
- Discussing more about the vast amount of effects it has on the body systems leads to medical professionals developing new methods to prevent concussions, in order to protect future athletes.

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