

# Understanding Concussion Recovery Using Virtual Reality

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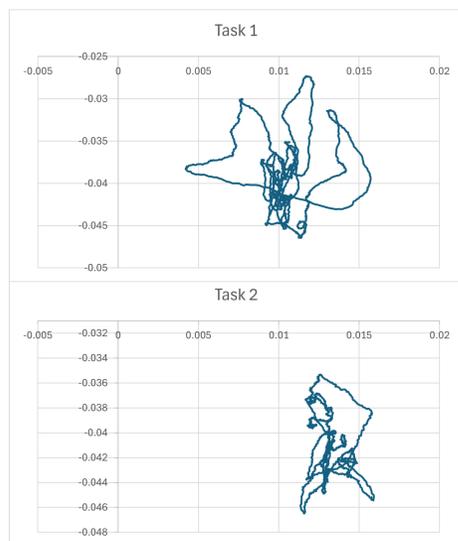
## Intro

Understanding where in the recovery process a concussion victim is at, will be important to make sure people in sport related accidents are not going back into their game too early. Checking if balance has returned is a keyway to check for this readiness. In this VR game there are multiple stimuli that the user will experience, giving a better idea of readiness than other methods.

## Method

1. Use the VR headset to get the concussion victim to play a game in this case as a soccer goalie.
2. Get default metrics to know the patient's base case.
3. Let the patient play the game and record the movement.
4. This can then be interpreted to understand what point of recovery they are at.

## Results



These graphs show the center of pressure of the athletes' feet or their sway. From this we can see that in task one the user is swaying more than in task two. Using data from the VR game it can be analyzed to determine the readiness to return to the field.



# Virtual Reality can be used to assess the progression of concussion recovery in individuals by utilizing a faceplate to monitor their balance.

## Discussions

The game itself is a goalie balancing game where the concussion victim is the goalie, and virtual players are kicking balls at the player. The player's goal is to stop the balls by blocking the ball from passing them. There are variable amounts of players from 2, 4 and 6 virtual players kicking balls. Aswell there are different conditions that will let the user have notice if the virtual player is going to kick the ball (condition 1) or not kick the ball (condition 2) and have multiple balls kicked at once. All this information is captured and saved in an excel file.

Condition	Players	Catches	Misses	Body Hits
1	1	6	0	0
1	2	5	1	1
1	4	4	2	1
2	6	4	2	2
3	6	5	3	2

Data from an individual playing the game

This research aligns with my background in computer science, leveraging technology to analyze concussion victims' readiness and improve their health outcomes. The collected data, including catching and missing rates, combined with movement metrics from the force plate, forms a basis for in-depth analysis of individual responses. The aim is to gain meaningful insights in knowing what point they are at and the readiness to return to sports or their normal life.

## Remarks

This was a collaboration between the sports science and computer science departments to make a VR game for concussion victims.

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