

Musculoskeletal



Problem or Need

The problem we are trying to solve is designing an assistive device for a child with musculoskeletal disorder to be able to hold an art tool and being able to draw something without the feeling of discomfort.

This problem is important because many people with musculoskeletal aren't able to draw or hold something due to pain or discomfort to the joints and muscles.

Kids and Teens that have musculoskeletal disorder would benefit with our solution.

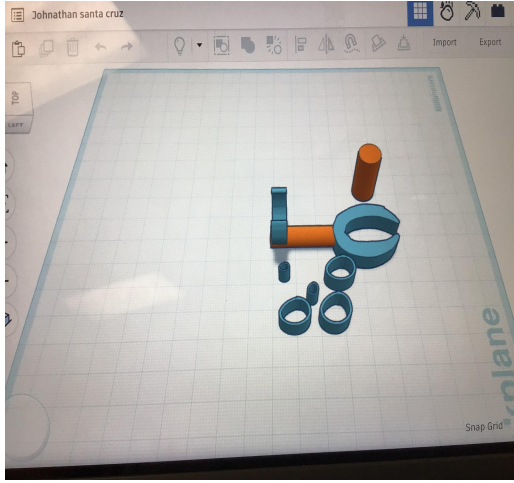
Research/Background

- This condition affects bones, joints, ligaments, tendons, and muscles.
- It limits the amount of physical movement and causes pain when there's movement.
- Musculoskeletal conditions are typically characterized by pain (often persistent) and limitations in mobility and dexterity, reducing people's ability to work and participate in society
 - Limits
 - Physical movement

Criteria and Constraints

Our design must provide comfort, stability, holds an art tool, and easy to put on. It needs to have velcro so adjust the wrist and art tool. It must be quick to print using Tinkercad/3d printer.

Materials our device will have are fabric and velcro there will be small amounts used. The printing time should take under 3-4 hours.

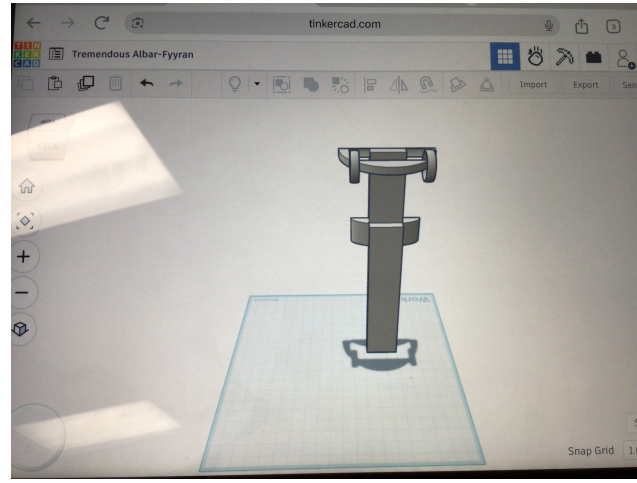


Pros

1. Attaches to wrists
2. Easy to put on

Cons

1. Hard to hold an art tool
2. Uncomfortable

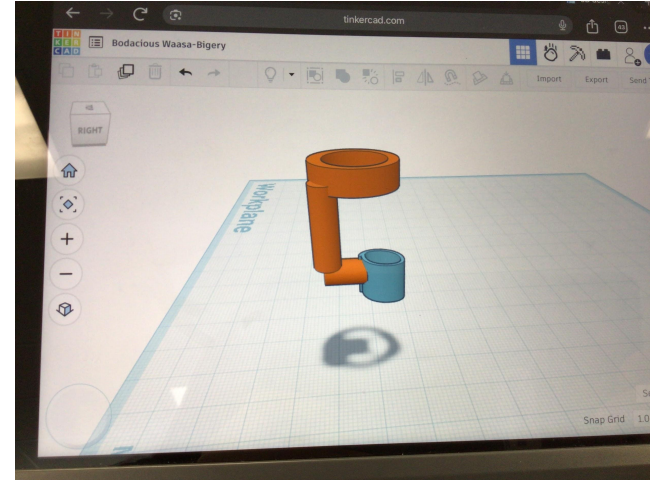


Pros

1. Holds an art tool
2. Attaches to the wrist

Cons

1. Uncomfortable to the arm
2. Hard to put on

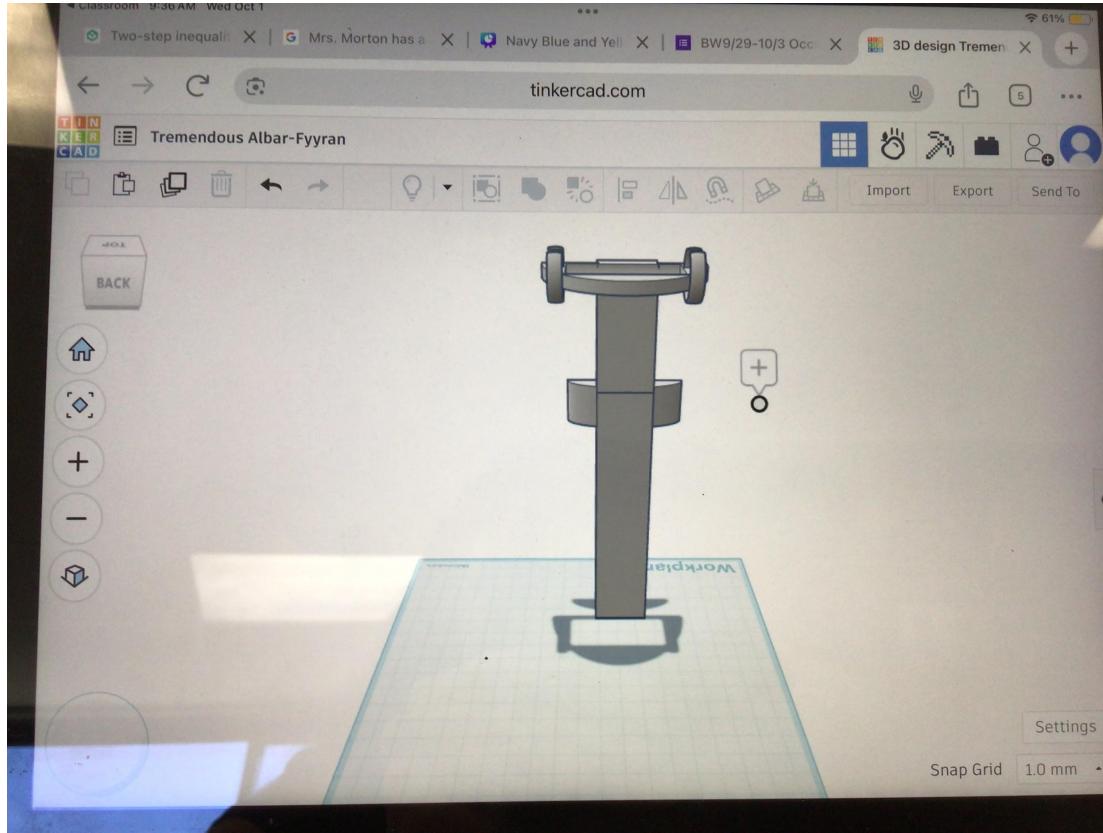


Pros

1. Attaches to wrist
2. Holds an art tool

Cons

1. Uncomfortable
2. Not functional



The steps we used to create our assistive device was to find a disability and research ways to design our device. We measured our classmate wrists and art tools. We created a paper prototype and then designed it in Tinkercad. We made modifications to create our final design.

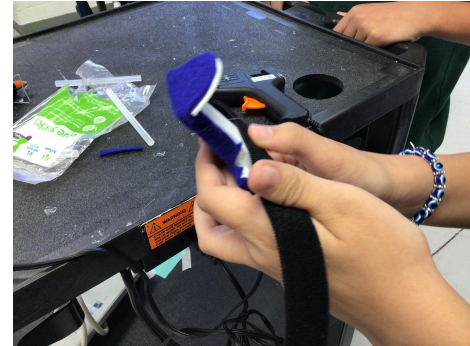
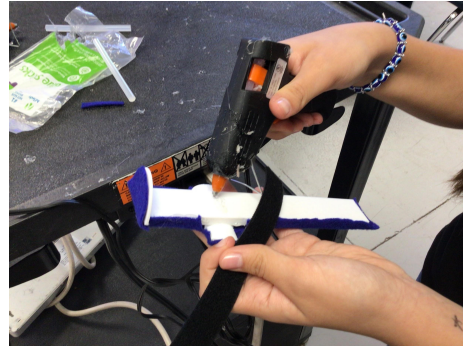
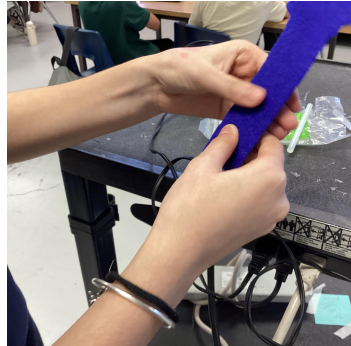
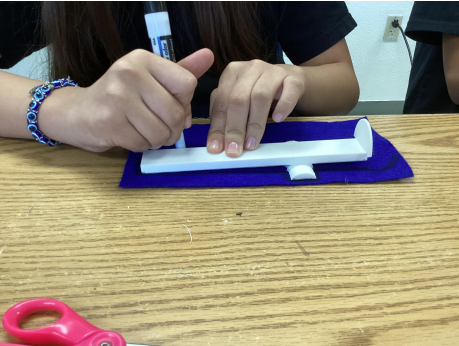
Materials

- Fabric
- Velcro

Build and Test Process

We used soft fabric so it would feel smooth and not scratch the patient. We included velcro to adjust the patient's wrist and be able to hold the wrist in place.

We tested our assistive device by putting it on everyone's wrist and asked if it would stay on and the comfortability.



Trial	Shape.	Times Color Went Outside Lines	Neatness 1-5	Notes
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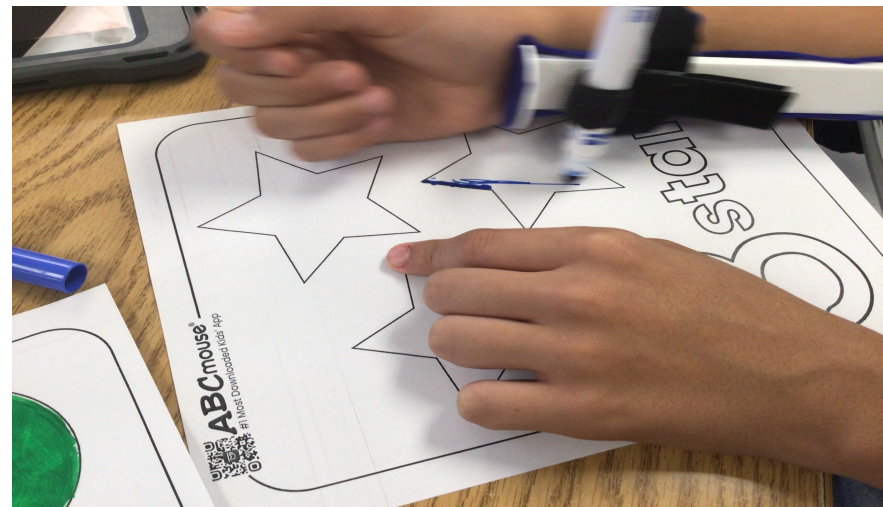
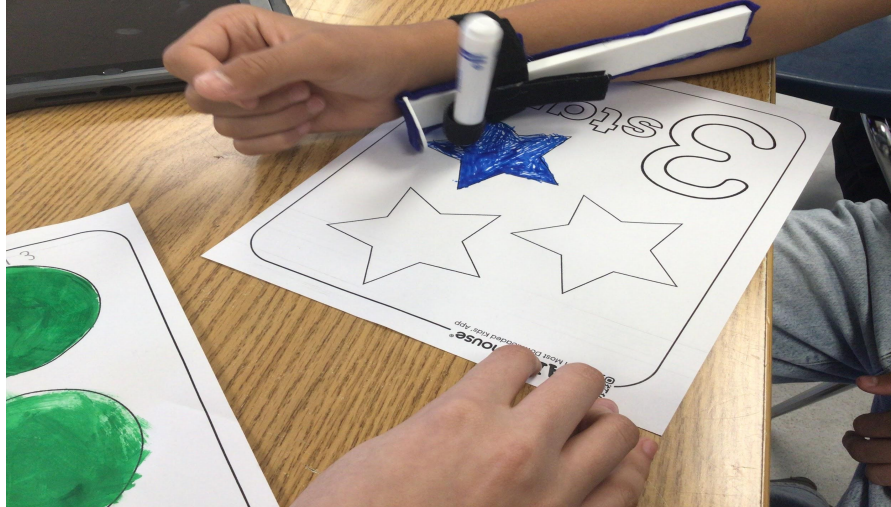
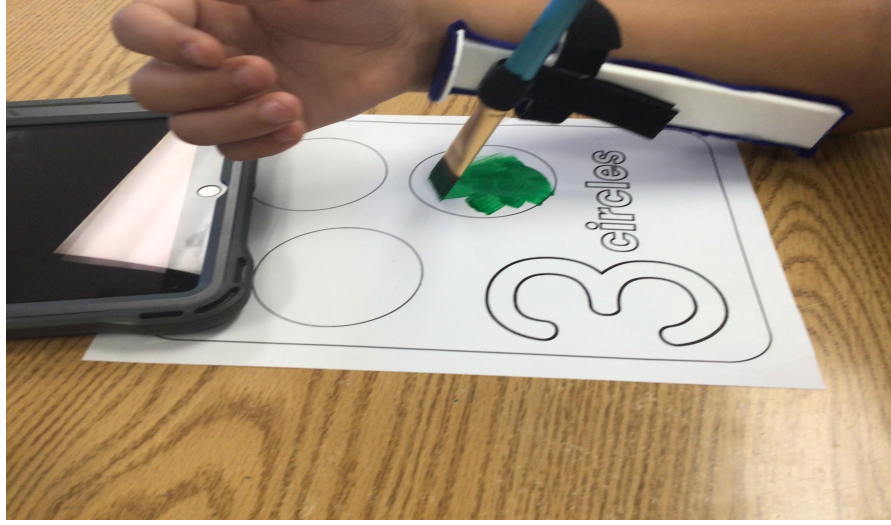
1.	Circle.	2.	4	
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2.	Circle.	2.	3	
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3.	Circle.	2.	5	
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Average- 4

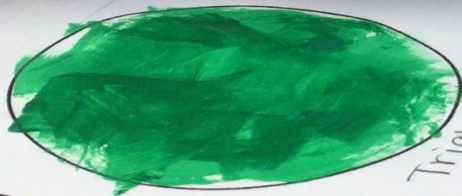
5= very neat & control 1= very messy or outside lines often



The problem we tried to solve was designing an assistive device that can help a child who has trouble holding an art tool to be able to draw. Our solution was to design a prototype that can be comfortable and help a child to draw without having pain or discomfort. Something that worked well in our design was holding the arm and wrist in place and providing comfortability when drawing. One problem our group had was using the velcro to be able to hold the art tool because the paintbrush kept falling off, making drawing difficult and stressful. If we could improve our design we would use something else to hold the art tool that would make it feel secure and trustworthy. We would also improve the top part where the hand rests and make it bigger so it can be able to hold the whole hand. Our results showed that our device can make drawing easier for a child who has trouble. This means that our device was somewhat accurate because while trying it on our groupmate he was able to paint inside of three circles and not be as messy. We learned that engineering is about problem-solving and learning from our mistakes. Our project could be useful in real life because it would help children color and draw. In the future I would like to try our prototype on an actual child.

Sources

- <https://www.who.int/news-room/fact-sheets/detail/musculoskeletal-conditions#:~:text=Musculoskeletal%20conditions%20are%20typically%20characterized,work%20and%20participate%20in%20society.>

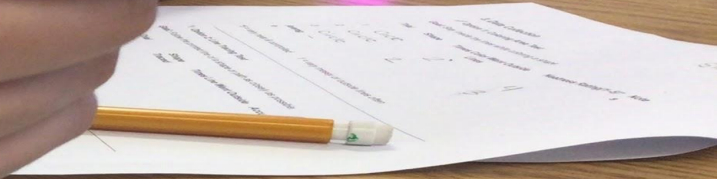
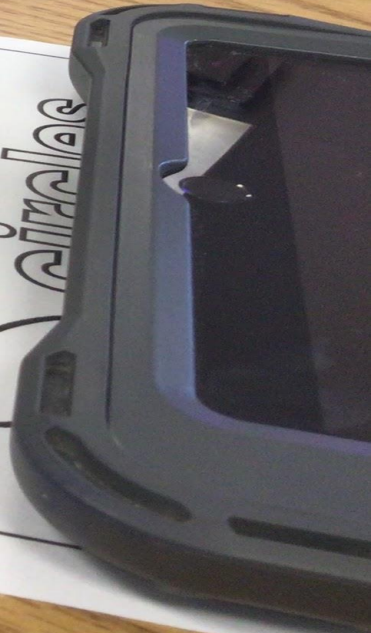


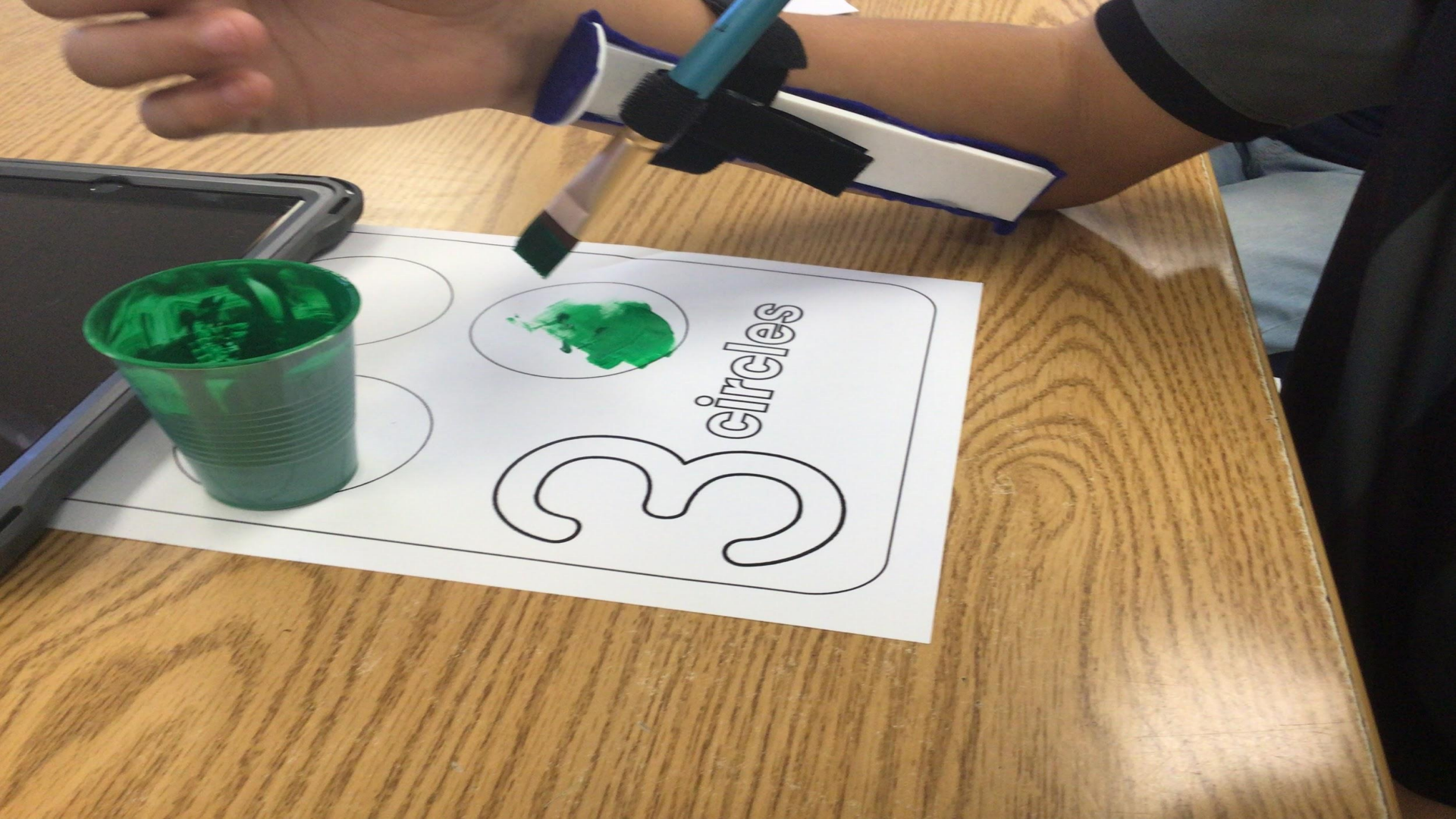
Trial 1

Trial 2

Trial 3

animal





circles

3