

Draw My Heat

Group number: 3-37

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1. Problem finding:

Our team first went on to identify three major problems we face. Our first problem is the difficulty of carrying food and drinks at the same time, followed by plastic wastage, and our final problem was scoliosis patients being uncomfortable while wearing brace for treatment.

We chose our third idea as we wanted to help scoliosis patients as any forms of scoliosis affect 3 in 100 people which is a huge part of society. This problem can also be expanded much as there has not been many inventions made to help the scoliosis patients as of right now thus our idea would be original and can be made to fit other criterias or their needs.

2. Define the problem

Scoliosis is a medical condition where the patient's spine is curved in a 'C' shape or 'S' shape. The main problem the scoliosis patients face is excessive heat as wearing the scoliosis brace is very stuffy and the user will sweat a lot and may have heat rash. The recommended time for bracing treatment is 17-18 hours a day, however, due to the excessive heat and discomfort, most patients do not wear the brace for the recommended hours and thus the bracing treatment becomes ineffective. When bracing treatment is ineffective, the patient would have to undergo a surgery which is not only painful and costly but will also cause permanent negative side effects.

3. Our BIG Idea

Our team brainstormed on many different ideas on how to solve this problem. Our first idea was to insert a cool towel on the back of the brace to cool it down. However, we tested it and found it to be too heavy. Thus, we approached a different alternative. We researched and found out about micro ventilators that is both light and effective. It is also very easy to use and install onto the brace with special attached supports. It also does not consume much space, hence its a very good alternative for it is lightweight, compact and effective.

4. Construction or Modelling Process

The construction process was quite long as there was a lot of strategic planning involved. For example, the stand which we are currently attaching the micro ventilator on actually had to be removed from the mask and was extremely difficult as the glue was extremely strong. We also had to refer to a thermal heat diagram to check for the hottest spots of the body and patients preference to install the micro ventilators. We also had to drill 5mm holes for the micro ventilators and use non-corrosive glue for the micro ventilators.

5. Modification or Evaluation

Afterwards, we continued testing our product and found out that where the micro ventilator's lifespan is only 2.5 hours, the patient is required to wear the brace for 17-18 hours a day. Thus, we decided to further modify our prototype. We added a power bank at the bottom of the brace to charge and run the micro ventilators concurrently, thus increasing the micro ventilator's lifespan to a much longer duration. We ran an experiment to test how effective our product really is, using heat sensors to test the amount of heat loss as a result of our product. We walked with a scoliosis patient wearing our brace, and tested the heat loss after 25 minutes of walking with and without the micro ventilators respectively, the results show that wearing the brace with micro ventilators can cool the air trapped between the brace and the patient's body down to 29.4 degrees celcius after the walk, whereas without the micro ventilator s, the temperature of the air between the patient's body and brace rose to 34.9 degrees celcius.

6. Cost

The total prototype was extremely costly, the original brace cost \$1250, the three micro ventilators totaled up to \$75, the power bank was \$30 and the velcrostrips was \$5.85. These items totaled up to a costly \$1360.85. However during our interview with a patient they commented that they would not mind having to pay the extra cost if it meant the comfort so they would be more willing to wear the brace so the bracing treatment will be effective.

7. References

1)

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