Transdermal Patch

An additional project was also explored during the past semester. A small subgroup explored the aspects of developing a transdermal patch which would release hydrogen sulfide in order to slow oxygen uptake upon resuscitation. This would decrease the risk of brain and tissue damage in cardiac arrest victims.

Future Direction

Since prototypes have been developed, thorough testing is now required. Animal testing will be necessary and future groups will need to follow the necessary legal steps to perform animal testing. Afterward, human testing will necessary. Again, there are many legal procedures which will need to be explored.

Eventually this project will need to become an EnPRO. The groups will need to explore manufacturing and marketing requirements for these products.

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ILLINOIS INSTITUTE OF TECHNOLOGY

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IPRO 319

New Technologies for Cardiac Arrest Victims

In the U.S., someone has a heart attack every 34 seconds

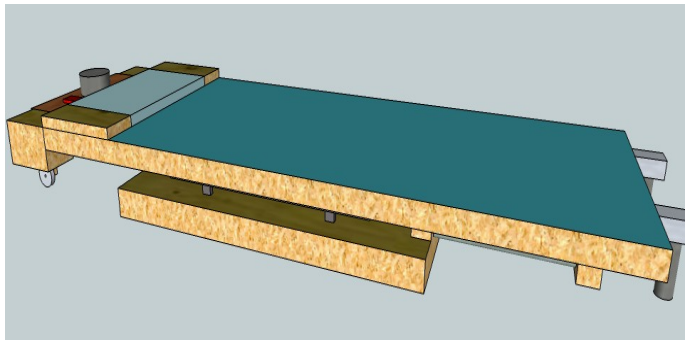
Over 250,000 people in the U.S. alone die annually from sudden cardiac arrest, and many of those that survive suffer brain damage, which can begin within minutes of the heart attack. If Whole Body Periodic Acceleration (WBPA) were initiated shortly after cardiac arrest, lives could be saved and brain damage could be greatly reduced. The problem is, although people have knowledge of this new technology, there does not yet exist a product that will serve this function on-site. There is an industry need for a product to implement this technology to minimize brain damage in cardiac arrest victims.

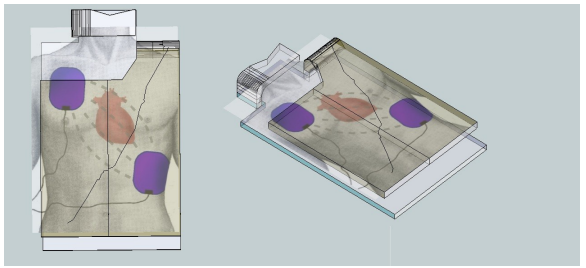
Cardiac arrest victims are also in danger of ischemic injury, which is the restriction of blood supply resulting in tissue damage. Hospitals contain machines to induce therapeutic hypothermia to reduce the risk of ischemic injury through a cooling process. However, there is currently no product to begin the cooling process prior to hospital arrival. There is a need for a product which would begin cooling the victim before and during transport to a medical facility.

Whole Body Periodic Accelerator

The purpose of this IPRO subproject was to design an apparatus which would employ Whole Body Periodic Acceleration to restore blood circulation in a cardiac arrest victim.

The previous semester utilized springs in their prototype. However, the previous prototype was difficult to use. Often the needed frequency was difficult to achieve by manual pushing and pulling. This semester however, a new prototype was designed and built using a track and also a motor. The goal of this design is to automatically reach the correct frequency depending on the weight of the person, and shake the victim without the help from possible bystanders.





Cooler

The purpose of this IPRO subproject was to design a cooling mechanism which was cost effective, portable and efficient at cooling the core body temperature.

Diflouroethane(1-1) was chosen as the coolant. It is environmentally friendly and poses no risk to the cardiac arrest victim or bystanders. The vest utilizes two types of materials: silicon rubber for direct skin contact and PVC for insulation. These materials were chosen to maximum the cooling effect of the product.

Our prototype is designed to cool the upper half of the body and neck. In addition, to improve compatibility with AED machines, parts of the vest are foldable allowing easy AED attachment.