



Gun-Aid

"The first aid gun"

Phuong Nguyen¹, Strina Rai¹
 Advisor: Professor Zheng Li, Ph.D.¹

¹Department of Mechanical Engineering
 University of Bridgeport, Bridgeport, CT

Abstract

Adhesive bandages are one of the most used form of first aid dressing. The adhesive sheet of a band-aid are commonly made of single use plastics. Gun-Aid is an environment friendly and sustainable multipurpose device that can act as an alternative to bandages and medical gauzes that can be used for fresh cuts, blisters and burns while also provide calmness and promote healing.

Introduction

Most bandages in the market are made of unsustainable materials that are harmful for the environment. The adhesive sheet of a bandage is generally made from materials such as woven fabric, latex strips are commonly made of single use plastics. Throughout an active open wound injury, bandages must be changed often in order to avoid infections. They should be changed at least twice a day. At a large scale, these little band aids can be extremely harmful to the environment.

Adhesive bandages are available in standard sizes which may not be correct for every type of wound because of this they have been known to hurt when pulling off and reopen scabs by sticking to it slowing down healing and risking infection.

So instead, GunAid is a first aid device that will be effective not just for wounds but also burns. It will provide the same security and coverage but will be a more effective alternative that is pain free, calming and environment friendly.

Fluid Mechanics Inside Tube

Bernoulli's Equation to relate the pressure, velocity, gravity and height.

$$P_1 + \rho \frac{V_1^2}{2} + \rho gh_1 = P_2 + \rho \frac{V_2^2}{2} + \rho gh_2$$

Cole- Brook equation to find the type of flow (laminar/ turbulent using Reynold number.

$$\frac{1}{\sqrt{f}} = -2.0 \log \left(\frac{\epsilon/D}{3.7} + \frac{2.51}{Re\sqrt{f}} \right)$$

Head loss due to pipe fittings.

$$h_L = \left(f \frac{L}{D} + \sum K_L \right) \frac{V^2}{2g}$$

Epithialization

One of the major factors that directly influences the rate at which a wound heals is epithialization which occurs during the proliferation stage of healing. This is directly influenced by the environment. In dry or dehydrated environment, this process can be seen in form of scabs made from dead cells, these scabs are prone to easy reopening of wound and scarring. Moisture allows epidermal cells to migrate to the surface easily for faster recovery and preservation of growth factors.

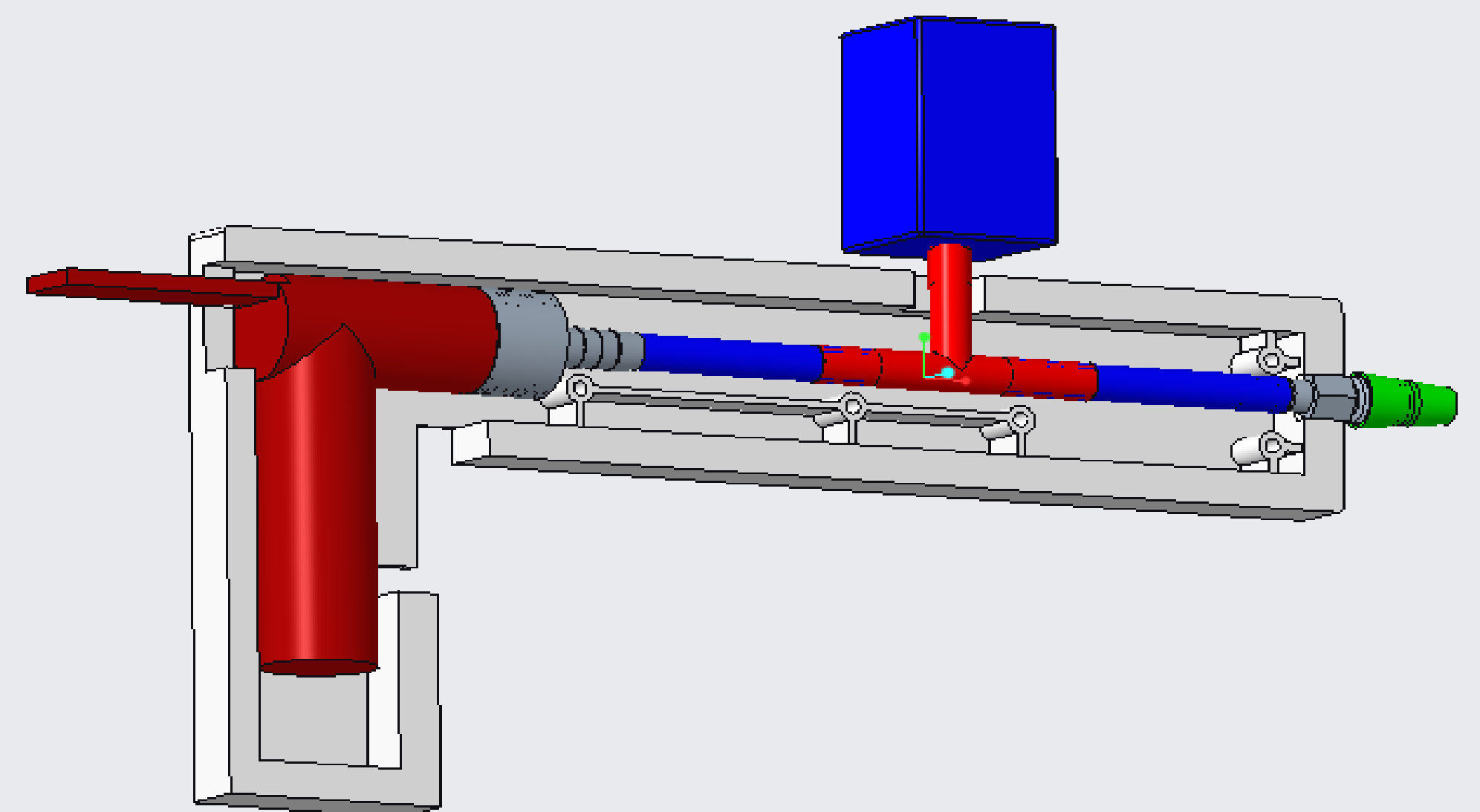


Figure 1. Computer Aided Design of the inside of the first-aid device.

Device Mechanism

The CO₂ canister is stored inside the grip, which connects to a trigger to release the gas. The outlet of canister is connected to a female barb hose to connect the outlet flow to the tube. The tee joint acts as a flow path between the CO₂ and the solution bottle. This also helps reduce the pressure from the gas. A check valve is placed between the solution bottle and the tee joint to prevent backflow of solution.

Solution

The solution is a hydrogel like wash off solution composed of 55% water. Upon application, a thin layer of gel will cover up the desired area and provide moisture. It will dry quickly and leave a thin film that as will protect it from infection. The solution can be washed off with water. It is in developing stage; it should provide the wound with a calming effect and moisture that will help speed up the epithialization process.

Ingredients: 55% DI water, 44% PUD, 0.5% sodium alginate, 0.5% gelatin.

References

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