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Prosthetic Covers

Product Specifications

1. **Idea**

We are going to design an above knee prosthetic cover, which is a protective and aesthetic device. The purpose of the cover is to partially restore the anatomic shape of the leg, but the design will be symmetric. Our cover will also be personalized to suit a specific group of amputees in order to meet their needs, which will be discussed in this document.

1. **Target Customers**

Our target customers are cyclists.

1. **Customer Needs**

Considering the physical activities of our target customers, the cover will be strong and solid, so it won’t easily deform or break during impact. For that reason, the front part of the cover will have 3-4 carbon fiber plates inserted into the PETG cover. The plates will stick out a bit. The cover will firmly fit to the prosthetic, so it won’t move around when the cyclist moves for extended periods of time. The PETG cover will be two pieces, which will be connected to each other using thumb screws, two at the top and two at the bottom. The carbon fiber plates will be attached to the front PETG cover with the thumb screws. Overall, we will have thirteen thumb screws, nine for the plates and only four for attaching the cover to the prosthetic. The cover will resemble the shape of a human leg, but it will be symmetrical, so the carbon fiber plates will have the same dimensions.

1. **Features**
2. Robust

Both PETG and carbon fiber are resistant to cracking and stress, even when flexed, and they are impact resistant.

1. Lightweight

PETG has density of g/cm3 and carbon fiber has density 1.57 g/cm3, therefore, considering our dimension it would be pretty lightweight and won’t add much weight to the already heavy prosthetic.

1. Durable

Again, due to the cover being made of carbon fibre and PETG, the cover is durable.

1. Replaceable/Interchangeable

As all carbon fiber plates will be the same, they are interchangeable. For example, if the front plate (the part that needs more protection) is damaged, you can just unscrew it and replace it with one of the side plates.

1. Easy to assemble

During assembling, you will only need to install four screws, which attach the cover to the prosthetic. There is also no need to have tools, in order to assemble it. It will take approximately 80 seconds.

1. **Related Information**

# [PETG Filament Complete Guide | Durability, Flexibility and Reliability](https://www.allthat3d.com/petg-filament/)

# [3D Printing with PETG: Tips and Tricks](https://airwolf3d.com/2015/12/05/3d-printing-with-petg-tips-and-tricks/)

* [Thumb Screws](https://www.mcmaster.com/thumb-screws/)
* [Characteristics of Carbon Fibre](https://www.fibre2fashion.com/industry-article/7123/characteristics-of-carbon-fibre)

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1. **Conceptual Design**