

6 SUMMARY AND CONCLUSIONS

The aim of this thesis was to investigate the modularity and price of prosthetics and create an above the knee modular prosthetic leg. The questions posed in chapter 1.4 can be answered based on this thesis in the following manner:

- What is the most suitable knee joint replacement mechanism? The mechanical locking system detailed above and modeled during the making in this thesis.
- What material is the most suitable for manufacturing and replacing components? Various materials are used in various components, as detailed in chapter 5.5. The high price of components comes from the medical certificates needed for prosthetics.
- How much would a replaceable component decrease excess spending? Replaceable components would decrease the spending on prosthetic limbs significantly. Although, the prosthetic must be monitored more for the users own safety – older prosthetics generally mean less reliability.
- Which design would prove most useful in case of replacing components? Simplistic and easy to manufacture designs would prove the most useful. The more common the design and material, the easier it is to find.

6.1 Modularity

The aspect of modularity in prosthetics is a difficult one. The biggest problem arises from a simple question – how to ensure quality in case of modularity?

A good answer to that would be to create maintenance kits for prosthetics. Once prosthetic legs would be simple enough by design to be taken apart by anyone with a user manual, a maintenance kit with sufficient or necessary parts could be created for the prosthetic. Buying parts from any building store would not work simply because some of the components would prove to be unreliable eventually. Thus, making a maintenance kit with a user manual and simply designing prosthetics to be more accessible by design could help reduce cost, time and energy. Another option would be to create an online catalogue of component providers, yet this is in conflict with the idea of general stores not providing sufficient quality for medical devices.

6.2 Price

The price of a prosthetic limb can be significantly reduced. The total estimated cost for the prosthetic limb was 421 euros for materials only. The lowest priced prosthetics start from around 2000 euros. Even if production of these parts from the given materials would cost 1000 euros, the total cost of it would still be significantly less than 2000 euros. The manufacturing of parts could most likely be done with less than 1000 euros. 3D printing technologies would help minimize the cost remarkably as well. As stated above in chapter 3.3, components usually need medical certifications, which raise the price, yet there are no concrete standards to follow for the manufacturing of prosthetics.

In closing, this thesis provides insight into the world of prosthetics manufacturing. It is a very wide and dynamic field of technology. Based off of this thesis, future topics can be found, such as improving modularity on design, providing further cost estimations, proposing universal manufacturing standards for prosthetics and many more. The thesis was overall a success: modularity can be obtained if developed further and price could be lowered significantly.