

Introduction

We are delighted to present our project: the creation of an innovative device intended to assist individuals with hand disabilities, specifically for cycling. This endeavor was inspired by Diego, a user with a partial hand featuring only the base of his thumb. Today, we will guide you through our journey of development, objectives, challenges, and the two prototypes we devised.

Project Development

Our journey commenced with an understanding of Diego's distinct requirements. Through dialogues and observations, we gained insights into the hurdles he encounters while cycling. Our primary aim was to devise a solution enabling Diego to grasp the handlebar securely and maneuver the bicycle comfortably.

We delved into existing solutions and brainstormed novel ideas. Subsequently, we sketched and crafted initial designs using Fusion 360, serving as the foundation for our 3D printed prototypes. As advised, we concurrently developed two prototypes to explore diverse approaches and identify the optimal solution.

Our foremost objectives were to ensure the device provided a stable and secure grip on the handlebar and to design an ergonomic shape that seamlessly fit Diego's hand, minimizing discomfort. Additionally, we aimed to devise a solution that could be easily affixed to and detached from the handlebar, employing materials resilient to regular usage and outdoor conditions.

By prioritizing these objectives, our aim was to develop a device not only catering to Diego's needs but also adaptable for individuals with similar conditions.

Challenges

Throughout our journey, we encountered several challenges. Designing a shape conducive to Diego's comfort and providing adequate support posed ergonomic complexities. Ensuring the device remained steady and resistant to slippage necessitated meticulous considerations regarding balance, stability, weight distribution, and attachment methods. Selecting materials that combined durability with comfort proved pivotal, leading us to experiment with various plastics and flexible materials. Furthermore, iterative prototyping and testing were imperative for enhancing the design, albeit consuming considerable time and demanding continuous adjustments based on feedback. Embracing our "useful mistakes," as suggested, we leveraged each iteration to contribute positively to the community.

Prototype 1

Our initial prototype was characterized by its simplicity and robustness. Featuring a cylindrical shape encasing the handlebar, it boasted an extended platform to support Diego's palm. This iteration aimed to evenly distribute weight and provide a secure grip. However, its weightiness resulted in a downward tilt of the hand due to the center of gravity.

Prototype 2

For our second prototype, we adopted a different approach to address the shortcomings identified in the first iteration. This version incorporated an adjustable clamp mechanism, facilitating effortless tightening around the handlebar using a screw for enhanced security. It boasted a contoured grip tailored to Diego's hand's natural shape, crafted from a softer, more flexible material to enhance comfort. Additionally, we introduced a small counterbalance weight at the device's base to prevent tilting and bolster stability. The design featured modularity, allowing parts to be interchanged or adjusted to accommodate varying user requirements. This prototype offered improved balance and comfort while maintaining a secure attachment to the handlebar.

Conclusion

In summary, our project underscores the significance of prioritizing user needs and iteratively refining designs. Through close collaboration with Diego and continuous design enhancements, we succeeded in crafting a solution that effectively addresses his requirements. Both prototypes provided invaluable lessons, and we believe that with further refinements, our device can significantly benefit individuals with hand disabilities. We extend our gratitude for the guidance in developing multiple prototypes and sharing our "useful mistakes" with the community, lending depth and empathy to our project.

Thank you for your attention, and if you have any questions, you can ask us.



