

After researching various medical/scientific articles, we found a lot of information on Parkinson's disease. Parkinson's and stroke patients would use our device for rehabilitation. We found two articles that gave us quantitative data on Parkinson's patients during cycling. One article gave us that maximum wattage (260 W) a Parkinson's patient produced during pedaling, and another article gave us the cycling cadence (about 53 rev/min) for Parkinson's patients. After doing some calculations we arrived at a maximum force of about 275N. With this being said, we would need a pedal that could this force and over to account for a safety factor. This could either be created by manufacturing, 3D printing, or buying a cheap pedal. However, we are most likely going to create a new pedal by some sort of manufacturing. 3D Printing would probably end up being too weak to handle the maximum force, and a cheap pedal won't be able to work with our specific designs. For the mechatronic part of our device, we are going to buy vibration motors and force resistance elements. The vibration motors will be able to deliver haptic feedback to the user in case the user goes off the virtual path. We will need some sort of force resistance elements such as strain gages in order to measure the force exerted on the pedal and deliver that information to the software. This will all be put together with an Arduino. For the Virtual Reality software, we may try to use a VR device to display the environment to the user. We could potentially use a Google Cardboard, but it would probably be better to use a higher quality VR device. By putting together all these elements from scratch, we will be able to design everything so it fits the device's needs as opposed to buying everything and hoping that it will work well with what we currently have.