



## Adaptive Clothing for People Effected by Parkinson's Disease

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Nearly one million people in the U.S. are living with Parkinson's Disease (PD) with about 60,000 more getting the diagnosis a year (Better lives. Together, n.d.) with a majority of these being men over the age of 60 (Parkinson's disease, 2020). PD is a disease that affects nerve cells in the brain and can slowly progress throughout a person's life (Parkinson's disease, 2020). Some physical symptoms that can be experienced are shaking in the extremities, a slowing of movements and speech, stooped posture, and stiffness in the limbs (Better lives. Together, n.d.). Simpson, LoPresti, and Cooper (2008) found that about 10% of people with PD are wheelchair users.

Adaptive clothing is a step to helping people with PD be more independent in their daily lives as their symptoms progress. Silverts and Buck & Buck offer options that are designed help keep pressure off key areas that could cause discomfort in a wheelchair. These options include shirts that utilize snap and magnetic closures to open the shirts from either the front or the back of the neck and shoulder. Shirts that close on the shoulder and neck also tend to have a double layered back, like a wrap top (Buck & Buck, n.d.; Silverts, n.d.). However, these styles lack accommodation for people with stiff limbs that want to independently dress themselves and do not feel secure in a wrapping garment. The use of back closures eliminates the choice for a person with limited mobility to dress themselves and this can be damaging to the confidence of this person.

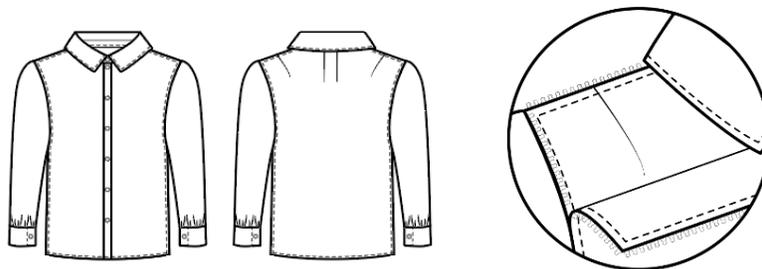
The purpose of this study is to provide adaptive shirt options for 60–75-year-old men with PD that are experiencing stooped posture and stiffness of the limbs, primarily when wheelchair bound. Lamb and Kallal's (1992) FEA framework was used in this study to create designs that were both user friendly and user centered. Based on the described FEA aspects, two shirts, Design 1 & Design 2, were developed.

**Functional:** PD symptoms can cause the people experiencing them to have difficulty with some closure types such as buttons. In Suri's study (2016), it was seen that wheelchair users were not satisfied with the fasteners of adaptive clothing or the body coverage. This is an essential part of creating adaptive clothing and can be remedied through better fastener placement and working to completely close the garment instead of using a flap design. The fabric needs to be wrinkle resistant and breathable for the wearer's seated position and the effects that PD has on the sweating response (Better lives. Together, n.d.).

**Expressive:** The expressive needs cater more towards adding comfort and confidence to the person who is donning the shirt. PD can have symptoms that are not as visible to an outsider like depression, cognitive issues, and general pain (Better lives. Together, n.d.). Creating a shirt

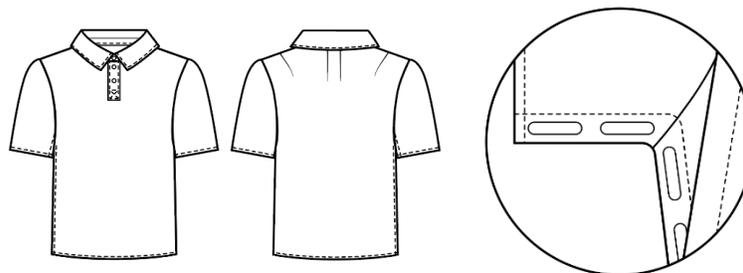
that allows for the wearer to feel confident and like themselves before their diagnosis can help to drive morale. This can be accommodated with different color/pattern options to provide for the variety of tastes that older men will have.

**Aesthetic:** Visual appeal is something that allows the wearer to convey something to the public. Adaptive clothing is meant to help a person live in a dignified and discrete manner with whatever condition they may have. This makes discretion of the accessible closures and changes a priority.



***Design 1: Cotton Men's Zippered Collared Shirt and Zipper Detail***

Design 1 is created to be a men's collared shirt. This design uses a different construction to allow the user to don the shirt unassisted with minimal overhead movement. Lapped zippers are used along both side seams to open the shirt flat and allow for the arms to be inserted. This feature also allows the front of the shirt to be completely removed and replaced if any spillage is to occur without having to remove the shirt entirely. The armholes of this shirt are slightly bigger in diameter, this accommodation gives the wearer more room to maneuver their arms into the sleeves of this shirt without causing pain/discomfort. Three magnetic buttons at the top of the collar and a back pleat gives the wearer more ease of movement when placing over the head or if they have a stooped posture. To add to the overall look, decorative buttons were added to the front of the shirt along with the cuff, which features a magnetic closure to give ease of access while keeping the feel of a men's dress shirt.



***Design 2: Cotton Stretch Men's Magnetic Underarm Closure Polo and Magnet Detail***

In Design 2, the closure follows the entire length of the side and sleeve seam. The strip of magnets will allow the wearer to slip one arm and the head in before sealing on the side of the shirt. Magnetic buttons are used in place of regular buttons on the front of the shirt as well, though they are still included for the aesthetic appeal. There is a back pleat to give more room for movement as well as accommodate the sloping of shoulders that can happen with stooped posture along with a wider armhole to help with sliding into this design.

Two designs were developed to give people who are wheelchair bound with stooped posture and stiffness PD symptoms more options for independent clothing donning. Design 1 gives the look of a men's professional collared button down while offering a variety of closures to help make this top assessable and discrete. Design 2 is a men's polo style that gives the wearer access to the shirt through the side and sleeve using a magnetic closure. These designs will give people more freedom in their day-to-day life and confidence in their appearance. Phase two of this study would include implementation of these designs in prototypes and then evaluation from a group of the target consumers. This study can be continued with the exploration of detachable collars and even sleeves.

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