

Hand-held device: Product Design Specifications

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Problem Statement

After experiencing a stroke, our client has had problems with walking due to a weakened left side. She has found that placing a ball in her hand allows her hand to relax, which consequently improves her walking gait. Our goal is to design a convenient, easy to operate hand-held device to relax her hand when walking, while at the same time easy to relocate or remove for tasks with both hands.

Client Requirements

- Hand-held device to help improve walking gait
- Rigid ball-like shape attached to securing mechanism
- Easily moveable
- Lightweight and washable
- Breathable material
- Aesthetically pleasing

Design Requirements

1. Physical and Operational Characteristics
 - a. *Performance requirements:* Device must improve walking gait by relaxing the hand. Should be easy to use and moveable to be used on a daily basis.
 - b. *Safety:* Must be securely fastened without restricting circulation.
 - c. *Accuracy and reliability:* Device must be secure when in use and successfully keep the hand relaxed.
 - d. *Life in Service/Shelf Life:* Should ideally last for 10 years with frequent daily use. Should withstand weathering and occasional washing.
 - e. *Operating Environment:* Should withstand temperatures from -20°F to 100°F. Device is typically used indoors.
 - f. *Ergonomics:* Should be comfortable for the user and rest lightly on the hand. Device should not deform during use and withstand up to 100 lbs.
 - g. *Size:* Ball diameter should approximately 1.5 inches. Needs to be portable and comfortably sit on the hand.
 - h. *Weight:* Less than 150 g.
 - i. *Materials:* Lightweight, breathable material such as cotton for the strap and ball. Ball should also be rigid.
 - j. *Aesthetics, appearance, and finish:* Client prefers a colorful product (red, green, and blue). Device should be soft and refined.
2. Production Characteristics
 - a. *Quantity:* At least one device ready to use.

- b. *Target Product Cost:* System less than \$100.
3. Miscellaneous
- a. *Standards and Specifications:* Meets health and safety regulations.
 - b. *Customer:* To be used by Carol and possibly other clients with similar problems.
 - c. *Patient-related concerns:* Patient has no allergies, confidentiality issues, or other concerns at this time.
 - d. *Competition:* There are no similar devices in the market used for this purpose.