The walkers depicted above represent the spectrum available—the standard walker at the low end to the rolling walker on the high end. Research indicates that medicare typically pays for 80% of the cost of a standard walker as pictured above left. Accessories are not covered at all as they are not considered “necessities” according to Medicare. These include baskets for carrying personal effects, rubber tip replacements, and plastic gliders which fit over rubber stoppers to help the walker move more efficiently and with less resistance over a variety of flooring. This type of walker has traditionally been considered the industry standard. However, some companies such as Rubbermaid, have begun to address issues of convenience and portability as seen in the built-in basket pictured above right. Other more advanced models now offer sporty wheels, removable baskets, seating, and hand brakes similar to those found on mountain bikes. Clearly there is a movement toward acknowledging the relationship between the aesthetics of a mobility device and the athletics of all types of movement among people of all ages and abilities. In addition to the “sport” trend, there is room for the development of other styles in the mobility device category. The intention of the proposed walker is to include as standard those items which would normally be addressed as accessories.
Shopping carts have been included in the existing product category as they can provide an alternative source of support for the elderly and those who need temporary mobility assistance or relief from the physical exertion of shopping. Viewing the shopping cart as a support device prompted a re-evaluation of the height limitations of a traditional walker. A new mobility device might accommodate a broader range of adjustability in the height of the handles and therefore satisfy the needs of a larger user population.
The Standard Walker As It Exists Today

Function:
Improves balance
Reduces pain, fatigue, weakness, joint instability, and excessive skeletal loading
Relieves weight bearing fully or partially on a lower extremity, as force from the upper extremity is transmitted to the floor by downward pressure on the assistive device

Form:
Materials:
Extruded aluminum tubing adjustable from 32 to 37 inches
Molded vinyl handgrips
Rubber tips on feet

Common Modifications:
Folding mechanisms allow walker to collapse, useful for those who travel
Molded handgrips or enlarged handles-helpful for patients with arthritis or limited dexterity.
Platform attachments allow the transfer of weight through the forearm to the walker
Casters allow functional ambulation for persons unable to lift the walker but reduces stability

Measuring:
The height of a walker should approximate the greater trochanter, the outer process at the head of the femur, and allow for 20 to 30 ° of elbow flexion

General Use of Walkers:
The walker should be picked up and placed down on all four legs simultaneously to achieve maximum stability. Rocking from the back to front legs or sliding the walker forward should be avoided because it decreases the effectiveness and safety of the assistive device.

The user should be encouraged to hold the head up and to maintain good postural alignment.

The user should be cautioned not to step too close to the front crossbar. This will decrease the overall base of support and may cause the patient to fall backward.

The Walker Continuum: A Semantic Comparison

Standard Issue
Low End Look and Feel
Utilitarian Feel
Cost Efficient Construction
“Cheap” looking Materials
No Accessories
Clinical/Engineered Appearance
Lightweight
Difficult to Fold
Somewhat Rickety/Unstable
Least Expensive Model

Sporty
Upscale Look and Feel
Comfortable
Sense of Pride
Color Choices Suggest Personal Style
Fully Accessorized:
wheels, basket, seat, brakes
Multifunctional
Suggests Active Lifestyle
Sturdy
Relatively Expensive
Four Point Gait Pattern

a. starting position: weight is borne on both legs and walker

b. the walker is advanced

c. the left leg is advanced

d. the right leg is advanced

Illustration of Four Point Gait Pattern Using Models of Different Heights
materials and mechanisms research
Materials used in the construction of products other than medical equipment were researched for their potential use in the design of walker components.

Wing knobs of tripod provide secure locking. Large easily maneuverable parts accommodate limited dexterity and low vision users.

Two existing types of winch handles used in sailing offer possibilities for maneuverability and reorientation of handles in proposed walker.

Carbon fiber and other lightweight composites are used in equipment requiring superior strength and performance.

Telescoping legs provide an alternative solution for height adjustment than those found on existing walkers.

Carbon furlers weigh half as much as aluminum furlers and increase performance due to increased capability to handle loads and stress.
Common materials used in bike frame construction include steel, titanium, carbon fiber, and aluminum. Steel has seen a renaissance recently due to advancements enabling manufacturers to produce frames comparable in weight to the lightest titanium. Titanium frames are famous for their light weight and resistance to fatigue. Carbon fiber is one of the strongest materials used in bike frame construction. Aluminum has been a popular material for use in bike frames since the 1970’s. New tube sets from major manufacturers have allowed builders to reduce frame weight significantly.

The body of the bike is coated in tritruim, a photoluminescent paint that glows in the dark and increase visibility of user at night. Application of paint to walker parts may assist low vision users.

Furniture padded with technogel, a soft polyurethane material, was developed for the health care industry in the 1970’s. It is capable of supporting the body with minimal friction and could be used for handles or seating of proposed walker.

Existing bike handle shapes.
concept development
Thesis Design Objectives

Design an assistive walking device that speaks to the issues of beauty, dignity, functionality and durability.

Invite touch through thoughtful choices in textural treatments of surfaces.

Ellicit a sense of pride in the user.

Support intuitive ease of use.

Thesis Design Strategies

Provide physical support for the user by functioning as a structure for stability.

Occupy a minimal amount of space when in use or closed.

Offer various possibilities for use, i.e., provide a secondary benefit such as seating.

Provide greater stability and maneuverability.

Adjust to a variety of users with varying levels of mobility and dexterity.

Adjust easily to accommodate users of different heights.
Examples of existing chairs that influenced and inspired the design of the proposed walker.

Integration of the arms and legs in a single piece of injection molded plastic gives a sense of stability to the ArcoBellini chair.

The Yanagi stool exemplifies the sensual and sophisticated in its use of materials and joinery.

The Voxia line of chairs is notable in its construction from a single sheet of laminated beech wood that is cut and bent into structural seating in one continuous process.
The seamless combination of materials, beech wood and steel tubing, provide inspiration for the integration of materials in the design of a walker.

The formed handles and mesh seat of the Caper chair relate to the design of proposed walker.

Collapsibility and portability are desirable features of the Klapp chair.

Ross Lovegrove’s Go chair exemplifies a streamlined silhouette and sensitively modelled parts.