

Cast Boot

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Function: The client, Dr. Donita Croft, has asked us to construct a boot for her daughter's cast. Her daughter has cerebral palsy, which causes an inhibition in dorsiflexion. Once a year, for approximately 4 months, her daughter is fitted with a cast which is used to slowly dorsiflex her feet. The cast itself is not waterproof and thus must be covered when she is outside. Currently no commercial products are available to cover the cast; however, the patient has used winter boots as well as a water proof sock and a medical boot.

Client Requirements

- Must keep the cast clean and dry when used outdoors
- Must be water resistant and durable
- Should be easy to put on and take off
- Needs to have some flexibility in terms of size
- Light weight and easily used by a child

Physical and Operational Characteristics

- *Performance requirements:*
 - Should keep the cast dry and clean, thus being water resistant and durable
- *Safety:*
 - The device must be made out of non allergenic materials such as latex.
 - Should have treads for traction
- *Accuracy and Reliability*
 - Must fit the patient well (not too tight or loose)
 - Should keep dry and clean 100% of the time
- *Life in Service:*
 - The device must be usable for at least 2-3 years
- *Shelf Life:*
 - Used for about an hour a day
 - Easily storable.
- *Operating Environment:*
 - Will fit over cast
 - Should fit within the given boot (unless a different mechanism is used)
 - Key is to be able to work in winter climate which includes: puddles, slush, and snow
- *Ergonomics:*
 - Comfortable for patient.
 - Must be easy for patient to put on without help.
 - Must maintain its position with normal patient movement.
- *Size:*
 - Patient has slightly larger than a childrens 13 size shoe

- Should go at least a foot up the cast, not necessarily the entire cast
 - Weight:
 - Should be light because a child will be using it
 - *Materials:*
 - Patient has no allergies
 - If future production is possible, may want to have latex-free
 - *Aesthetics, appearance, and finish:*
 - Shouldn't look overly medical
 - Blue, Black, Purple
- **Production Characteristics**
 - *Quantity:*
 - At least one
 - *Target Product Cost:*
 - Less than \$100
- **Miscellaneous**
 - *Standards and Specifications:*
 - There is nothing on the market for this problem, so no specifications
 - *Customer:*
 - Customer would like the ability to possibly construct at home when our design becomes too small, but this is not imperative
 - *Patient-related concerns:*
 - Breathability
 - Easy to put on
 - *Competition:*
 - There is currently no products on the market for this problem