Team 11: Craig Hanna, Kyle Hamilton, Nick Woolsey

TEAM #11 FINAL PRESENTATION
Presentation Outline

- Introduction
  - About Dominic
  - Our Solution
- Treadmill weight bearing system
  - Frame
  - Weight Bearing System
  - Harness
  - Treadmill
- Budget
- Secondary Project
  - A pool lift for Zak Mahoney
- References
TREADMILL SUPPORT SYSTEM FOR DOMINIC GONDREAU
About Dominic

- “Cerebral palsy is a group of disorders that can involve brain and nervous system functions such as movement, learning, hearing, seeing, and thinking.” [1]
- Cerebral Palsy does not allow Dominic to exercise on a daily basis.
- A safe environment for exercise presents the possibility for Dominic to gain more muscle control.
Our Solution

- Design a weight bearing system to be used with a treadmill to allow Dominic to exercise and improve muscle tone and function.
Constraints

- Design must be light weight and easy to disassemble
  - As requested by client
- Must stabilize Dominic and be able to bear his full weight
- Design must be able to slowly lift Dominic from his wheelchair
- Must support Dominic’s head and back while he exercises
- Treadmill must have 0.1mph increments
Alternative Design

- Aluminum frame
- Utilizes pulley system to lift Dominic

Problems:
- The design is unstable in a number of places
- There is no place to attach a pulley system for a vertical lift
Our Solution
Components Overview

- **8020 Frame**
  - 1.5” x 1.5” 1515-LS cross section
  - 8020 3364 Corner mounting joints
  - Casters

- **Weight Bearing System**
  - Firgelli Automations 450-TR-24-XX Track Actuator

- **Cable System**
  - Sportsmith.net
  - Cable and accessories used for exercise equipment

- **Harness**
  - Black Diamond Wiz Kid Harness

- **Treadmill**
  - Precor model 946
The Frame

- 6’ beams along base
- 6’ legs attached to base beams
- 4’ side beam for weight support system attachment
- 3’ beams on top and sides of frame supply rigidity
  - Side beams clear treadmill and Dominic in wheelchair
Weight Support System

- Track Actuator
  - 40” stroke length
  - Light weight aluminum design
  - 450lb load capacity
  - Load Speed = 0.14-0.39 in/s

- Includes
  - Plug in power supply
  - Wired remote control
  - Mounting kit
Track Actuator Safety System

- Wireless remote control has a RF emergency stop button which screws into the track.
- When the track actuator presses this button, an RF signal shuts of the actuator.
- This button will be installed at the top of the track actuator to provide an extra safety measure to prevent Dominic from being lowered to close to the treadmill.
Cable to Actuator Fixation

- Machined plate is attached to existing mounting hardware for attaching the cable to the actuator.
- Attachment via plate and carabiner (quick release clip).
Harness System

- The harness is easily placed on and off Dominic
- It is rated to support the weight of a child
- The system will also include a back brace for extra support
Cable Harness Attachments

- To allow for maximum stability we crafted a bar which creates four points where the harness can be attached.
- This prevents Dominic from falling forward and backward as well as to the left or right.
Attaching the pulleys

- The pulleys attachments are supporting all of Dominic’s weight
- The attachment needs to be rigid
- Solution: Steel attachments were welded around the top bar which the pulleys hang from
Treadmill Issue

- Treadmills cost at least $400
  - Cheaper treadmills are used and may be unreliable
- Realistically this project needs a $1000 treadmill with the following specifications
  - 0.1 mph speed increments
  - Durable enough to last 5 years
  - Width about 34”
- Our solution was to ask for a treadmill donation
The Treadmill

- Precor treadmill model 946
- Donated by New England Fitness
  - Contact: Peter Lamagna, a UConn Alumni
- The treadmill meets all specifications and fits perfectly into the frame
Pictures of Final Design
Treadmill Support System Budget

- **Track Actuator**
  - Actuator: $240.00
  - Mounting Kit: $19.50
  - Wireless Remote System: $65.00

- **Cable System**
  - 3/8” x 25’ Wire Cable: $20.00
  - Pulleys: $20.00
  - Cable Accessories: $25.00

- **8020 Frame**: $680.00
- **Braces**:
  - Neck: $15.00
  - Back: $50.00

- **Harness**:
  - Rock climbing harness: $50.00

- **Treadmill**: Precor 946
  - Donated

**TOTAL**: $1180.00
POOL LIFT FOR ZAK MAHONEY
About Zak

- Zak also has Cerebral Palsy
- He enjoys swimming in his pool, but is unable to get in and out on his own
- Swimming is a great way for Zak to exercise
- As he grows larger, his family is having a harder time to transfer him from his wheelchair into the pool, and then back out
Our Solution

- With many existing above-ground pool lifts on the market already tailored to the needs of the Mahoneys, we have decided to purchase one of these.
Constraints

- Must be able to transfer Zak directly from his wheelchair into the pool, then back to his wheelchair.
- As simple as possible (i.e. no electrical components).
- Must be able to be disassembled during the winter months.
- Must be corrosion-resistant.
- Should mount to the client’s wood deck.
- Must be able to support Zak’s weight.
Pool Lift

- Triton Pool Lift
- Weight Capacity: 400lbs
- Weight: 60lbs
- Hand powered crank
- Deck mount included
- Harness attachment included
Pool Lift Budget

- Refurbished Lift and Base Price: $846
References


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