

Introduction

Our client is a sophomore at Loyola University studying Graphic Arts. She has osteogenesis imperfecta (OI) and has thereby been a wheelchair user since birth. She is approximately 31" tall and weighs 40-45 lbs; she cannot support her full body weight, and desires a device to help exercise her lower body.

Osteogenesis Imperfecta

- Caused by a collagen I deficiency
- Results in brittle bones and weak joints
- OI patients often are of short stature due to stunted growth
- Commonly known as "brittle bone disease"

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EXERCISE SYSTEM FOR OSTEOGENESIS IMPERFECTA

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Team Design Show

Design Criteria

- *Be safely operable*
- *Afford variable resistance*
- *Be easily transported*
- *Be durable*
- *Be aesthetically pleasing*
- *Operate quietly*
- *Afford comfort*
- *Provide feedback on resistance level*

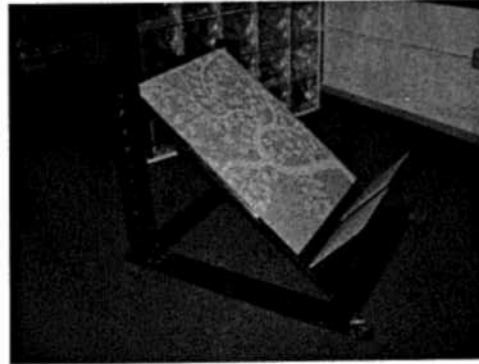
The design goals for the exercise system were devised based upon input from our client. They were reviewed by the teaching staff and our faculty panel before construction of the device began.

Model Features

- 10 levels of resistance
- Collapsible
- Wheels for easy transport
- Lightweight (<25lbs)
- Durable wooden frame
- Designed with custom ergonomics for our client
- Indexed load settings

Top: Device in its deployed state.

Bottom: Device in its stowed state.



Future Directions

An additional feature of the device is a set of interchangeable lengths of surgical tubing that serve as a displacement-dependent load. Our client can lay the device horizontally and work against various strengths of tubing, set the device to a desired incline for a constant load, or some combination thereof.

In the coming month we will devise a workout plan for our client. In addition to the Operation & Safety Manual, we will deliver placards enveloped in plastic that will walk the client through various workouts and detail which muscle groups are being worked.

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