



THE EQUILIBERATOR

BALANCE THERAPY ENTERTAINMENT SYSTEM

Drew Berger (BIOE), Matt Jones (MEMS),
and Michelle Pyle (MEMS)
asb1@rice.edu, mkj1@rice.edu, mlp1@rice.edu

The Equilibrator is an inexpensive and effective therapy tool designed to address balance disorders in pediatric patients. It focuses on making therapy fun for kids and informative for therapists.

Balance disorders resulting from conditions such as cerebral palsy, can be improved with therapy. Existing balance therapy devices are expensive, boring for child patients, and insensitive to the patient's reliance on balance aids. Shriner's Hospital for Children sought an inexpensive device that could improve autonomous balance while challenging, entertaining and rewarding a patient. Our device accomplishes this by using Nintendo® Wii Balance Boards in conjunction with innovative force-measuring handrails. This device is designed to control a video game that is fun and beneficial for patients while informative for therapists.

Pediatric balance disorders:

- Range from trouble standing to faltering gaits
- Cause reliance on aid for balance

Primary goals:

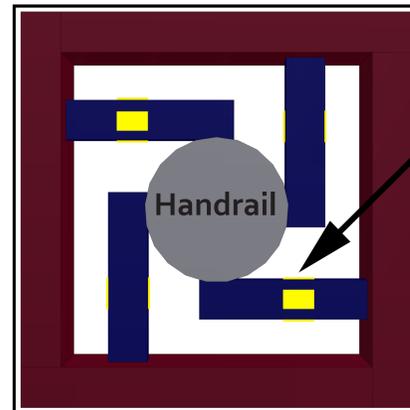
- Quantify and reduce reliance on balance aids
- Make therapy attractive to child patients

Design strategy:

- Encourage completion of simple balance tasks
- Discourage use of handrails for balance
- Make therapy informative and fun

Design Criteria:

- Measure reliance on rails
- Measure center of balance
- Provide large measurement area
- Provide interactive experience
- Ensure patient safety
- Accommodate patients:
 - up to 300 lbs
 - younger than 18 years
 - with mental disabilities
- Start up quickly
- Cost less than \$2500

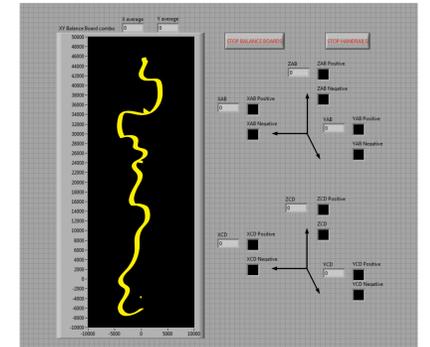


Four sensor boxes are constructed of 1/2" aluminum and support up to 300lbs

Omnidirectional handrail force data:

- Generated by 120 ohm Omega strain gauges (yellow)
- Collected by NI 9219 DAQ
- Read by LabVIEW 2009

Galvanized steel handrails are held fast with welded steel couples



The diagnostic interface shows data from handrails and Wii boards in real time

All electrical components are grounded for safety

Wii boards are covered with plexiglass to eliminate tripping

The Eucaboard frame is light, strong, and designed for easy board access



Center of balance is measured by an array of five Wii boards

Rocketfish® adapter reads Wii boards' bluetooth signals into the computer

The standing area is 53 x 160 cm and is surrounded by shallow ramps

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In conclusion,
The Equilibrator:

- Entertains while providing therapy
- Challenges patients safely
- Measures reliance on aid for balance

The Equilibrator is an inexpensive and fun therapy tool designed to address balance disorders in pediatric patients. Its implementation in clinics and homes across the country will improve the lives of millions of children.