

## Results

### Participants:

- Nine youth (6 males), mean age 15 years
- Five walked with devices at baseline, and 4 were pre-ambulatory
- All completed >10 of 16 planned LOK sessions (mean=13.9)

### LOK use:

- Early LOK discontinuation was linked to rapid gait improvement (new goals) or early discharge
- LOK set-up was challenging in initial sessions due to ABI-related impairments/fatigue but became easier over time

### Gross Motor and Gait Outcomes

- **GMFM Stand and Walk** mean gains (n=15) were 25.3% points (SD=17.2)(P=0.0001) and 29.1% points (SD=26.7)(P=0.0002), respectively
- **6mWT** mean gain of 230.6 metres (SD 116.9) for the 5 youth who did at both assessments

### COPM and GAS

- COPM change (/10) was 2.17 points (n=8)
- GAS T-score was 58.0 (n=7) indicating goal achievement above the level targeted

## Conclusions

- Our LOK treatment protocol is **feasible** during early/mid-stage rehabilitation post-ABI
- Dramatic changes in **walking independence**
- Evidence of **large gross motor gains** (GMFM) and clinically **important change on the COPM and GAS** in association with our study's integrated LOK and PT program
- **Gains** are far **more** than in another study (Beretta et al.) – however most of our youth were in earlier rehab phase → peak time for gross motor training and change
- Change score estimates will be valuable a **effect size estimates** for a future RCT

## What are the burning questions now?

- Are there **advantages beyond** an equal frequency of gym-based PT alone? We do not know that yet!
- Does the LOK **speed up achievement** of gait gains in the short term?
- Does the LOK promote **greater overall gait improvements** (reaching new levels of gait quality) that PT alone will ever achieve?

## Acknowledgements

- Centres for Leadership in Acquired Brain Injury, Bloorview Research Institute
- Youth and families who participated in the study
- PT and OT assessors in the Brain Injury Program
- Holland Bloorview Chair in Pediatric Rehabilitation

## References

1. Beretta et al. Combined robotic-aided gait training and physical therapy improve functional abilities and hip kinematics during gait in children and adolescents with acquired brain injury. Brain Injury 2015;29:955-962

# Our Lokomat robotic gait trainer is only being used in research.

## We don't have enough evidence or knowledge of best practice yet to move it into clinical care at Holland Bloorview



## Evaluation of robotic gait training in early stage rehabilitation of children and youth after an acquired brain injury

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## Background

- Children with acquired brain injury (ABI) can have significant motor deficits that persist long-term.
- During early/mid-stage rehabilitation, a common goal is to regain independent walking ability. Thus, physiotherapy (PT) frequently focuses on retraining gait/related function.
- Robotic-assisted gait training devices, such as the **Lokomat (LOK)**, target walking retraining and allow earlier exposure to ambulation due to the LOK's adjustable body support and gait guidance.
- The LOK has been studied mostly in children with cerebral palsy, while research is very limited in ABI with only one previous study from Italy (Beretta et al., 2015) at a later stage in rehabilitation.



## Research Questions

1. Is the LOK a feasible and acceptable 'integrated' intervention for children with ABI who are in the **early ambulation stages** of rehabilitation?
2. What **magnitudes of change** in overall gross motor functional abilities and individualized gait-related goals are **associated** with Lokomat use in this context?

## Methods

- **Design:** Single-group pre-/post-test feasibility
- **Sample:** Inpatients admitted to Holland Bloorview's Rehab program with moderate or severe ABI, age 5-18 years
- **Intervention:** 2 sessions LOK/week and 3 sessions/week of gym-based PT over 8-weeks
- **Key outcome measures:**
  - a) **Clinical:** Gross Motor Function Measure (**GMFM**)
  - b) 6 minute walk test (**6mWT**)
  - c) Individualized goal achievement via Canadian Occupational Performance Measure (**COPM**): parent + child (if possible) report
  - d) Goal Attainment Scale (**GAS**) by PT with child