



## GAIT TRAINERS THE ADVANCED COURSE FOR CALIFORNIANS

Ginny Paleg, PT, DScPT, MPT

## 4 NEW ARTICLES!

- Systematic review (Paleg and Livingstone, 2015)
- Comparing 3 models (Paleg et. al. 2016)
- Outcomes measures (Livingstone and Paleg, 2016)
- Clinical Perspectives (Paleg and Livingstone, 2016)
- Email me if you want them



## DEFINITION (PALEG AND LIVINGSTONE, 2016)

- Gait trainers commonly unweight the body through a solid or fabric 'seat', stabilize the trunk and support the pelvis.
- Survey data suggests that therapists hope to influence body structure and function components such as hip structure, cardiorespiratory function and bone mineral density through gait trainer use (Low, 2011)



## MODELS AVAILABLE IN US AND CANADA

- |                 |               |               |
|-----------------|---------------|---------------|
| 1. Bronco       | 10. Kaye      | 18. Smart     |
| 2. Buddy Roamer | 11. Kidwalk   | 19. Star      |
| 3. Comet        | 12. Mey Walk  | 20. Taos      |
| 4. Crocodile    | 13. Mustang   | 21. Trekker   |
| 5. Dynamico     | 14. New Lift  | 22. Up-N-Go   |
| 6. Gait Master  | Walker        | 23. Up-N-Free |
| 7. Gator        | 15. Nurmi Neo | 24. Walkabout |
| 8. Grillo       | 16. Pacer     |               |
| 9. Hart         | 17. Pony      |               |



## SYSTEMATIC REVIEW

- Seventeen studies involving 182 children were included.
- Evidence from one small randomized controlled trial suggests a non-significant trend toward increased walking distance
- One level II study reports increased number of steps.
- Two level III studies report statistically significant impact on mobility level with one finding significant impact on bowel function and an association between increased intervention time and bone mineral density.
- Remaining descriptive level evidence provides support for positive impact on a range of activity outcomes, with some studies reporting impact on affect, motivation and participation with others.



## SYSTEMATIC REVIEW OF GAIT TRAINER OUTCOMES FOR CHILDREN WITH MOTOR IMPAIRMENTS

### Why?

- Lots of people (teachers, parents, therapists, children etc.) use gait trainers
- We didn't know of more than a handful of studies
- Gait Trainers were considered "experimental"
- This was resulting in a lack of access for children in the US and Canada

My girls gait trainer transformed into a sweet sixteen dress.



## Methods:



- 7 electronic databases - search updated to November 2014
- Search Terms 'gait trainer', 'support walker', 'walking device', 'ring walker', 'infant walker', 'baby walker', 'body weight, support gait trainer', 'walker', 'supported ambulation', 'David Hart Walker', and 'supported walking'
- Included studies - gait trainer intervention in home or school setting and child up to age 18 years
- Level of evidence AACPD Evidence Levels.
- AACPD Quality assessment of Evidence Level I-III studies.

## Paleg and Livingstone

Clin Rehabil. Oct 2015



- 17 studies included.
- Two level II studies supported impact on walking distance and number of steps taken.
- Two level III studies supported impact on mobility level with one of these suggesting impact on bowel function and bone mineral density.
- Level IV and V studies support positive impact on a range of activity outcomes, some supporting impact on affect, motivation and participation.

## Level II (weak)

- Overground vs treadmill the same at school for distance with positive trend in increased endurance in over ground group (Willoughby, 2011)
- MOVE helps students increase # of steps taken N=3 (Barnes, 2003)



Video courtesy of Wendy Altizer, PT, ATP

## Level III

(Eisenberg, 2009)

- N=22 children with severe cerebral palsy, 11 used a Hart Walker (HW) device, and 11 had a passive standing program.
- Gait Trainer use makes you poop!



## Level III

van der Putten, 2005

- N=44 GMFCS Level IV and V
- Taught to "step" using MOVE
- The level of independence of the **experimental group increased significantly** in performing movement skills; the control group did not increase significantly
- At an individual level, 20 children (63%) of the experimental group improved in comparison with the control group, in which four children (33%) improved.



## Conclusions



**YELLOW**

- There is Level II Evidence for gait trainers in children with CP
- We recommend beginning use at 9-12 months
- For children at GMFCS levels II-V
- Children at Level V <50<sup>th</sup> percentile may need adult to push devices to activate CPG/Stepping (THIS IS OK WITH BC/BS ANTHEM!)
- Children at Level IV should be independent indoors
- Children at Level III <50<sup>th</sup> percentile may benefit from use outdoors

## Clinical messages

- Gait trainers may assist development of independent stepping and walking distance for some children who are unable to walk without support.
- Observational evidence suggests that gait trainers may have a positive impact on body structure and function, activity and participation outcomes.



## COMPARING 3 MODELS

- Pacer and KidWalk were easiest to move on tile flooring
- KidWalk was easiest to move on carpet
- Pacer was lightest, KidWalk was heaviest
- Pacer has largest amount of growth for weight, KidWalk for height



## OUTCOME MEASURES

- The Pediatric Evaluation of Disability Inventory (PEDI) rated highest across all areas at this time.
- Canadian Occupational Performance Measure (COPM)
- Goal Attainment Scaling (GAS)
- Quebec User Evaluation of Satisfaction with assistive Technology (QUEST)
- Spatiotemporal measures appear to be less useful than functional measures with this intervention and population.

## CLINICAL PERSPECTIVES

- 27 articles were included in this study
- 24 different gait trainers were identified as being commercially available in the UK, Canada and USA at time of searching
- Many factors need to be considered when selecting an appropriate gait trainer for a specific child including: muscle tone, movement patterns, need for support as well as inertial forces.

## KEY POINTS

1. Gait trainers or support walkers may be used to promote development of upright posture and independent gait with young children in GMFCS levels II or III who will transition relatively quickly to less supportive hand-held walkers or to walking without aids.
2. Gait trainers or support walkers are commonly used to promote activity and participation for children in GMFCS levels IV or V as well as some adolescents in GMFCS level III.
3. At least 24 different gait trainers with a variety of different frame styles and support components are commonly available in North America and Europe, but research supporting clinical reasoning around selection of gait trainer styles and features is very limited.
4. Limited research suggests that therapists should first consider posterior hands-free types of gait trainers for younger children with CP unless arm support and a forward leaning posture are necessary for stepping.

## KEY POINTS

5. Anterior frame styles may be more appropriate for older children who have a more flexed posture, and appear to offer some advantages for caregivers in terms of ease of transfers.
6. Gait trainers with dynamic or orthotic components may promote the development of independent stepping and gait parameters, although transfers into devices with orthotics or reciprocators appear to be challenging for older children.
7. When selecting a gait trainer for an individual child, therapists should consider the impact of the physical parameters of the device and support features as well as environmental factors such as location of use, support personnel, type of transfer and need for folding or easy transportation.
8. Further research is needed on all aspects of gait trainer prescription, use and implementation.

## WHO NEEDS A GAIT TRAINER?

- Children at GMFCS levels IV and V are unable to use typical hand-held walkers due to impaired trunk control, strength, balance and range of motion.
- Children with complex developmental delays also benefit from walkers that provide additional trunk and pelvic support.
- Children with visual impairment or profound cognitive limitations may lack motivation to explore due to limited ability to engage in functional or stimulating activities.
- Supportive walking devices or gait trainers may be used with these populations to influence different types of outcomes as defined by the International Classification of Functioning, Disability and Health (ICF).



## HEAD SUPPORT OPTIONS:

- Children without adequate head control should be considered for a head support
- Soft neck supports or a headrest
- Some gait trainers do not have headrests
- Some allow use of other commercial head supports
- Gait trainers that can be anterior or posterior may have head support only in the posterior setup



Use head support  
at least 50% of  
time in gait trainers  
when  
• Child only looks up  
<50% of the time

## CHILDREN AT GMFCS LEVEL III

- A child not pulling to stand and cruising by age 24 months is predicted with 90% certainty to always need a walker
- Choose a gait trainer that converts to a posterior walker
- Kaye,
- Nurmi Neo,
- Crocodile,
- Gator



## SHORT LEG

- Wear a cast boot on short leg
- Tape a shoe lift (foam or other material for trials) – try a flipflop!
- Have a shoe lift made
- Some brands of shoes (Keeping Pace, SureStep) allow you to add inserts inside of shoe to gain height



## NEED LESS SUPPORT

- Remove "seat/sling" (**NOT FROM KIDWALK!!!!**)
- Loosen trunk support
- Loosen trunk support BEFORE pelvic support
- Switch to soft trunk support (KidWalk)
- Flip trunk supports "up"
- Remove trunk support



**WARNING!!!! NEVER REMOVE SEAT OR POMMEL FROM A DYNAMIC SYSTEM INCLUDING KIDWALK!!!!**



## CHILD IS RUNNING OVER THEIR OWN FEET

- Raise system (1-3 pumps, then re-assess)
- Make sure sacrum/pelvis is all the way back against the support pad
- Make sure pelvic laterals and anterior supports are tight and at the ASIS level
- Reduce posterior pelvic tilt
- Try twister system – like suspenders wrapped around leg and clipped to shoe laces



## SHOULD CHILD LEAN FORWARD?

- CPG is triggered with hip extension (GTO and spindle stretch in hip flexor)
- Upright is best for kids with full range who are just starting
- Older people with tightness (or contractures) may need forward lean so gravity can assist with forward motion
- Try both, try to get upright (for vision, breathing, BMD, etc)
- Don't tilt the KidWalk too far forward – make sure the pelvis is all the way back in the frame and snug



LAURUSCHKUS K1, NORDMARK E, HALLSTRÖM I. "IT'S FUN, BUT?..." CHILDREN WITH CEREBRAL PALSY AND THEIR EXPERIENCES OF PARTICIPATION IN PHYSICAL ACTIVITIES. DISABIL REHABIL. 2014 APR 30.

- N=16 children with CP 8-11 yo
- Having fun with family and friends when being physically active, and enjoying the **sensation of speed** should be taken into consideration when designing interventions.
- When supporting children to become and remain physically active, attention should be paid to pain, fatigue and the accessibility of activities and locations.
- Service planning and design may be facilitated by asking children about the physical activities they enjoy.



## GAIT TRAINER OR STANDER?

- GMFCS V – Stander First
- GMFCS IV – BOTH!!!!
- GMFCS III - Gait Trainer that converts to a walker and a stander at 9 months maybe for a few years?
- Hip subluxation, hip/knee/ankle ROM, spasticity \*\*\*may need both!



## IT CAN BE MEDICALLY NECESSARY TO USE BOTH!

- Muscle fibers contract at a shortened length and adapt to the abbreviated working range by decreasing the number of in-series sarcomeres. (Wren, 2005, VanDyke, 2012, Tardieu, 1982)
- The decrease in ROM involves the soft tissues, including tendons, ligaments, and joints.
- Stretches combined with isometric contractions resulted in significant increases in joint ROM and extensibility. (Van Dyke, 2012)
- According to Fowles (1982) contraction is required in combination with a stretch to preserve the number of sarcomeres, and maintain proper muscle fiber length.
- Decreased activity results in decreased stem cells in the muscle (satellite cells)



## IT'S OVER

- What will you do differently Monday?
- Any kid you didn't think was a candidate for standing or gait trainer that you might try?
- What did you learn today?
- Join my Facebook group Pediatric PT and OT Discussion Group



Tomorrow's Monday??  
Again?? I don't think I can do  
this every week!

