
Assessing the Effects of Adaptive Tricycles on the Quality of Life in Children with Movement Disorders

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Background: AMBUCS

AMBUCS is a national non-profit organization with a mission to provide riders who have motor/developmental disabilities with therapeutic adaptive tricycles.

There are over **160 chapters** in more than 35 states. They have **provided over 400,000 Amtrykes** to riders all over the United States.



Background: AMBUCS

AMBUCS works closely with PTs, OTs, & SLPs. These therapists acknowledge that Amtrkys offer many therapeutic benefits, including **improved motor skills, strength development, & self-esteem.**



- They believe that **everyone** should enjoy the fun experience & freedom of riding a bike, especially people who are unable to operate traditional bikes.

Previous Research has focused on:

Improvements in gross motor function & safe effective means of exercise for patients with **cerebral palsy**.¹

Parent's perspective of the physical, social & emotional impact a therapeutic bike has on children with special needs.²

Effects of bikes on hip extensor muscles in subjects with **cerebral palsy**.³

Levels of participation & the relationship to the QoL in children with CP.⁴

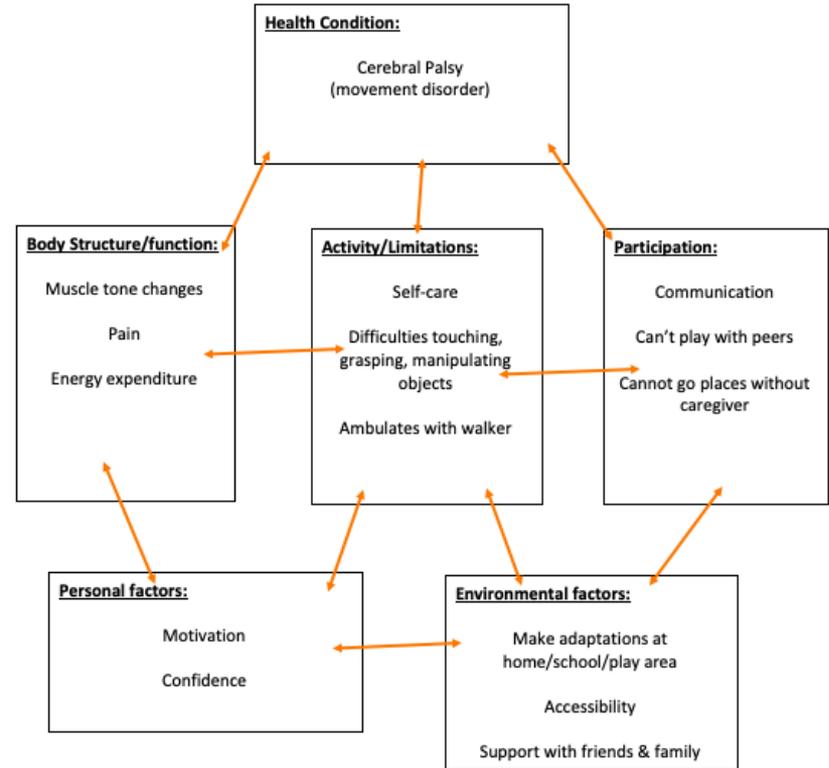
However, none of these studies have captured the usage of these adaptive bikes on the quality of life of children with movement disorders.

The main focus has been subjects with Cerebral Palsy, while ours is not requiring an exact disability.

Problem:

Children with movement disorders often experience abnormal muscle tone & decreased physical strength.

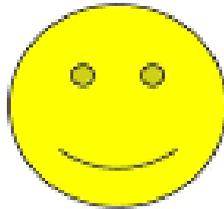
- This affects their ability to participate in daily activities as well as their quality of life when they are not able to partake in childhood activities.



Purpose:

To determine if the use of Amtrykes have an affect on the overall quality of life in children with movement disorders.

Happy



OK



Sad



Research Question:

How will the use of an adaptive tricycle affect the quality of life in children with movement disorders?

Hypothesis:

Amtrykes will have a positive effect on a child's quality of life.

Variables:

Dependent Variable → quality of life

Independent Variable → presence of the Amtryke

Confounding Variables → cognitive level of the child, biased answers

Methods - Participants

- 17 participants
- Inclusion criteria
 - Age 4-18
 - **Movement disorder** such as (but not limited to) cerebral palsy, or autism
 - Meets AMBUCS requirements to receive an adaptive tricycle
- Exclusion criteria
 - Non-English speaking

Participant Recruitment

- Recruited through Bluegrass AMBUCS organization
- Participation flyer and link to Qualtrics Survey sent to 97 families
 - Those with Amtryke and on wait list
- Other recruitment methods: reaching out on our own via email, attending bike giveaways and events
 - Limited due to COVID-19

Methods

- Participants fill out survey with parent/guardian
- Components from ASK, CAPE, PAC questionnaires
- Rate task in question



12:29

0% 100%

UK University of Kentucky

Thank you for participating in our survey about the Effects of Adaptive Tricycles on the Quality of Life in Children with movement disorders. We want to get your thoughts on the following questions for children who are EITHER on a wishlist to obtain an AMBYKE, or for children who have already received their AMBYKE. Thank you for taking the time to provide us with your thoughts.

Gender:

Male

Female

Age of Child (years, months):

Survey: Part I - Demographics

Gender:

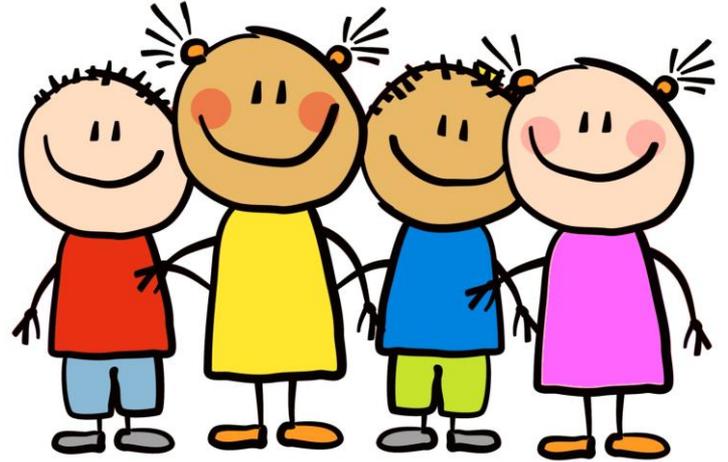
Male

Female

Age of Child (years, months):

Child's Diagnosis/Condition:

Amount of time child has had adaptive tricycle (years, months): *if child is currently on a waitlist write N/A*



Survey: Part II - Quality of life

In the Past ONE MONTH, how would you place your child in the following activity categories: *choose "Not Applicable" if you child is physically not able to perform due to their condition

	Physical Functioning & Social Interaction					
	Never	Almost Never	Sometimes	Most of the time	Always	Not Applicable
Walking more than one block	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Performing grooming activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Participating in sport activities or exercises	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Able to play outside	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taking a bath/shower by themselves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Never	Almost Never	Sometimes	Most of the time	Always	Not Applicable
Completing chores around the house	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Having hurts/aches	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Child can finish daily activities without getting tired	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ability to do things that other children their age can do	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Keeping up when playing with others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you feel as if the adaptive tricycle has affected your child's quality of life or the way they feel about themselves?

Yes

No

If "Yes", please explain:



Survey: Part III - Adaptive Tricycle Frequency

	Adaptive Tricycle Use				
	Never	1-2 times	3-4 times	5-6 times	6+ times
How often does your child use their adaptive tricycle each month?	<input type="radio"/>				

Does the time of year affect how much your child uses the bike? If yes, please explain.

Does the weather affect how much your child uses the adaptive tricycle? If yes, please explain.

Does the area you live in affect how much you use the adaptive tricycle? (examples: sidewalk access, driveways, hills, park access, etc.) If yes, please explain.

If the adaptive tricycle is NOT being utilized, please check the following reasons that apply:

Bike is broken

Not enough time to use the bike

Too much difficulty to get child on the adaptive tricycle

other children in family do not have bikes to ride

Child does not care to ride adaptive tricycle

Child has outgrown their adaptive tricycle

other

Study Significance:

Our study is significant because it focuses on the impact an adaptive bicycle has on a child's quality of life.

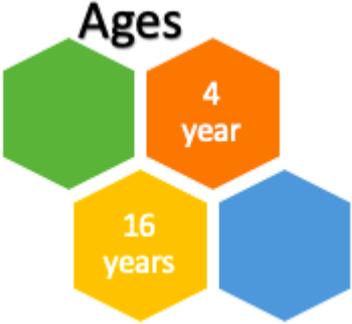
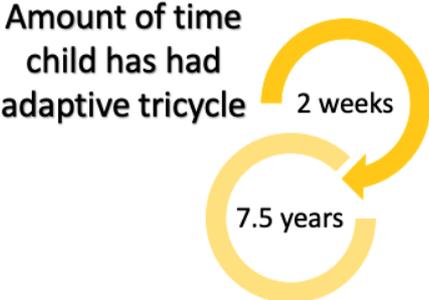
This type of information is important for organizations like AMBUCS to help justify future investments in these organizations

These bicycles are very expensive and insurance does not cover the costs, so with studies like ours it may help lead to insurance coverage in the future.

PT's can also use these objective findings into their reasonings for adding adaptive bikes to their exercise programs for children with movement disorders

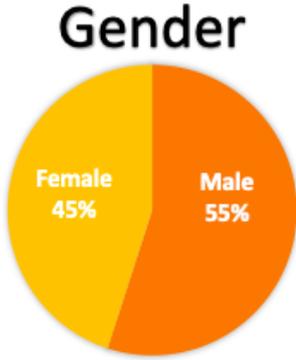
Our study is also relevant for multiple populations of children with different movement disorders.

Results: Demographics



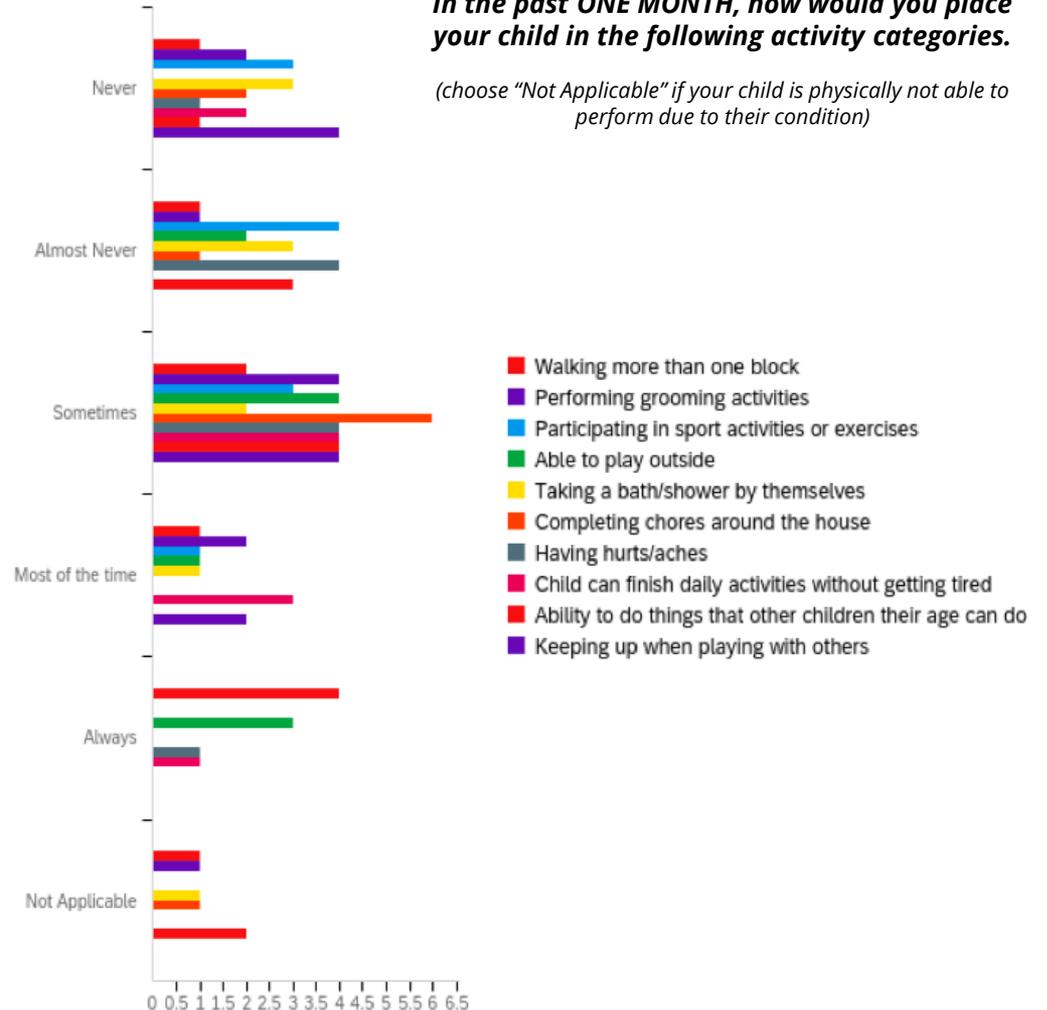
Child Diagnosis/Condition

Trisomy 21	Cerebral Palsy	Joubert Syndrome
Hypoxic Ischemic Epilepsy	Angelman Syndrome	Spina Bifida
Autism	Visual Impairment	Global Developmental Delays
Peri Ventricular Leukomalacia	Mitochondrial Disease	Down Syndrome



Results: QoL

Amtryke Influence



Physicality

Motor Skills

"My daughter cannot walk or stand unassisted...she is gaining strength and working muscles she does not work when walking when riding the bike."

"The tricycle is a great way got her to exercise and enjoy the outdoors"

Exercise

"The adaptive bike has so much potential to provide my daughter with independence and strengthen her physically"

Socialization

Participation

"We can go on bike rides as a family now and he can use his own bike"

"Gives us a way to be outside for a longer period of time."

"She loves riding and showing other kids her Bike"

"It has helped him be able to play with other kids"

Emotional Well-Being

Sense of normalcy

"Her smile when she is riding tells it all, *'I'm free and I feel great.'*"

"The bike allows her to make memories and have fun just like all her friends"

Confidence

"Self confidence in riding along with his friends just the same."

Results: Bike Frequency



Weather

- "If it is raining, snowing, or very cold the tryke remains in garage"
- "If it is raining, we try to ride around in the garage"



Season

- " My daughter rides more during the warmer months"
- "As long as there is no snow, we will bundle up and ride"

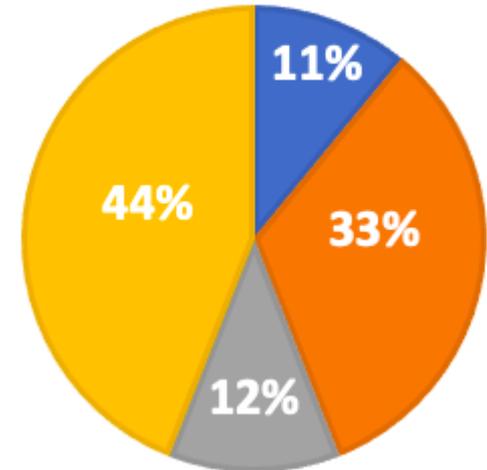


Location

- "We have a quiet street and long driveway"
- "We live in a subdivision and can ride on the sidewalks"
- "We live in a rural area with a gravel driveway and have to transport the bike to the park"

BIKE FREQUENCY PER MONTH

■ 1-2 times ■ 3-4 times ■ 5-6 times ■ 6+ times



Conclusion

The quality of life portion of the study confirmed that children with movement disorders are unable to fully participate in activities at the same level as their peers.

The survey then confirmed that the Amtrykes could provide opportunities for increased community participation.

- *100% of respondent say the Amtryke has had a positive impact on their child's quality of life.*



100% - Positive Impact

Limitations

- Due to world-wide COVID-19 pandemic:
 - Reduced number of participants.
 - Limited access/ways of communication with participants.
 - Unable to participate in bike giveaways, be present at the clinics for bike fittings, etc.
- The children may have been unable to independently answer the questions of the survey due to their age and/or cognitive status.
 - Parents were allowed to assist when needed, but it should be noted that parents are not always able to understand the child's true emotions and thoughts.
- Wide range of disabilities could have an impact on the objective findings.
- There was not a comparison group/control group.



More about AMBUCS & Adaptive Trykes

- Most of the amtrykes utilize a fixed drive, which does not allow for coasting. Whenever the trykes are in motion, the pedals are also in motion for full therapeutic effect. This allows the amtrykes to be utilized as a skillable intervention.
- The amtrykes have adaptive foot pedals to allow the rider's feet to be strapped in. There are also amtrykes that can be peddled with the rider's hands and others that are peddled using a combination of hands & feet.
- There are options to allow the child to pedal the amtrykes, but the parent/guardian to steer.
- There are over 15 therapeutic tricycle frames & 50+ adaptive accessory options available.

Different Models



PT Certification - Amtryke Evaluation & Fitting Training

The online course serves as a training for licensed PTs and OTs, PTAs and COTAs for appropriately evaluating and fitting individuals with disabilities for Amtryke adaptive therapeutic tricycles.

There is both didactic and hands-on learning led by a trained instructor with extensive experience in this program.

- PT's receive CCU hours for completing the course
- Cost ~ \$75 (includes lunch)



Resources

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Questions?