



ACTIVE PASSIVE TRAINER

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# CEREBRAL PALS

The **Active Passive Trainer (APT)** is a family of unique exercise rehabilitation trainers for upper or lower limbs. The **APT** offers benefits that rehabilitation professionals expect from a medical device that is quality engineered and FDA and CE registered. The **APT** is commonly used in physiotherapy clinics in the USA and around the world and over the years, multiple clinical studies have confirmed the benefits of the trainer.

The wide range of exercise options makes the **APT** suitable for use by healthy and independent senior citizen for the maintenance of fitness and physical well-being. It is also designed for the physically impaired, as part of a planned rehabilitation program and as a supplement to physiotherapy.

The **APT** combines both passive and active exercise by using physical effort in conjunction with the electrical operation of the motor. Offering a wide range of advanced features, the **APT** trainer helps passive users recovering from injury, suffering from muscle atrophy or confined to a wheelchair, maintain muscle tone and improve blood circulation and stamina. The trainer also challenges active users with five levels of resistance for active exercising. This makes the trainer extremely helpful for movement rehabilitation, improving strength, stamina and fitness.

**APT** Trainers are now available for home use so patients can continue rehabilitation, without having to leave home.

# APT Rehabilitation Trainers

## TOTAL WORKOUT FOR ARMS AND LEGS

### INCREASES RANGE OF MOTION

The **APT** trainer allows the performance of repetitive movements of the upper and lower extremities. Using the Passive and Passive Assist modes allows to moderately increase the passive range of motion of the major joints. Once obtained, a novel range of motion should be followed by Active Mode training for muscle conditioning.

### REDUCES SPASMS

The **APT** trainer Passive and Passive Assist modes facilitate slow and controlled rhythmic movements of the extremities. Users with increased muscle tone due to neurological conditions may benefit from using these modes. If needed, accessories providing additional support for the limbs may be added. Furthermore, increased muscle tone during movement may be a result of weakness, therefore training with the Passive Assist and Active mode may increase muscle strength and reduce the demanded effort performing movements.



### IMPROVES WALKING CAPABILITIES

Training with the **APT** helps to improve walking distance and speed. This improvement is achieved mainly by improving the aerobic capacity of the circulatory and respiratory systems, along with increasing the major muscles' resistance to fatigue.

### INCREASES MUSCLE STRENGTH

The **APT** trainer enables muscle strength training by concentrically flexing and extending the main joints of the extremities, using five distinct levels of resistance. Additionally, trunk muscle strength and postural control can improve while sitting unsupported.



# APT Trainers for Arms and Legs



## CLINICAL APPLICATIONS

- Parkinson's disease (PD)
- Spinal cord injury (SCI)
- Elderly / geriatric
- Orthopedic pathologies
- Multiple sclerosis (MS)
- Post-polio syndrome
- Post-cardiac rehabilitation
- Post-operative therapy
- Spina bifida
- Cerebrovascular accident (CVA)
- Cerebral palsy (CP)
- Myopathies
- Congenital muscular dystrophy



## FEATURES AND BENEFITS

- Five speeds for passive exercising
- Five levels of resistance for active exercising
- Auto reverse enables the reduction of a sudden increase in muscle tone (spasticity)
- Adjustable radius of movement of hand grips or footrests
- Upper or lower limbs training
- Improve blood circulation, muscle tone and range of motion
- Improve strength and endurance
- Activate rhythmical locomotion patterns
- Decrease atrophy, spasms and swelling
- Motor Learning
- Easily interchangeable accessories

## GROW & TELL APP

When you use the **APT** Trainer as part of a physiotherapy program, you will want to share your progress with your healthcare providers. The Grow & Tell App lets you grow in your abilities and to share your progress with others.

Install the app on your smart TV, tablet or smartphone to start tracking and sharing your progress.



# APT Trainer Utilization for Patients with Cerebral Palsy

Cerebral palsy (CP) is the most common motor disability beginning in infancy and persisting throughout the lifespan.<sup>1</sup> It is a non-progressive condition characterized by damage to the brain areas that control posture and movement. As a result, it primarily impairs gross motor functions, accompanied by disruptions of non-motor brain functions such as sensation and cognition.<sup>2</sup> These motor impairments may lead to difficulties with the performance of basic daily activities, including standing and walking, as well as limiting participation in family and social activities. Furthermore, children and teenagers with CP may develop a variety of musculoskeletal problems, such as muscle/tendon contractures, bony torsion, hip displacement and spinal deformity.<sup>2</sup> Many of these problems develop throughout life and sometimes require surgery and intensive rehabilitation.

Children and young adults with CP are less physically active compared to their peers and do not reach the recommended levels of physical activity, possibly causing higher mortality rates of adults with CP due to cardiovascular diseases.<sup>3-5</sup> Impairments such as weakness, increased muscle tone (spasticity), and deficient balance are possibly accounting for these findings.<sup>6</sup> This may increase the severity of the difficulties children with CP as well as their families are facing, therefore reducing overall health and quality of life. Recently published research suggests cycling exercise may benefit

aerobic fitness and quality of life for those living with CP.<sup>7-10</sup>

The **Active-Passive Trainer (APT)** enables the performance of repetitive cycling movements of the upper and lower extremities. The **APT** can be used to customize training programs that promote aerobic conditioning suitable for a wide range of functional abilities, characterizing children and adults with CP. Moreover, for milder symptoms, or if progress has been made, the **APT** can be used for resistance training with five different resistance levels. Those who struggle to perform independent active cycling motion, may benefit from the **APT's** Passive Mode (fully motorized), followed by the Passive Assist Mode (motorically assisted) to increase their capabilities. The **APT** can be adjusted to the user's needs, including recumbent, semi-recumbent, sitting, and standing positions. If needed, accessories providing additional support for the limbs can be added.

## **AEROBIC TRAINING RECOMMENDATION\*, PERFORM TWO TO FOUR DAYS PER WEEK**

1. Start with five minutes of low-intensity cycling.
2. Cycle for 20 minutes, moderate intensity (11-14 on the Borg RPE\*\*).
3. Finish with five minutes of low-intensity cycling.

\* Please consult physician or physical therapist prior to training.

\*\*[www.physio-pedia.com/Borg\\_Rating\\_Of\\_Perceived\\_Exertion](http://www.physio-pedia.com/Borg_Rating_Of_Perceived_Exertion)



## **FOR HEALTHCARE PRACTITIONERS**

Aerobic exercise recommendation according to a recent systemic review:  
2-4 days per week for 20 minutes per day with a moderate intensity of about 60%-75% maximum heart rate, 40%-80% of HRR, or 50%-65% peak oxygen uptake.<sup>11</sup>

## BIBLIOGRAPHY

1. Korzeniewski SJ, Slaughter J, Lenski M, Haak P, Paneth N. The complex aetiology of cerebral palsy. *Nature Reviews Neurology*. 2018;14(9):528-543. doi:10.1038/s41582-018-0043-6
2. Paneth N, Leviton A, Goldstein M, et al. A Report: The Definition and Classification of Cerebral Palsy April 2006 Peter Rosenbaum (Definition Panel Chair) MD
3. Mcphee PG, Claridge EA, Noorduyn SG, Gorter JW. Cardiovascular disease and related risk factors in adults with cerebral palsy: a systematic review. *Developmental Medicine & Child Neurology*. 2019;61(8):915-923. doi:10.1111/dmcn.14028
4. Nooijen CFJ, Slaman J, Stam HJ, Roebroek ME, van den Berg-Emons RJ. Inactive and sedentary lifestyles amongst ambulatory adolescents and young adults with cerebral palsy. *Journal of NeuroEngineering and Rehabilitation*. 2014;11(1):1-8. doi:10.1186/1743-0003-11-49
5. Carlon SL, Taylor NF, Dodd KJ, Shields N. Differences in habitual physical activity levels of young people with cerebral palsy and their typically developing peers: A systematic review. *Disability and Rehabilitation*. 2013;35(8):647-655. doi:10.3109/09638288.2012.715721
6. Fowler EG, Kolobe TH, Damiano DL, et al. Promotion of Physical Fitness and Prevention of Secondary Conditions for Children With Cerebral Palsy: Section on Pediatrics Research Summit Proceedings. *Physical Therapy*. 2007;87(11):1495-1510. doi:10.2522/ptj.20060116
7. Knights S, Graham N, Switzer L, et al. An innovative cycling exergame to promote cardiovascular fitness in youth with cerebral palsy. *Developmental Neurorehabilitation*. 2014;19(2):135-140. doi:10.3109/17518423.2014.923056
8. Armstrong EL, Spencer S, Kentish MJ, Horan SA, Carty CP, Boyd RN. Efficacy of cycling interventions to improve function in children and adolescents with cerebral palsy: a systematic review and meta-analysis. *Clinical rehabilitation*. 2019;33(7):1113-1129. doi:10.1177/0269215519837582
9. Demuth SK, Knutson LM, Fowler EG. The PEDALS stationary cycling intervention and health-related quality of life in children with cerebral palsy: a randomized controlled trial. *Developmental Medicine & Child Neurology*. 2012;54(7):654-661. doi:10.1111/j.1469-8749.2012.04321.x
10. Cleary SL, Taylor NF, Dodd KJ, Shields N. An aerobic exercise program for young people with cerebral palsy in specialist schools: A phase I randomized controlled trial. *Developmental Neurorehabilitation*. 2017;20(6):331-338. doi:10.1080/17518423.2016.1265602
11. Verschuren O, Peterson MD, Balemans ACJ, Hurvitz EA. Exercise and physical activity recommendations for people with cerebral palsy. *Developmental Medicine & Child Neurology*. 2016;58(8):798-808. doi:10.1111/dmcn.13053

# Clinical Research

Tzora has been building rehabilitation trainers for the past 25 years. We design our devices to improve the lives of users. Multiple clinical studies have been completed on patients using the features offered by **APT Trainers**.

Below is a sampling of some of the clinical studies that you can read at [www.tele-apt.com](http://www.tele-apt.com).

## **CLINICAL BENEFITS OF USING PASSIVE LEG CYCLING FOR PEOPLE WITH SPINAL CORD INJURIES (SCI)**

### **– CLINICAL STUDIES**

- Impact of Passive Leg Cycling in Persons with Spinal Cord Injury: A Systematic Review
- The Effect of Electrical Passive Cycling on Spasticity in War Veterans with Spinal Cord Injury
- The Effect of Passive Cycling Movements on Spasticity After Spinal Cord Injury: Preliminary Results
- Updated SA Spinal Cord Injury Service SubAcute Model of Care 30 Nov 2016

## **CLINICAL BENEFITS OF USING PASSIVE LEG CYCLING FOR PEOPLE WITH MULTIPLE SCLEROSIS**

### **(MS) – CLINICAL STUDIES**

- The Effect of Cycling Using Active-Passive Trainers on Spasticity, Cardiovascular Fitness, Function and Quality of Life in People with Moderate to Severe Multiple Sclerosis (MS); a Feasibility Study
- The Effects of Therapy on Spasticity Utilizing a Motorized Exercise-Cycle
- Cycling Progressive Resistance Training for People with Multiple Sclerosis: a Randomized Controlled Study
- Exercise Prescription for Patients with Multiple Sclerosis; Potential Benefits and Practical Recommendations

## **FUNCTIONAL RECOVERY AND WALKING ABILITY OF LOWER EXTREMITY IN PATIENTS WITH STROKE**

- Effect of Biofeedback Cycling Training on Functional Recovery And Walking Ability of Lower Extremity in Patients with Stroke
- Acute Bouts of Assisted Cycling Therapy for People with Chronic Stroke-Related Deficits
- Effects of Passive Exercise Training in Hemiplegic Stroke Patients. A Mini-Review

## **FRACTURES INVOLVING KNEE JOINTS**

- Knee Joint Replacement Surgery Post-Operative Exercise Program

### **THE EFFECT OF EXERCISE DURING HEMODIALYSIS**

- The Effects of Passive and Active Intradialytic Pedaling Exercises on Dialysis Efficacy, Electrolytes, Hemoglobin, Hematocrit, Blood Pressure and Health-Related Quality of Life in Hemodialysis Patients

### **CLINICAL BENEFITS OF USING LEG CYCLING FOR PEOPLE WITH PARKINSON'S DISEASE (PD) – CLINICAL STUDIES**

- Active Assistive Forced Exercise Provides Long-Term Improvement to Gait Velocity and Stride Length in Patients Bilaterally Affected by Parkinson's Disease
- A 12-Week Cycling Training Regimen Improves Gait and Executive Functions Concomitantly in People with Parkinson's Disease
- An 8-Week Low-Intensity Progressive Cycling Training Improves Motor Functions in Patients with Early-Stage Parkinson's Disease

### **CLINICAL BENEFITS OF USING ACTIVE PASSIVE CYCLING FOR CHILDREN WITH CEREBRAL PALSY – CLINICAL STUDIES**

- Pediatric Endurance and Limb Strengthening (PEDALS) for Children with Cerebral Palsy using Stationary Cycling: A Randomized Controlled Trial
- Task-Specific and Functional Effects of Speed-Focused Elliptical or Motor-Assisted Cycle Training in Children with Bilateral Cerebral Palsy: Randomized Clinical Trial
- The Pedals Stationary Cycling Intervention and Health-Related Quality of Life In Children with Cerebral Palsy: A Randomized Controlled Trial
- Characteristics of Lower Leg Muscle Activity in Patients with Cerebral Palsy during Cycling on an Ergometer
- Method of Analyzing the Performance of Self-Paced and Engine Induced Cycling In Children with Cerebral Palsy

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