



ACTIVE PASSIVE TRAINER

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# SPINAL CORD INJURIES

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 in Spinal Cord Injury Rehabilitation

Patients who have suffered a Spinal Cord Injury (SCI) face debilitating impairments. SCI can affect multiple body systems and may lead to complete or partial loss of motor, sensory, and autonomic function below the lesion level. The severity of the impairments and disabilities resulting from SCI vary among patients, depending on the mechanism, level, and the extent of damage to the nervous tissue. Cervical SCI causes quadriplegia, impairing the function of the arms as well as the trunk, legs, and pelvic organs. Injuries to non-cervical segments cause paraplegia, impairing the function of the trunk, legs, and pelvic organs, while arm function remains intact.<sup>1,2</sup>

Despite the advances in medical care and rehabilitation, the life expectancy of people with SCI remains lower than the general population. One of the leading causes of premature death amongst patients is associated with cardiovascular diseases, attributed to deconditioning and autonomic impairments.<sup>3</sup>

According to a recent exercise guideline published in the International Spinal Cord Society's (ISCoS) official journal, adults with SCI should perform at least 30 minutes of upper-limb aerobic training three times per week for cardiometabolic health benefits. Additionally, two strength training sessions per week are recommended to improve muscle strength and power output.<sup>4</sup>

The **Active-Passive Trainer (APT)** trainer allows

the performance of repetitive cycling movements of the upper and lower extremities. Depending on the rehabilitation stage and the severity of the injury, patients with SCI may benefit from the **APT's** Passive Mode (fully motorized) to improve joint range of motion and reduce spasticity (increased pathologic muscle tone).<sup>5,6</sup> Additional significant benefits may be attained by combining Functional Electrical Stimulation (FES) with the **APT** to facilitate muscle contraction simultaneously.<sup>7,8</sup>

For aerobic and strength training, patients with minimal motor capabilities can utilize the passive cycling mode to actively perform the movement with the motor's aid (Passive Assist Mode). For less severe injuries or if progress has been made, patients can cycle autonomously (Active Mode) using five increasing resistance levels. The **APT** trainer can be adjusted to the patient'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 THREE TO FIVE DAYS PER WEEK**

1. Start with five minutes of low-intensity cycling.
2. Cycle for 30 minutes, at light-moderate intensity (11-14 on the Borg RPE\*\*).
3. Finish with five minutes of low-intensity cycling.

**\*Please consult physician or physical therapist before training.**

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



## **FOR HEALTHCARE PRACTITIONERS**

Minimal aerobic exercise recommendation for cardiometabolic health according to ISCoS guideline:

Three days per week for 30 minutes per day at moderate to vigorous intensity (65% HRR, 80% HRpeak or Borg CR10 of 7).<sup>4</sup>

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# 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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