



***tyromotion***

# AMADEO®

The pioneer in  
Finger-Hand-Rehabilitation

**TYROTHERAPY**  
GET BETTER.  
EVERY DAY.

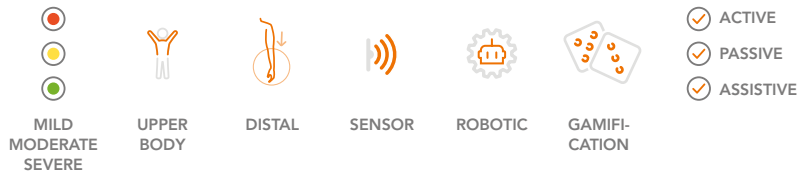
AMADEO® IS ENGINEERED, DESIGNED,  
AND MANUFACTURED IN AUSTRIA.

# AMADEO®

With AMADEO®, patients train various aspects of the grasping movement and finger extension. Patients who are barely able or unable to grasp can perform hundreds of robot-assisted grasping movements. Active participation of the patient's affected hand is promoted by biofeedback and assist-as-needed interactions.

## Why AMADEO®?

- Therapy for hand, individual fingers and thumb
- Guided finger and hand movements through magnetic attachment system
- Specific treatment options for patients with spasticity or changes in tone
- Objective assessments to show therapy progress
- Highly adjustable therapy setup

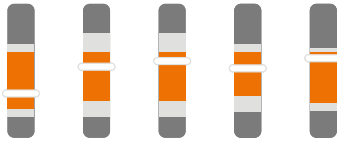


## Force control



The exercise is controlled through flexion and/or extension force of one or more fingers.

## Movement control



The exercise is controlled by the movement of one or more fingers.



*Robotic training yields improvement of hand motor performance by restoring hand motor control.<sup>1</sup>*

# AMADEO<sup>®</sup>

## Therapy



Short setup time



Hygienic patient attachment



Isolation of individual fingers for assessment or therapy



Objective assessments and reports



Multiple therapy modes



EMG integration



Combined motor and cognitive exercises



For children and adults



Gamification

## Assessments



### **Range of Motion (ROM)**

Active ROM for individual fingers and thumb as percentage of the passive ROM



### **Tone**

Measurement of muscle tone in resting position



### **Force**

Isometric grip force in extension and flexion for every finger and thumb, as well as the total grip force of the hand



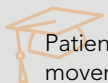
### **Spasticity**

Objective spasticity evaluation according to Modified Ashworth Scale (MAS) and Modified Tardieu Scale (MTS)



## Spasticity

Spasticity is a prevalent impairment following a neurological injury, and can cause considerable disability and economic burden. AMADEO® can be used in rehabilitation with present spasticity in the hand.



Patient-initiated and robot-assisted movement of the fingers reduces spastic tonus elevation and improves passive and active motor function of the hand.<sup>2</sup>

### Therapy options for spasticity with AMADEO®:

- CPMplus
- Spasticity treatment
- Sensitivity training



## Movement Therapies

### CPMplus (Continuous Passive Motion)

CPMplus passively moves the joints of the hand and fingers. Parameters such as speed, strength limit, or delay time between movements can be individualized.

### Assistive Therapy

The patient performs the movement actively as far as possible by finger force. Once the maximum is reached, the system helps to complete the extension or flexion movement.

### Spasticity treatment

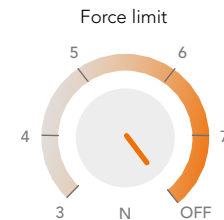
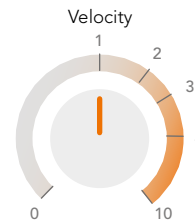
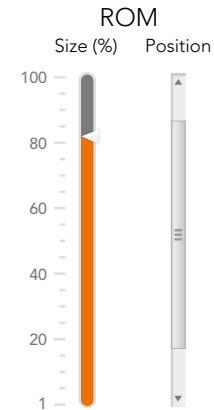
Individual finger, which cross the force limit, stop, while the others continue the movement.

### Sensitivity Training

Sensitivity training provides a vibratory proprioceptive stimulus of different frequencies and intensity.

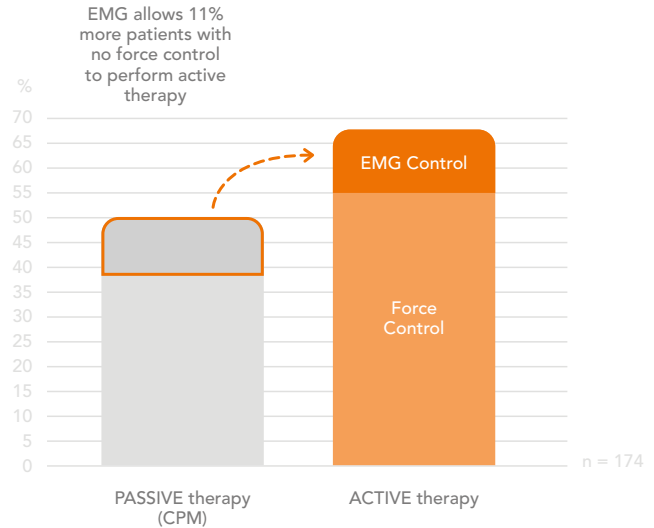
### Motility Training

Uses haptic or visual stimuli to train finger individuation and the related isolated movement.



# EMG MODULE

Surface electromyography (EMG) can detect muscle activation in severely affected patients with little to no movement in their fingers and hand. The combination of AMADEO® and EMG allows patients, unable to produce detectable force at their fingertips, to benefit from active therapy.<sup>3</sup>



*EMG enlarges the access to active therapy in patients with severe hand impairment.<sup>4</sup>*





# EMG BENEFITS

## Closed-loop sensory feedback

provides information on which muscle group is active, even if no finger movement can be seen.

## Detection of the patient's intention

to perform a hand movement enables early active therapy.

## Biofeedback of co-contraction patterns

to reduce co-activation of agonist and antagonist muscles.



# 3

## Components of TyroTherapy:



Intensity



Dose



Motivation

# TYROTHERAPY UPPER EXTREMITY

## TyroS

The TyroS software has been developed in close collaboration with therapists. This proprietary software is the heart of the Tyromotion technology and combines devices,

clinical expertise, and therapeutic games. The software is a sophisticated, therapeutic system that helps to challenge and encourage patients.

- Highly intensive, focused and motivated training
- Enforces motor learning principles
- Combines motor and cognitive therapy
- Intuitive and easy to learn
- Visualizes therapy progress

<sup>1</sup> Calabrò RS, Accorinti M, Porcari B, Carioti L, Ciatto L, Billeri L, Andronaco VA, Galletti F, Filoni S, Naro A. Does hand robotic rehabilitation improve motor function by rebalancing interhemispheric connectivity after chronic stroke? Encouraging data from a randomised-clinical-trial. *Clin Neurophysiol*. 2019 May; 130(5):767-780.

<sup>2</sup> Takahashi CD, Der-Yeghiaian L, Le V, Motiwala RR, Cramer SC. Robot-based hand motor therapy after stroke. *Brain* 2008; 131: 425-437.

<sup>3</sup> Turolla A, Baldan F, Baba A, Mahmoud A, Jakob I. Effect of Rehabilitation Robotics controlled by sEMG Closed-Loop System for the Recovery of Hand Function after Stroke. WCNR 2018 Oral Abstracts in Neurorehabil Neural Repair 32(4-5):324.

<sup>4</sup> Baldan F, Turolla A, Rimini D, Pregolato G, Maistrello L, Agostini M, Jakob I. Robot-assisted rehabilitation of hand function after stroke: Development of prediction models for reference to therapy. *J Electromyogr Kinesiol*. 2021 Feb 16; 57:102534

**TYMO®**  
BALANCE TRAINING AND  
POSTURAL CONTROL

**TYROSTATION**  
THE THERAPY STATION

**ROBOTICS**

**DIEGO®**  
SHOULDER-ARM-  
REHABILITATION

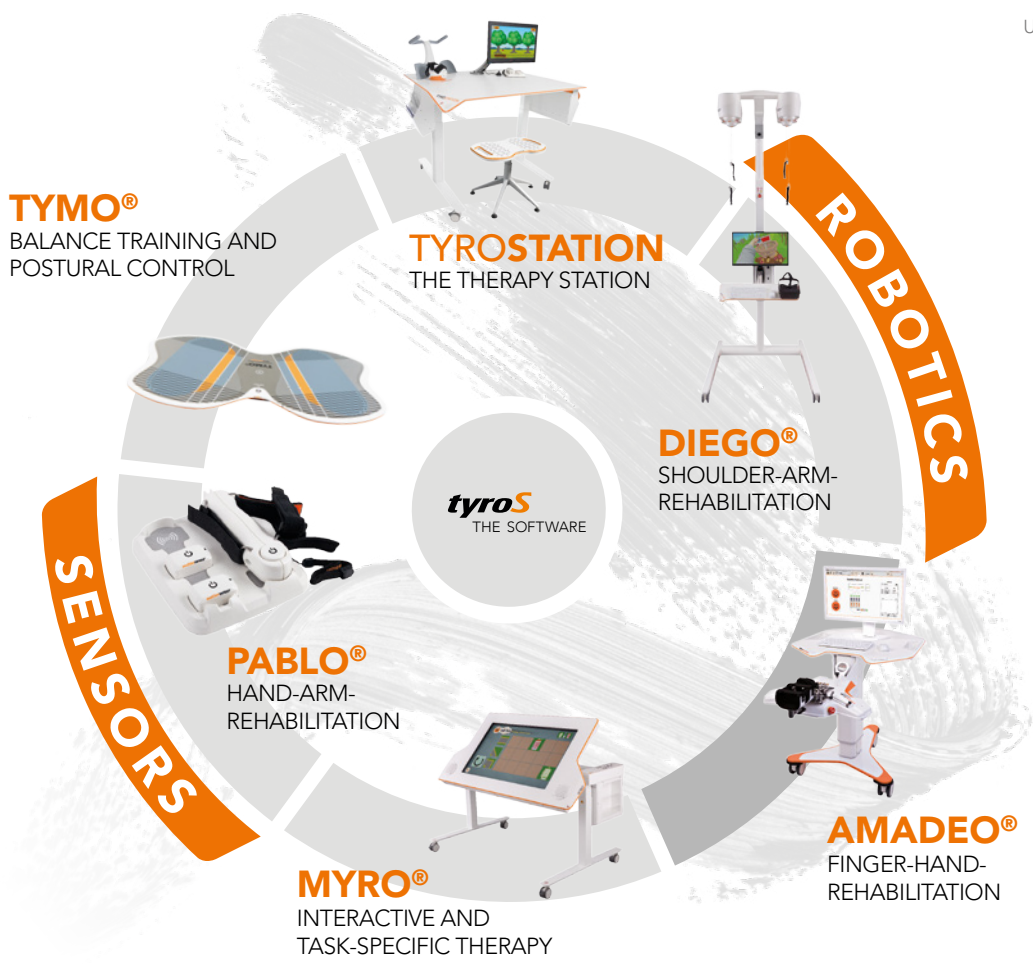
**tyroS**  
THE SOFTWARE

**SENSORS**

**PABLO®**  
HAND-ARM-  
REHABILITATION

**AMADEO®**  
FINGER-HAND-  
REHABILITATION

**MYRO®**  
INTERACTIVE AND  
TASK-SPECIFIC THERAPY



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