



Medical Device for  
Visual Rehabilitation  
and Cognitive Development



## Linari Medical

Linari Holding Group

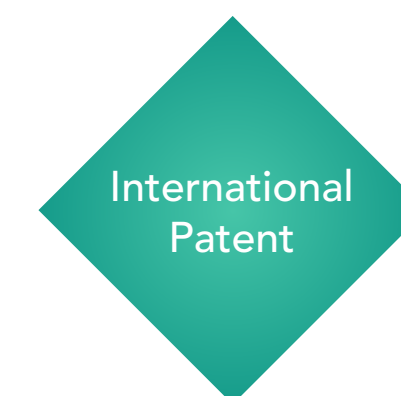
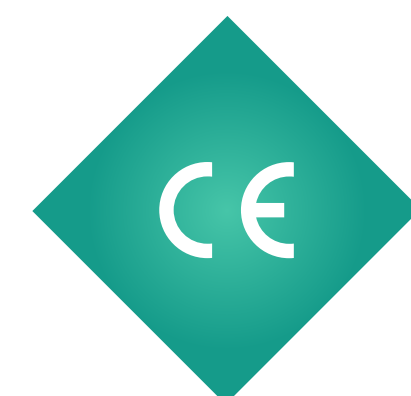
Founded in Pisa in 2018, Linari Medical SRL is the biomedical specialized division of the Linari Holding. From its launch in 2003, the Linari Holding Company has anticipated and successfully met the industrial's and researchers' needs thanks to its industrial automation cutting-edge technologies, design, 3D simulation and advanced production systems.

The achievement of successful results of its medical devices, together with the need of having its own manufacturing process, led to the creation of this medical company branch.

AvDesk™ is a I class medical device for the self-administration of visual rehabilitation therapies. It has been designed and created in 2010 by the Linari Holding, together with the IRCCS Fondazione Stella Maris Pisa, child neuropsychiatry world leader, accredited for its visual rehabilitation studies and its cutting edge systems in cognitive development.

Av Desk is the result of the big experience gained in years of cooperation with the best research centres of the world. Over ten years of intense synergical work with important European and International research institutes in the sector of particle physics, nanotechnology, medicine and mechatronics allowed Linari Holding to develop various skills ranging from mechanics, to electronics, to multi-physics analysis, always using cutting-edge materials and sophisticated production technology.

Design, production, certification and technical assistance: our capability to follow the product's life cycle is centrally important to us.



## Patented I Class Medical Device

AvDesk™ is a medical device for the visual telerehabilitation of patients with visual field deficit originated from neurological pathologies such as Hemianopsia and Quadrantanopia. These disturbs can be caused by congenital diseases, traumas or other disorders that compromise the cerebral occipital cortex.

Inpatient and outpatient aged from 7 to 70 have been successfully treated.

### Congenital Disease

Epilepsy

### Trauma

Head Injury

### Other Diseases

Stroke  
Brain Cancer



Visual Rehabilitation

Patient with AvDesk™ undertakes a path of cognitive training which allows him to partially balance his visual field deficit, thanks to audio-visual stimuli.

“The sound spatially coinciding with a visual stimulus can improve visual perception in the blind hemisphere, due to the activation of “multisensory neurons” mainly located in the superior colliculus.”  
(F. Tinelli)



Skills Test

AvDesk™ continuously monitors the results achieved daily customizing patients’ treatments. To do that, AvDesk™ takes advantages of the most innovatives computer vision systems, also used by Walt Disney to create the famous cartoons.



Cognitive Development

The AvDesk™ therapy could lead to a cognitive development which can significantly improve the peripheral vision response time. This can be useful for those looking for better sport performances or those in needs of special visual skills as athletes, rescue teams, airline pilots, drivers or army forces.



## Visual Rehabilitation

The visual deficit of 8 to 25% patients survived to stroke can be treated with AvDesk™.

	Italy	EU	USA	Global
New estimated patients per year	25.000	250.000	166.000	2.475.000
Total patients estimated	228.000	2.280.000	1.511.000	22.000.00

Millions of people worldwide could enjoy the benefits of AvDesk™ treatment.

## Cognitive Development

People who can take advantages increasing their peripheral vision skills.

	Professional athletes	Rescue Teams	Drivers (taxi, bus,...)	Soldiers
Total Applicants	30.000	Millions	Millions	77.000.000
	EU+USA		Global	

Millions of people can't follow a specific visual field training.

### People involved in the treatment

**Patient:** AvDesk™ patients have visual field deficit originated from neurological pathologies caused by congenital diseases, traumas or other disorders that compromise the cerebral occipital cortex.

**Certified Medical:** Considering the patient's features and after an initial medical examination, the neurologist, together with the ophthalmologist, verifies the compatibility of AvDesk™ device with the patient. In case of positive assessment, he decides whether the patient should be treated at home or in clinic.

**Qualified Tutor:** The Tutor, qualified by Linari Medical, takes care to daily define patient's treatment monitoring the results from remote. Treatment is modified accordingly to the results obtained after every dosing.



*“The real voyage of discovery consists, not in seeking new landscapes, but in having new eyes.”*

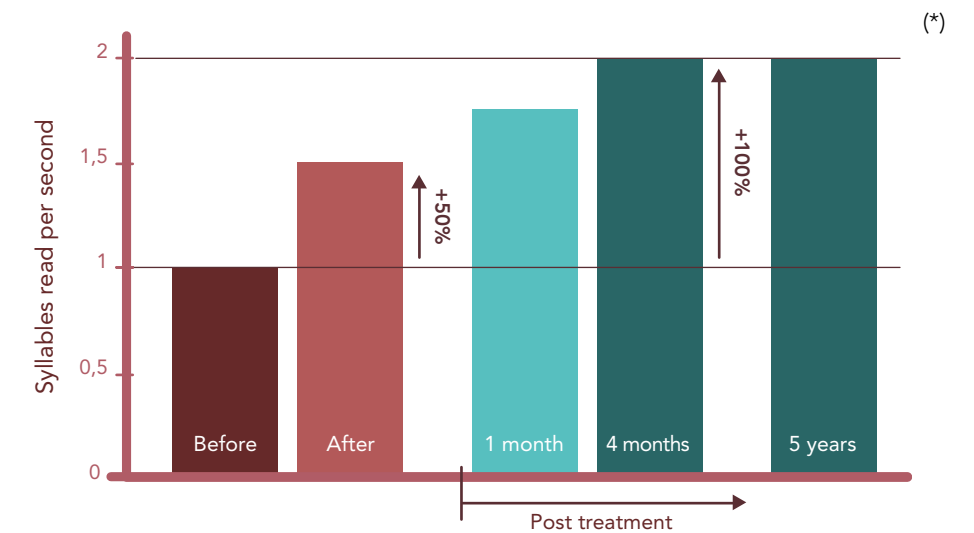
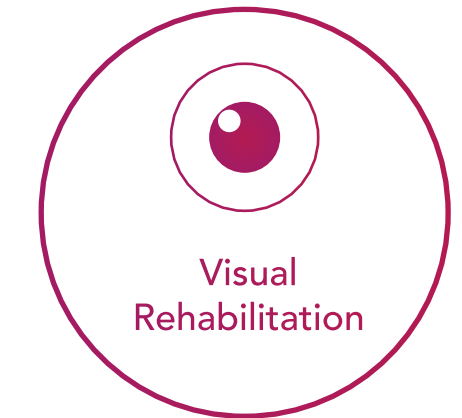
Marcel Proust

### Hemianopsia and Quadrantanopia

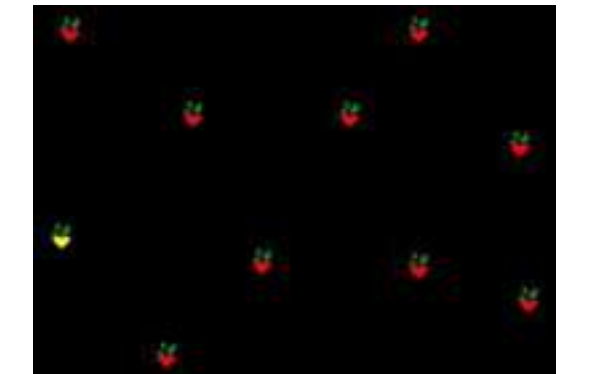
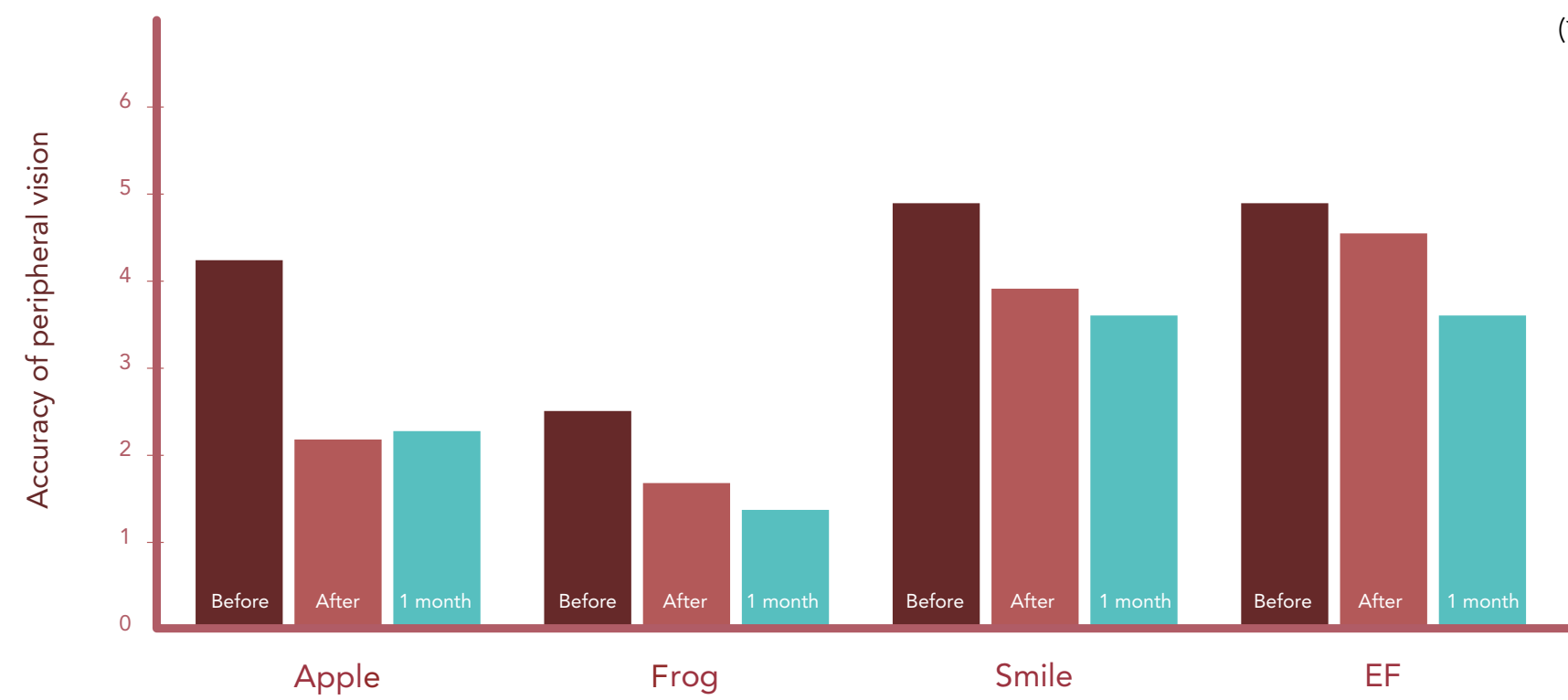
Reading speed increases 100% after 20 hours treatment ca.

Improvement of life quality in:

- Reading and studying
- Driving Licence achievement
- Crossing street skills
- Avoiding unexpected obstacles



A 50% increment is observed in the reading speed of the patient after 20 days of treatment. It improves till the 100% after 4 months treatment, remaining constant in time.

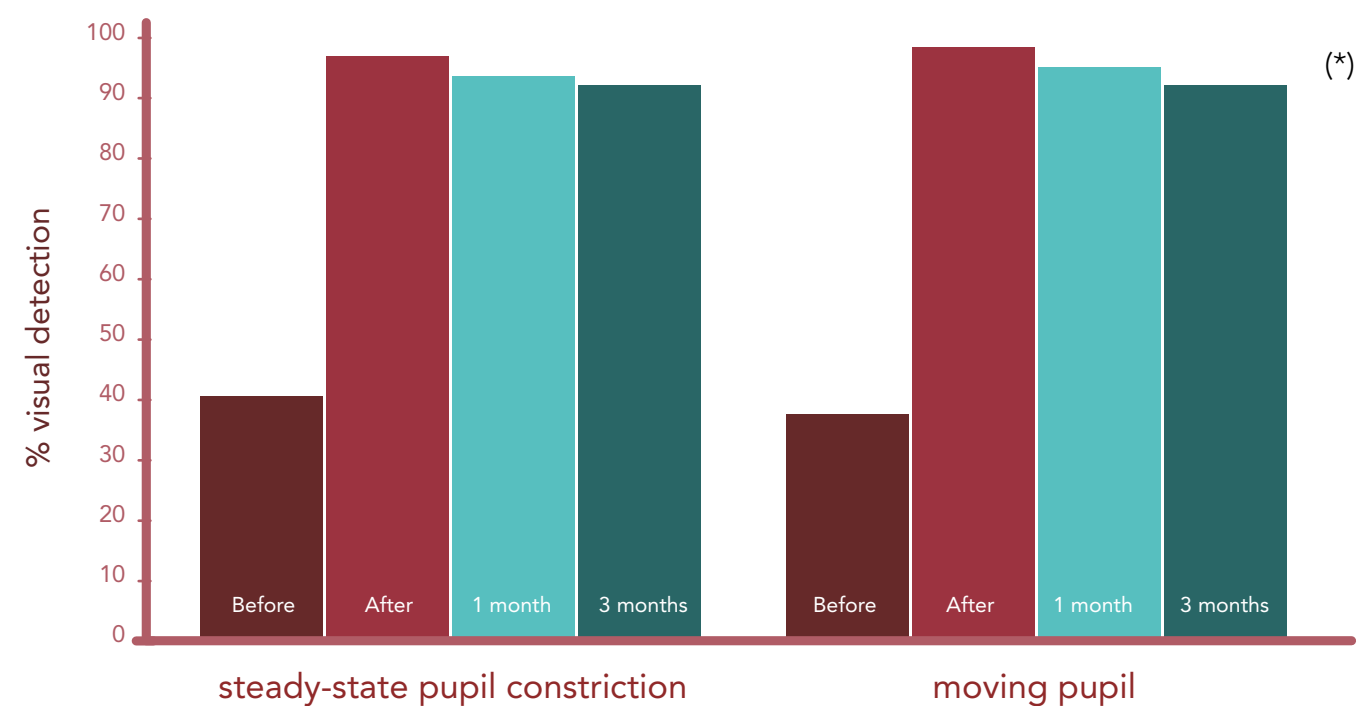
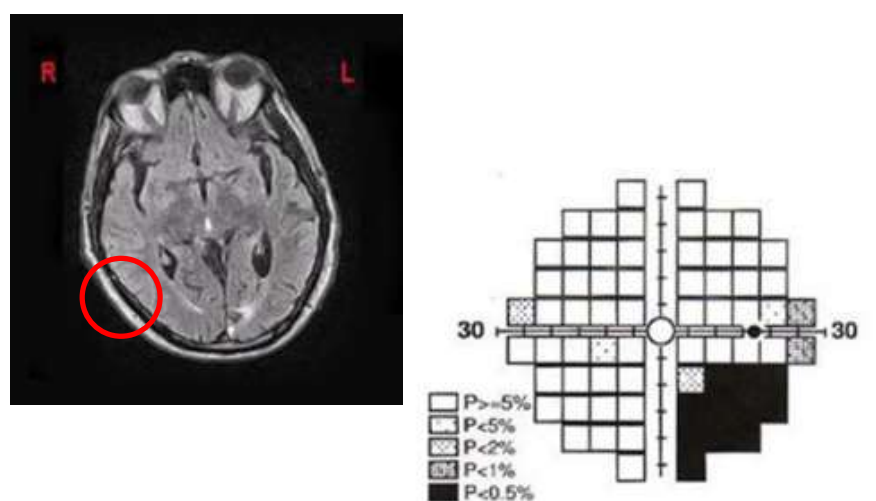


Apple test: green apple seek

\*\* Datas subjected to statistically significant differences among patients

## Quadrantanopia and Hemianopsia: Clinical results in adult patients

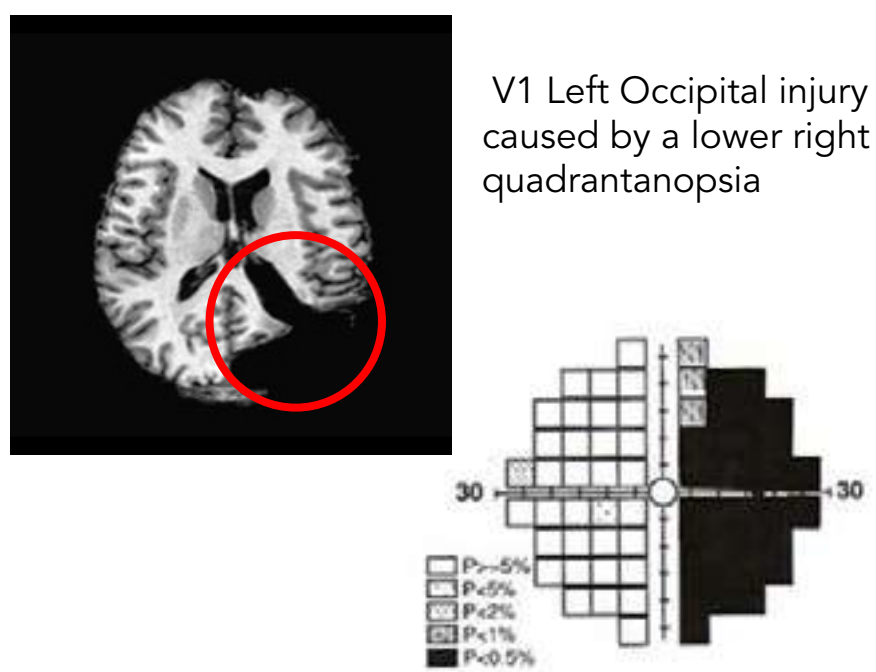
### Quadrantanopia



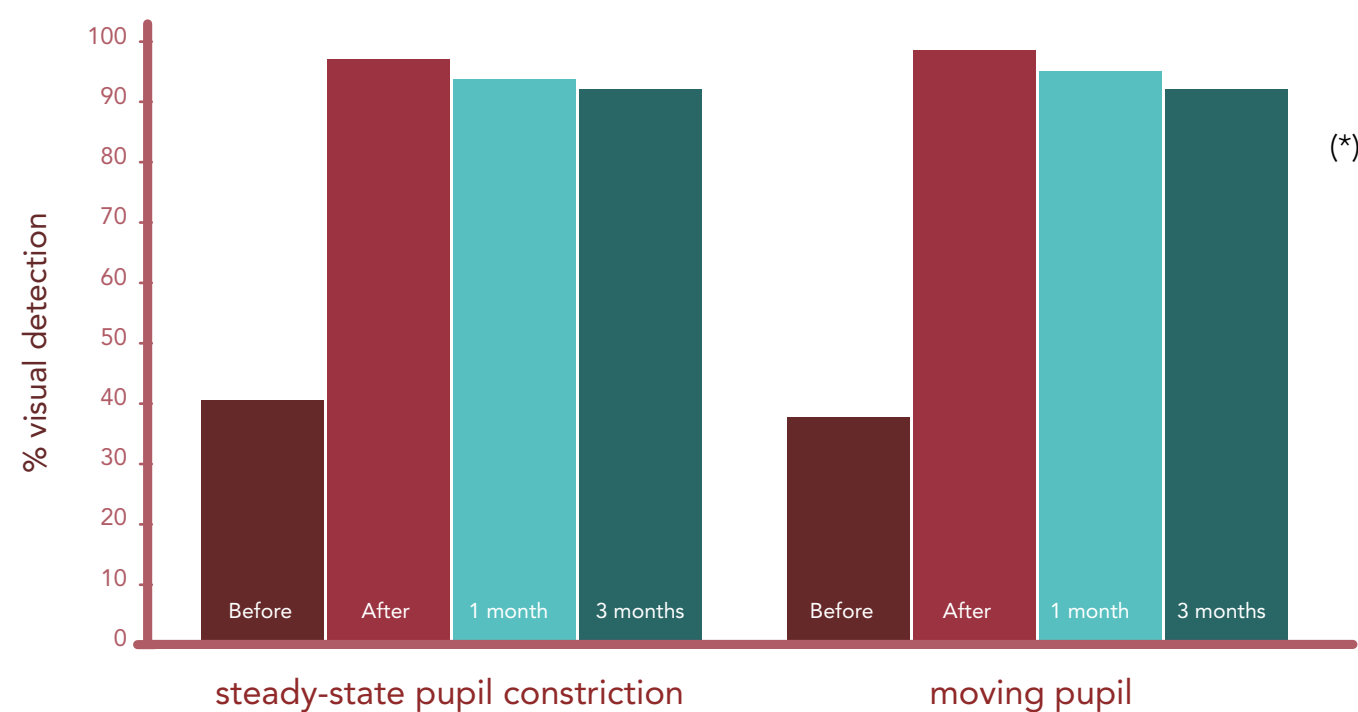
**BEFORE:** Visual capacity < 40% (\*)

**AFTER:** Visual capacity > 90% (\*)

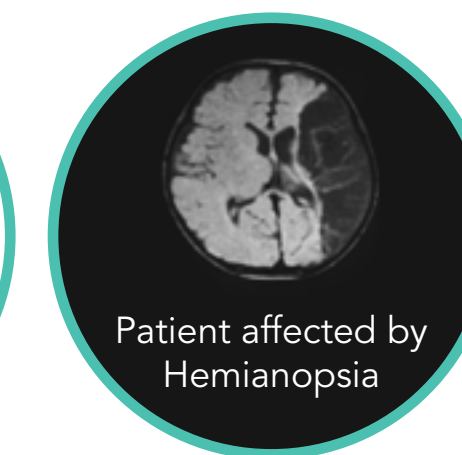
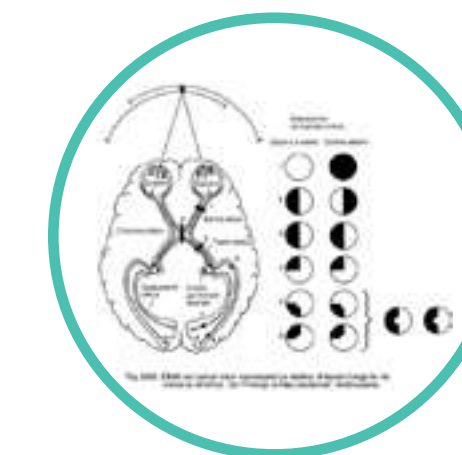
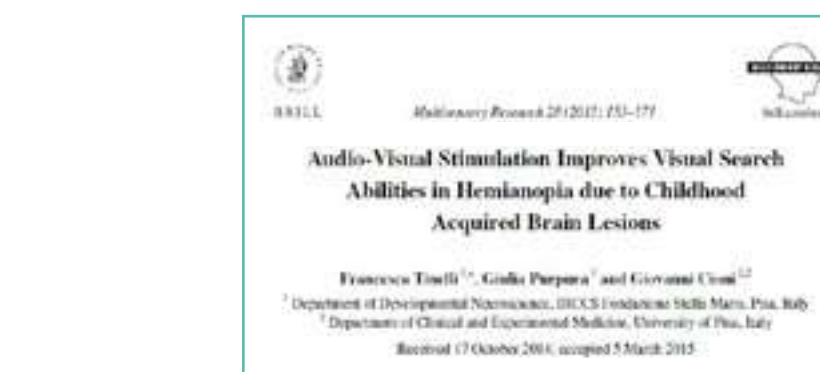
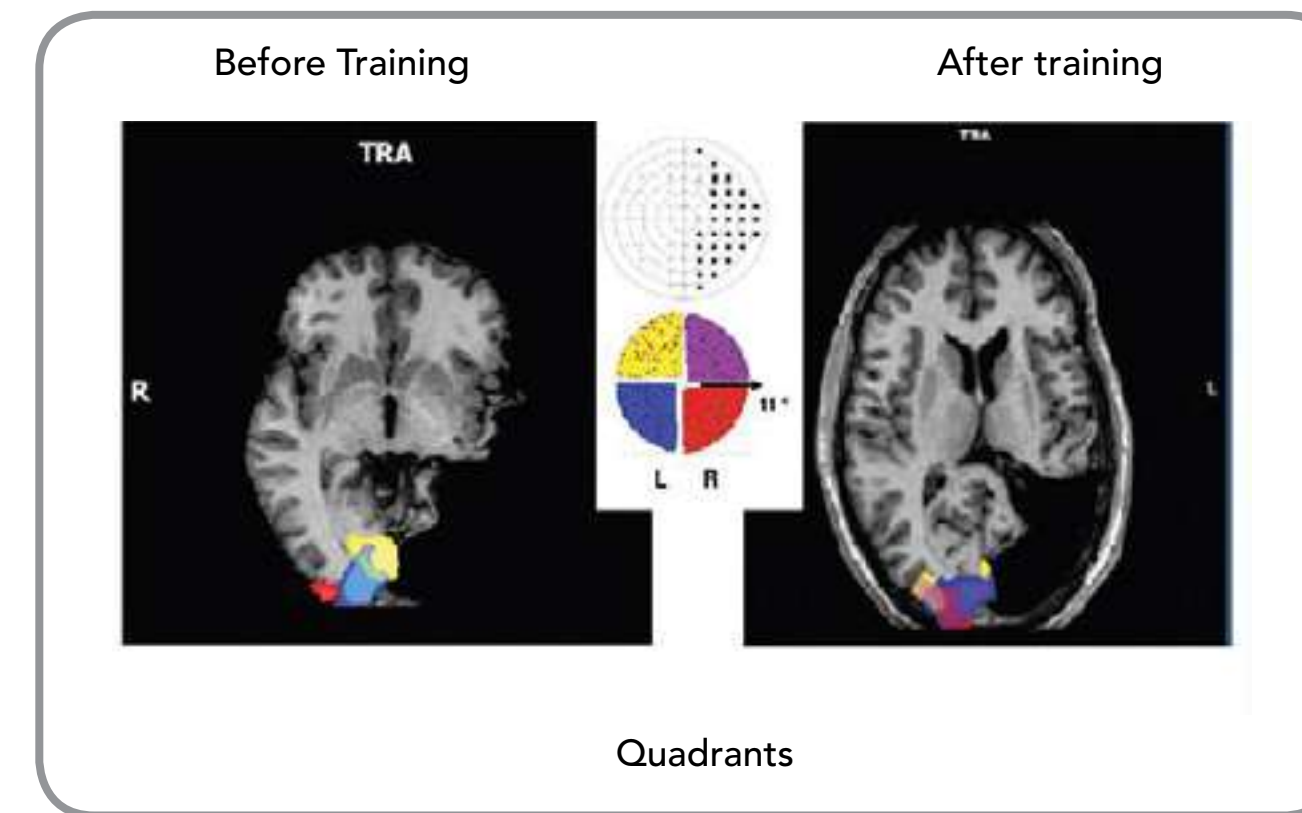
### Hemianopsia



V1 Left Occipital injury caused by a lower right quadrantanopsia



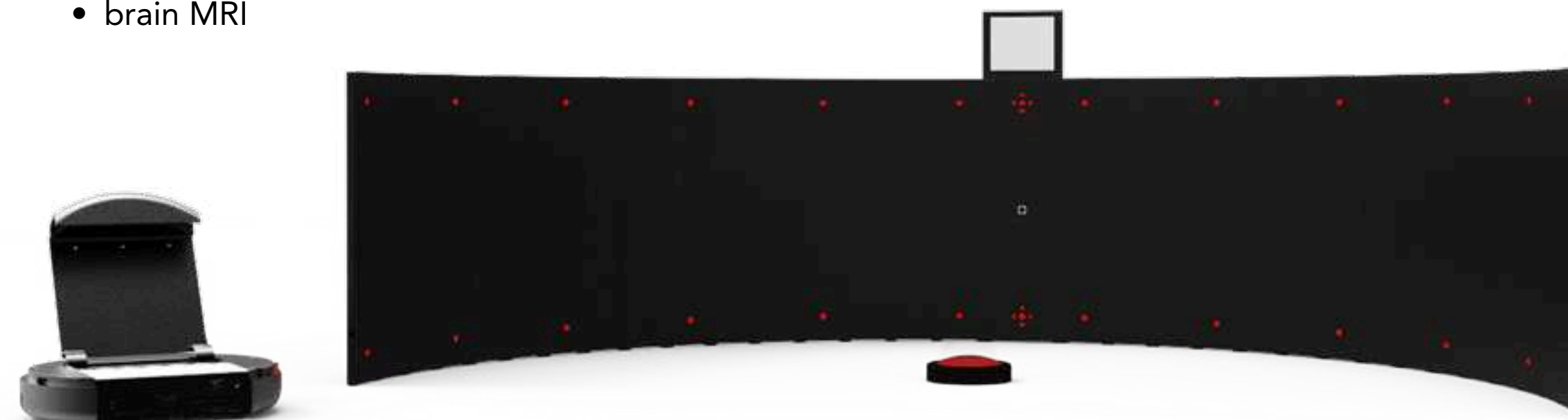
Brain plasticity induced by the treatment:red and violet areas are bigger than the saved hemisphere



### Can I get AvDesk™ treatment?

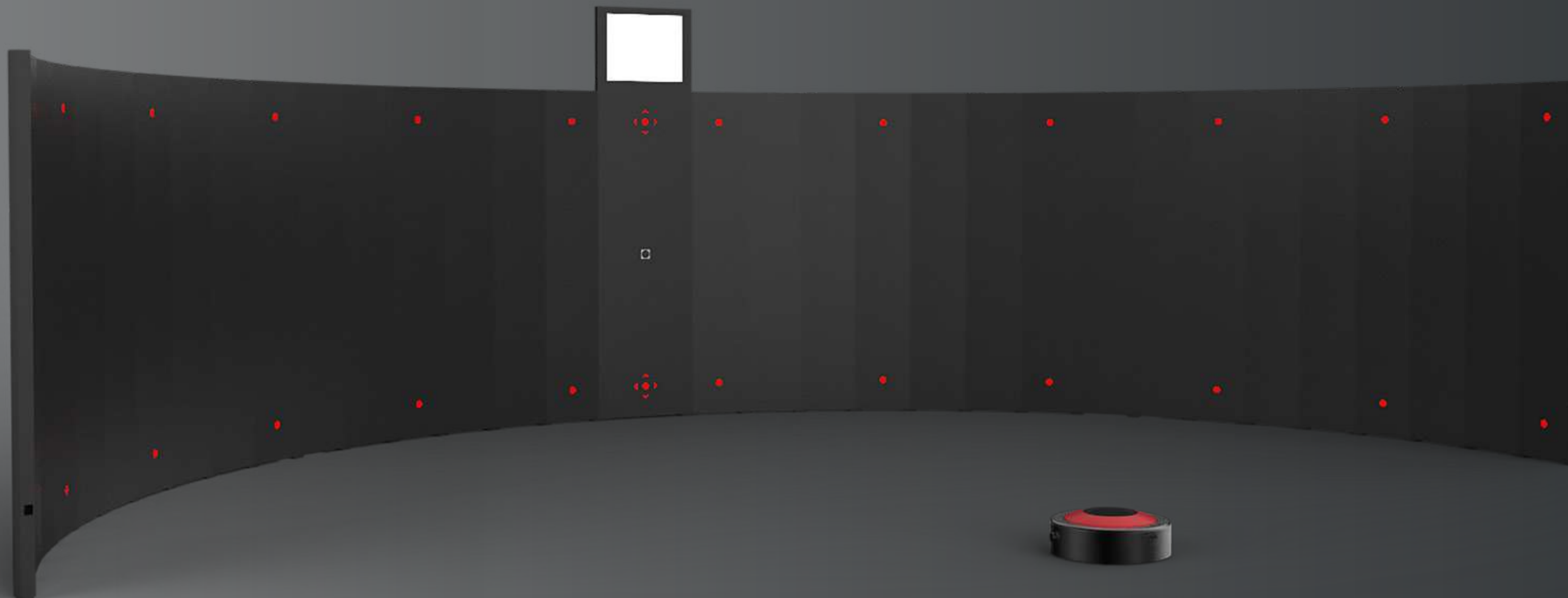
To verify the applicability of AvDesk™ device therapy, patients should undergo two simple examinations:

- visual field testing
- brain MRI



Thanks to its 180° audio-visual stimulation AvDesk™ guarantees an optimal recovery of the visual abilities.

\* datas subjected to statistically significant differences among patients



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With its rollable structure AvDesk™ is lightweight and easy to install for persons with mobility impairments too.

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Untouched subcortical structures

This treatment is based on the multi-sensorial stimuli of untouched subcortical structures. Through a stimulation panel the patient reacts to a variety of audio-visual signals. How often and in which sequence these signals are given depends on the patient progresses and is adjusted in time. A wireless button with a feedback interface allows the patient to answer these stimuli.

The personalized treatment is daily modified and re-adjusted by a qualified doctor certified by Linari, connected on remote. Years of researches have allowed Linari Medical to create its own analysis software which continuously sends treatment result feedback after every dosing.

The Linari Cloud software continually updates the AvDesk™ device with new therapy algorithms through the integrated 3G/4G internet connection.

The device measures the time frame in millisecond between the lighting of the stimulus (anticipated by an acoustic signal) and the pushing of the wireless button by the patient. Therapy benefits are also highlighted in the reduction of patient response times for the peripheral areas of his visual field too.

Effectiveness of the treatment is ensured by AvDesk™ use in a quiet and half light location where audio-visual stimuli are clearer.

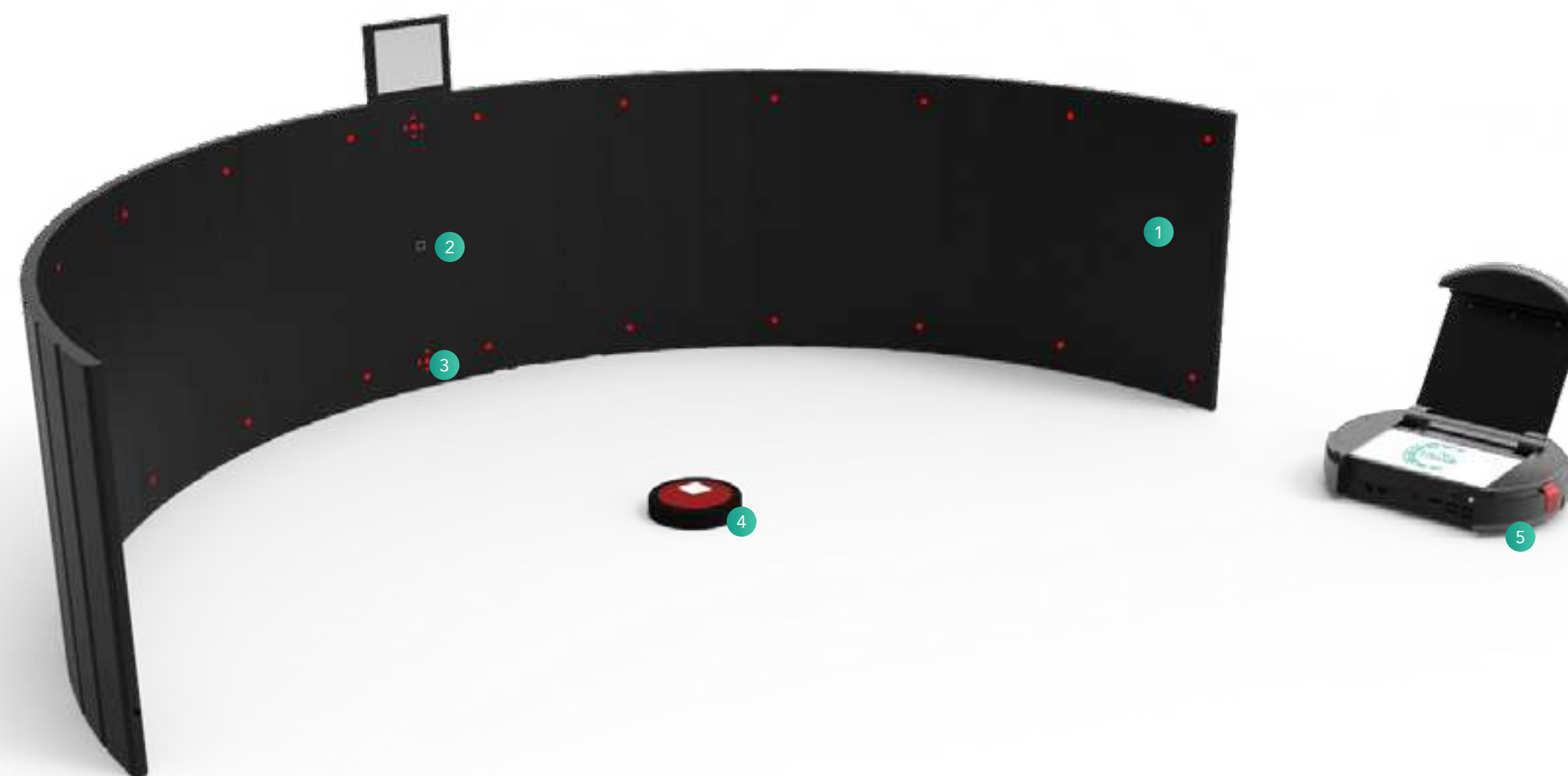
AvDesk™ has a sophisticated artificial visual system which constantly controls patient's sight and head position. For this reason the active presence of an Assistant during the treatment is not necessary. Bright arrows lead the patient have the right posture during the whole treatment.

artificial visual system



Qualified doctor

- 1 Horizontal curved monitor which gives audio-visual stimuli
- 2 An high-resolution night vision camera, integrated with the main panel on the curved monitor and connected with the Data Collection Unit, to control the bright arrows group during the whole patient monitoring process
- 3 Four bright arrows group which lead patient gaze to the center part of panel control after every stimulation, to guarantee the treatment effectiveness
- 4 Signal Interface (wireless button) pushed by the patient upon stimulus reception
- 5 Data Collection and Processing Unit through its own software, cloud connected



Personalized treatment



# Integrated Electronics

Advanced Software  
for remote rehabilitation

Easy to use



## AvDesk™ is the first visual rehabilitation device in the world

AvDesk™ is one of a kind device, protected by an International patent. Based on the most innovative rehabilitation neuroscience researches to shape brain areas, it reinforces the visual ability through the activation of multisensory neurons mostly located in the superior colliculus. Several Professionals, as doctors and Linari Medical Tutor, are involved in the treatment. Their physical presence throughout the whole treatment is not necessary.

To guarantee the best efficacy of treatment, Linari Medical Group certifies health facilities and professionals.

Telehealth allows the device use in clinic without the physical presence of a doctor or his assistant. What makes that possible is the union between cloud- connected artificial intelligence technologies and doctor sensibility and experience.

The Linari Medical Tutors take care of the patient on remote during the whole treatment, daily updating and adapting the treatment protocol, based on patient's real brain plasticity.



brain plasticity

## How does the treatment work?

Basing on patient's features and needs, the specialized Doctor decides whether the patient can receive the treatment at home or in clinic. Treatment duration can vary from a minimum of ten to a maximum of twenty days. Every day the patient needs to undergo one hour treatment, better if consecutive.

Improvements of the visual field are permanently significant from the second week of treatment and can be strengthened by a second course of therapy after six months. Effectiveness of the treatment is ensured by using the device in a quiet and half light location without any source of distraction. The 3G / 4G provided router should be connected to the network.

Being the system based on brain plasticity, naturally present in each individual, no medicine ingestion is necessary.

Analysing the results and the improvement of the patient on remote, the authorized Tutor daily modifies the treatment.

The device guarantees therapy adherence without the physical presence of the tutor, thanks to an integrated artificial visual system based on sophisticated algorithms which can recognise the patient's attention level, keeping his focus on the ideal treatment conditions.

Thanks to a secure access to the Linari Medical cloud, the doctor verifies his patients' progresses in real time to support them in a framework of neuro-functional and, possibly, psycho-motor rehabilitation.

cloud

## The Benefits of Telehealth



### In clinic

**Patient's benefits:** optimal internet connection, quiet location, brightness under control, specialized and supporting Professionals at your disposal, perfect treatment conditions.

**Doctor's benefits:** Same device used on different patients on the same day.



### At home

**Patient's benefits:** suitable for patients with mobility impairments or distant from the clinic

**Doctor's benefits:** increase of the geographical area provenance of his clients

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AvDesk™ is a medical device cloud- connected which can be installed in a few minutes both in a clinical or at patient's home.

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# Linari Medical Therapy Certification

## Become a certified doctor

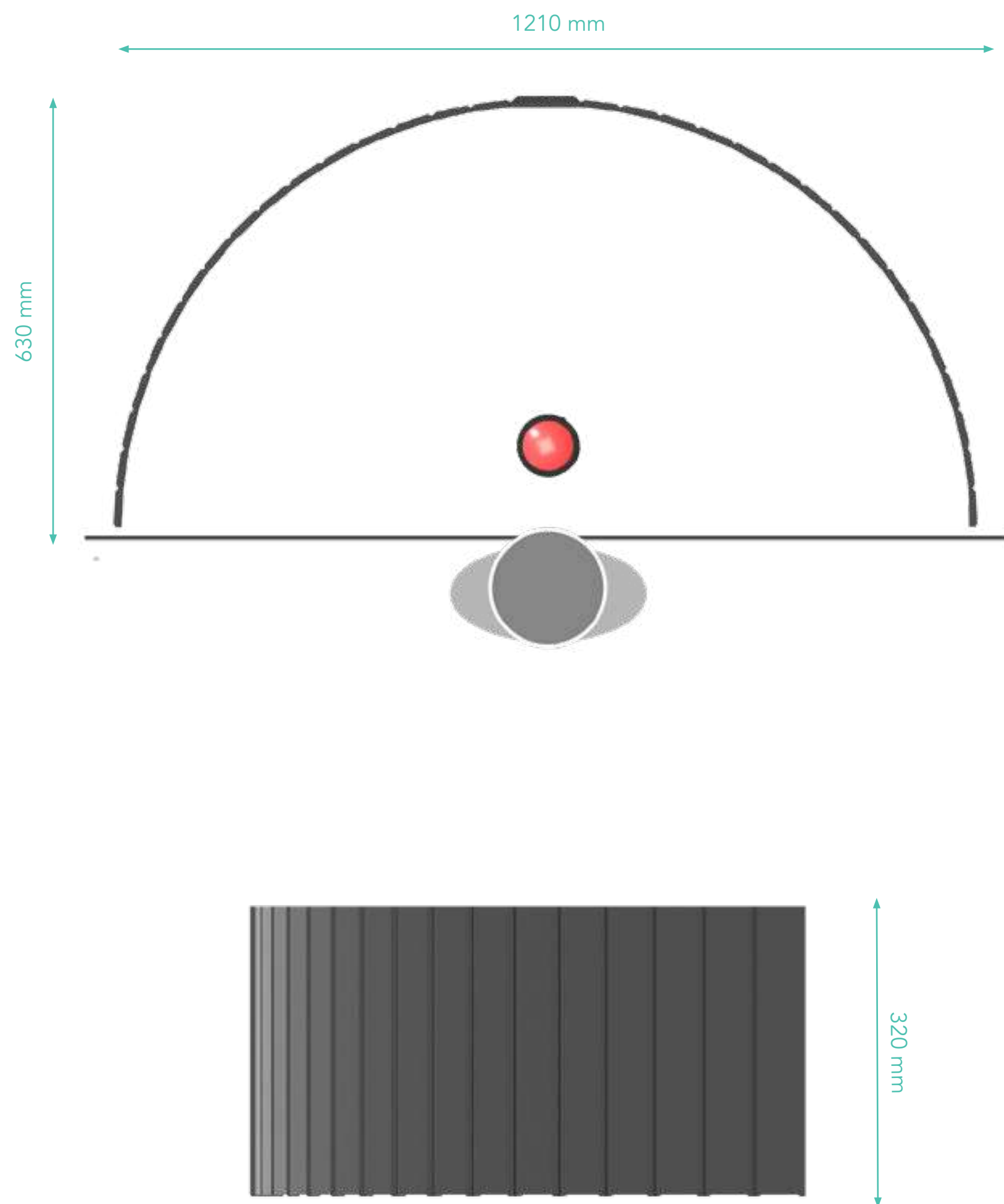
Linari Medical Therapy certifies doctors interested in proposing their professionalism to patients who today have no alternative health treatment to AvDesk™.

With the certification, doctors and health facility acquire the professional skills to use and prescribe AvDesk™. We help you to create the ideal environment for the neuro-visual rehabilitation of patients with cognitive and motor impairments.

Certified facilities and doctors will be advertised on the specialized media and will have access to the Linari Medical e-learning platform to join our research project too.



Dimensions



AvDesk™ Components

- Rollable Audio-Visual stimulation Panel
- Data Collection and Processing unit
- Data collection unit power supply
- 2 USB cables to charge tablet and mini router
- Case in rigid polyurethanes



Texts, pictures and any other material contained in the catalog must be intended as an example and are not exhaustive. Linari Medical s.r.l. may revise the products described and illustrated in the brochure as its discretion and at any time without prior notice.



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