

SCENAR-THERAPY EFFECTIVENESS IN PREVENTING MYOPIA AND SLOWING DOWN ITS PROGRESSION

DEPARTMENT OF PEDIATRICS №4
DEPARTMENT OF OCULAR DISEASES №2
ROSTOV STATE MEDICAL UNIVERSITY

Yu.I.Perfiliev, I.P.Shourygina,
N.M.Galenkina



Background

Refraction abnormalities are the main cause of eye disorders in schoolchildren today. The prevalence of myopia among school-aged children is 12 – 35%. Degenerative myopia ranks second among the causes of eye-related handicaps in young adults. Its development is provided by the following factors.

Genetic predisposition

Children of myopic parents are frequently myopic.

Primary weakness of accommodation

Causes compensatory lengthening of sclera.



Unbalanced, strained accommodation and convergence

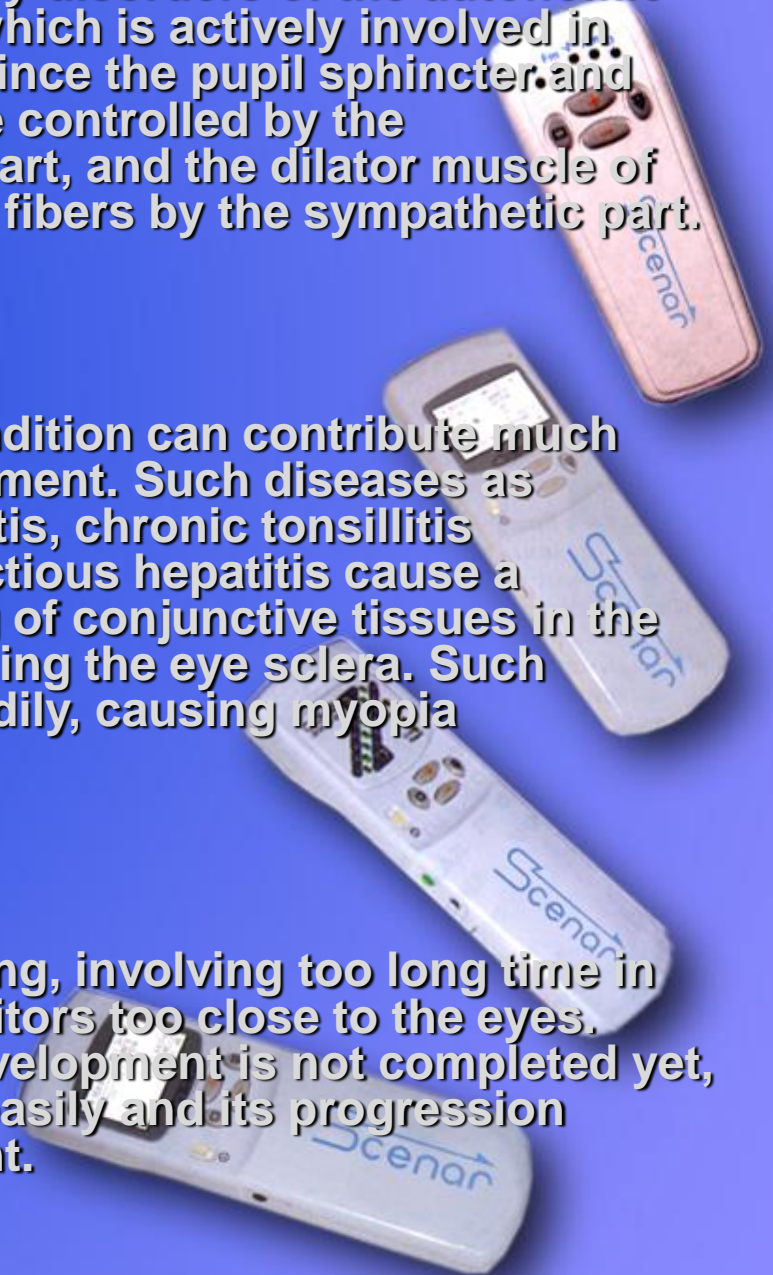
Lead to false and subsequently true myopia. This can be promoted by disorders of the autonomic nervous system, which is actively involved in accommodation, since the pupil sphincter and Brucke's fibers are controlled by the parasympathetic part, and the dilator muscle of pupil and Ivanov's fibers by the sympathetic part.

General health decline

General health condition can contribute much to myopia development. Such diseases as rheumatism, arthritis, chronic tonsillitis exacerbation, infectious hepatitis cause a general weakening of conjunctive tissues in the whole body, including the eye sclera. Such sclera extends readily, causing myopia progression.

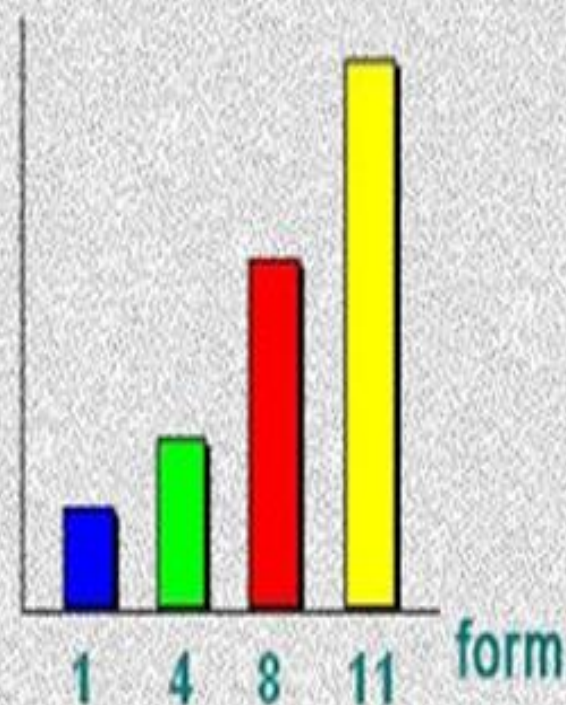
Unfavorable environment

Professional training, involving too long time in front of video monitors too close to the eyes. When the body development is not completed yet, myopia develops easily and its progression becomes persistent.



Natural and geographical factors

The closer to the North pole, the higher myopia frequency is. This is due to light conditions, vitamin deficiency, urbanization particularities, more frequent abnormal pregnancy and labor. In urban schoolchildren myopia occurs more often than in rural ones. The number of nearsighted students increases at the senior school.



1st Form – myopia occurs in 10% schoolchildren
4th Form – 13%
8th Form – 28%
10th -11th Forms – 38%

Electric pulse stimulation with SCENAR was delivered once daily for 10 days.

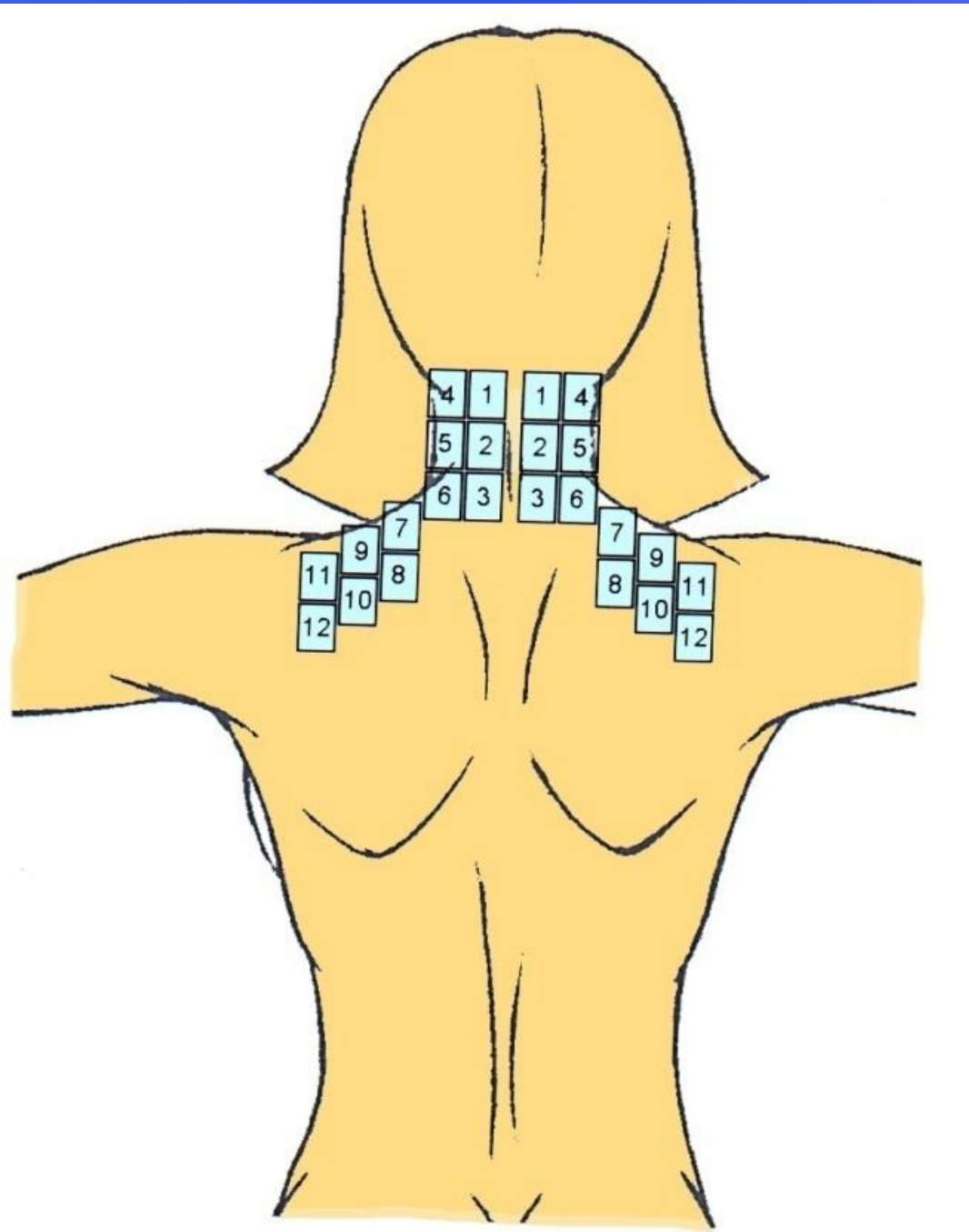
SCENAR-therapy was given at the Eye Health Care Office and Eye Department of the District Children's Hospital.

Improvement in microcirculation makes a morphofunctional basis for antihypoxic and anti-edema action, stimulation of metabolic and redox processes as well as reflex-relaxing effect of the method.

Stimulation was applied on peripheral zones that have biologically active points of the Chinese meridians associated with the functional state of the accommodative apparatus of the eye and retina electrogenesis.



Collar Zone



Periorbital Zone

External edge of an eyebrow, in the recess that corresponds to the lateral edge of the maxillary process of frontal bone (TR_{23})

Midpoint of each eyebrow (VT_6)

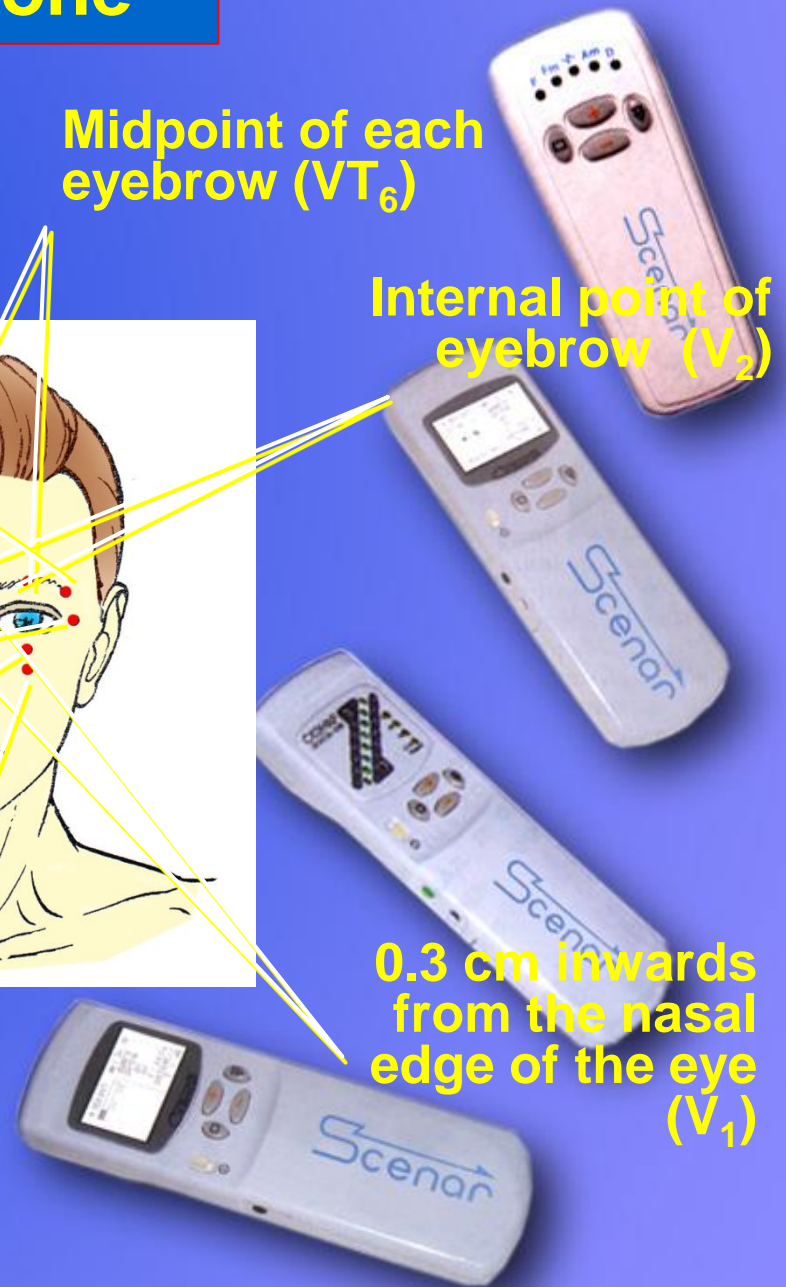
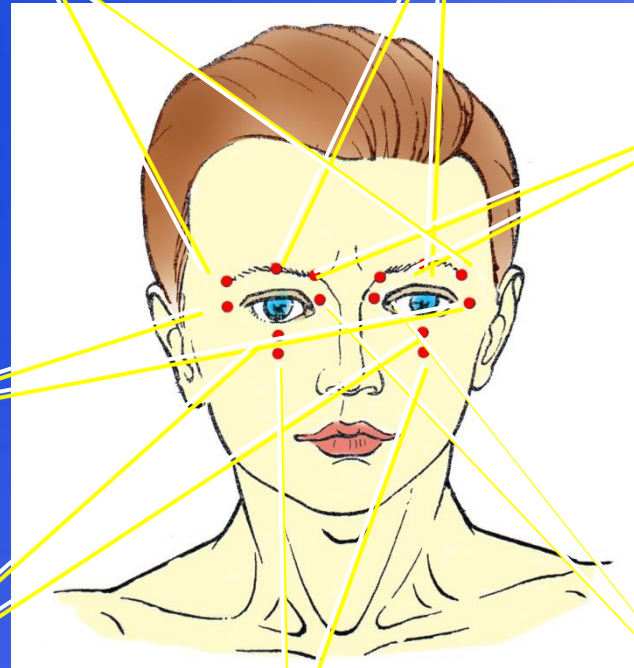
Internal point of eyebrow (V_2)


0.5 cm outwards from the tail of the eye, corresponds to the outer edge of eye orbit (VB_1)

Center of the lower eyelid (E_1)

1 cm downwards from the lower eyelid, corresponds to the infraorbital foramen (E_2)

0.3 cm inwards from the nasal edge of the eye (V_1)





In implementation (+) of the action, both local reflex mechanisms and general response of the body to the stimulation are involved.

Local effects of pulse current manifest themselves as activated blood microcirculation and improved tissue trophism not only locally in the zone of influence but also in the eyeball (as it is the organ corresponding with this skin area) on the principle of dermatovisceral reflex.

Tonographic data proved normalization and/or prevention of microcirculatory-circulatory hypoxia in nearsighted children.



Methods

- ➔ Identification of a concomitant somatic pathology
- ➔ Identification of burdened family background
- ➔ Visometry
- ➔ Refractometry
- ➔ Accommodation indices (accommodation reserve)
- ➔ Ophthalmoscopy (examination of the back part (fundus) of the eye)
- ➔ Neurophysiological measurements (electrophysiological study)
- ➔ Echobiometry (measuring the shape of the eyeball)

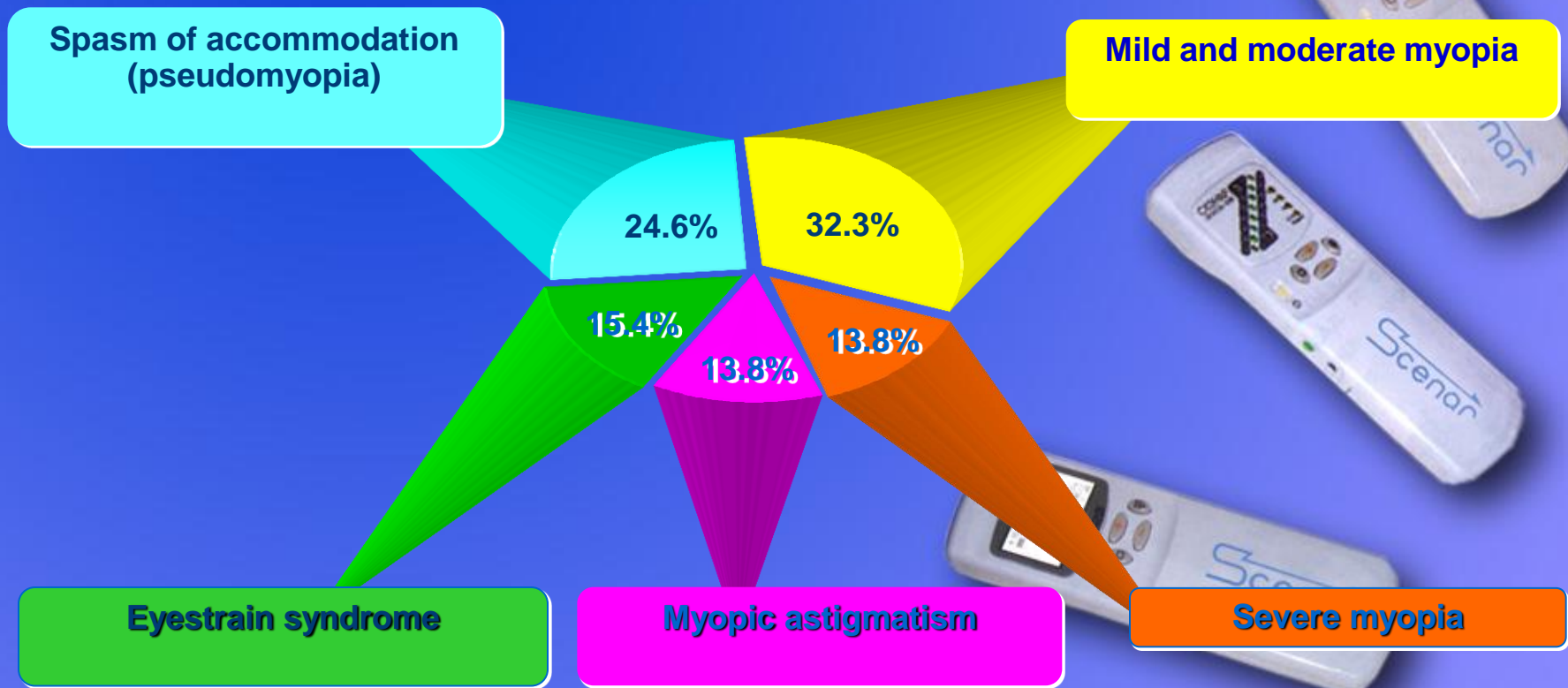


Clinical Profile of Patients

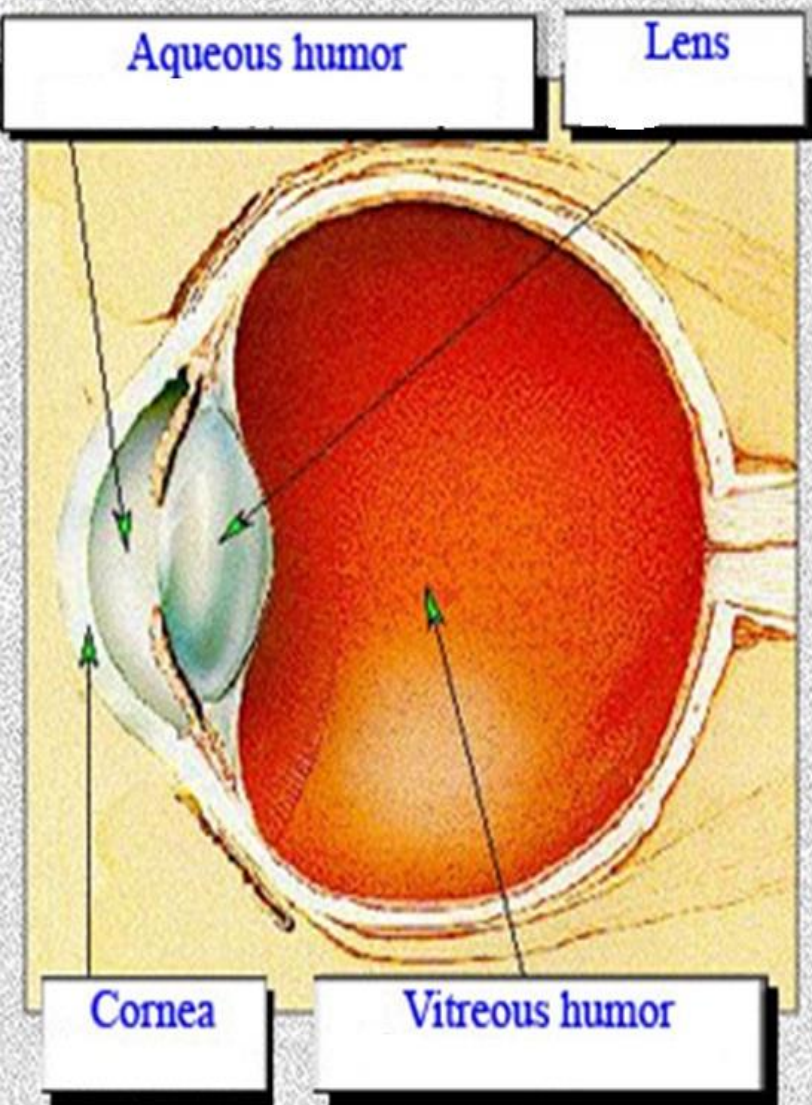
65 children aged 7 to 15

Treatment was given at the Eye Health Care Office and Eye Department of the District Children's Hospital.

Clinical forms of eye pathology in the groups under test



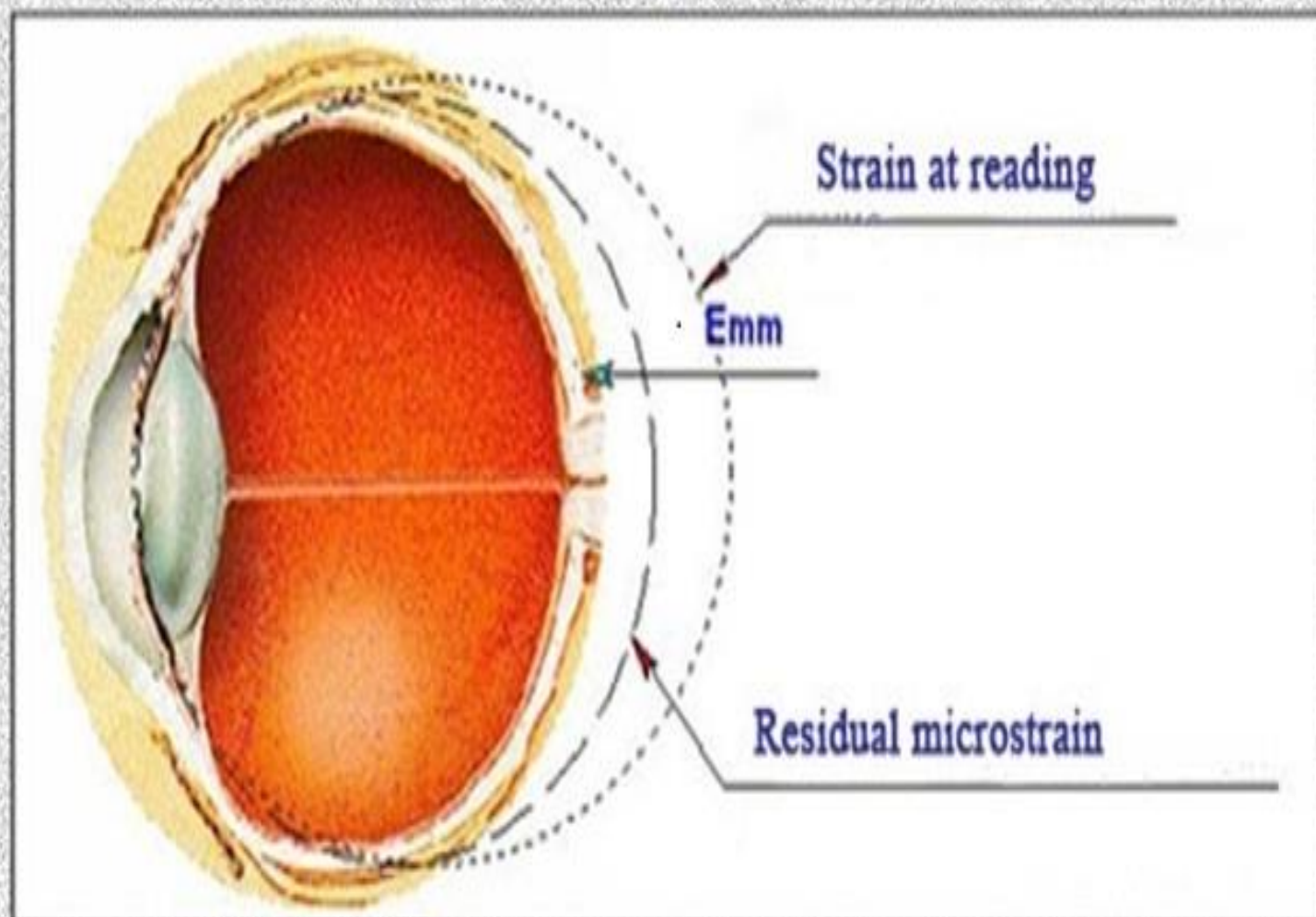
Optic system of the eye



Eye is a complicated optic system consisting of *cornea, aqueous humor (of the anterior chamber), lens and vitreous humor*. Refractive power of the eye depends on the curve radiuses of the front of cornea, anterior and posterior surfaces of the lens, distance between them and refraction factors.

Role of Sclera

Accumulation of residual sclera microstrain due to excessive load (fluctuations in intra-ocular pressure (ophthalmotonus)) should probably be considered as the mechanism of irreversible extension of the eyeball in progressive myopia.

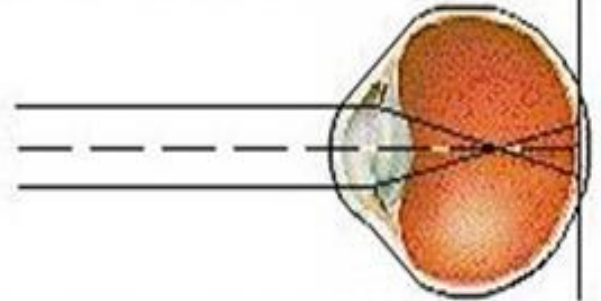


Myopia

In myopia the prime focus is in front of retina.

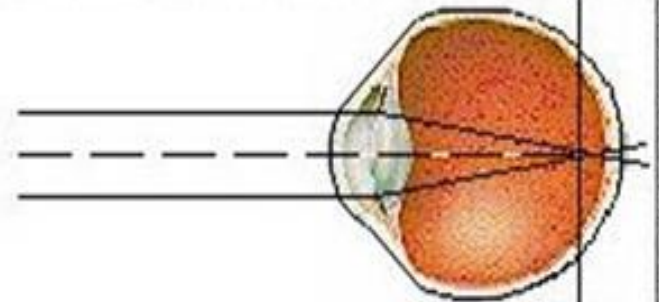
Refractive myopia

(too strong refractive power of the eye)



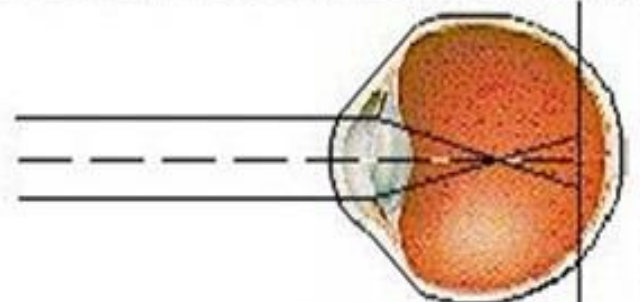
Axial myopia

(too long A-P diameter)



Combined myopia

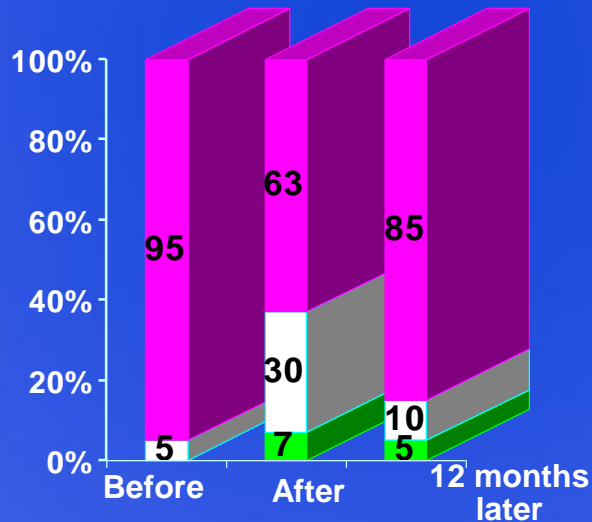
(refractive and axial components co-exist)



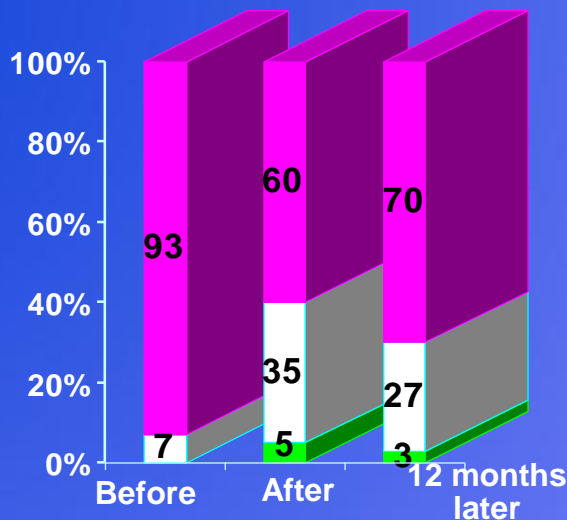


Changes in visual acuity without corrective lenses

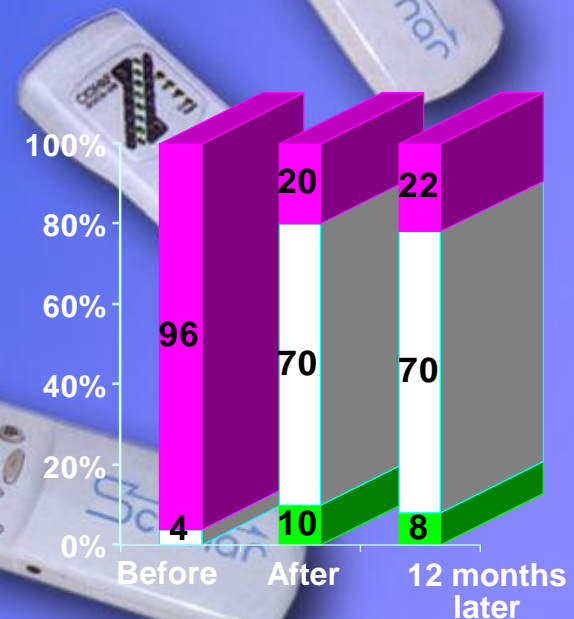
Group I - conventional management



Group II – monotherapy with SCENAR



Group III – multiple treatment + SCENAR-therapy

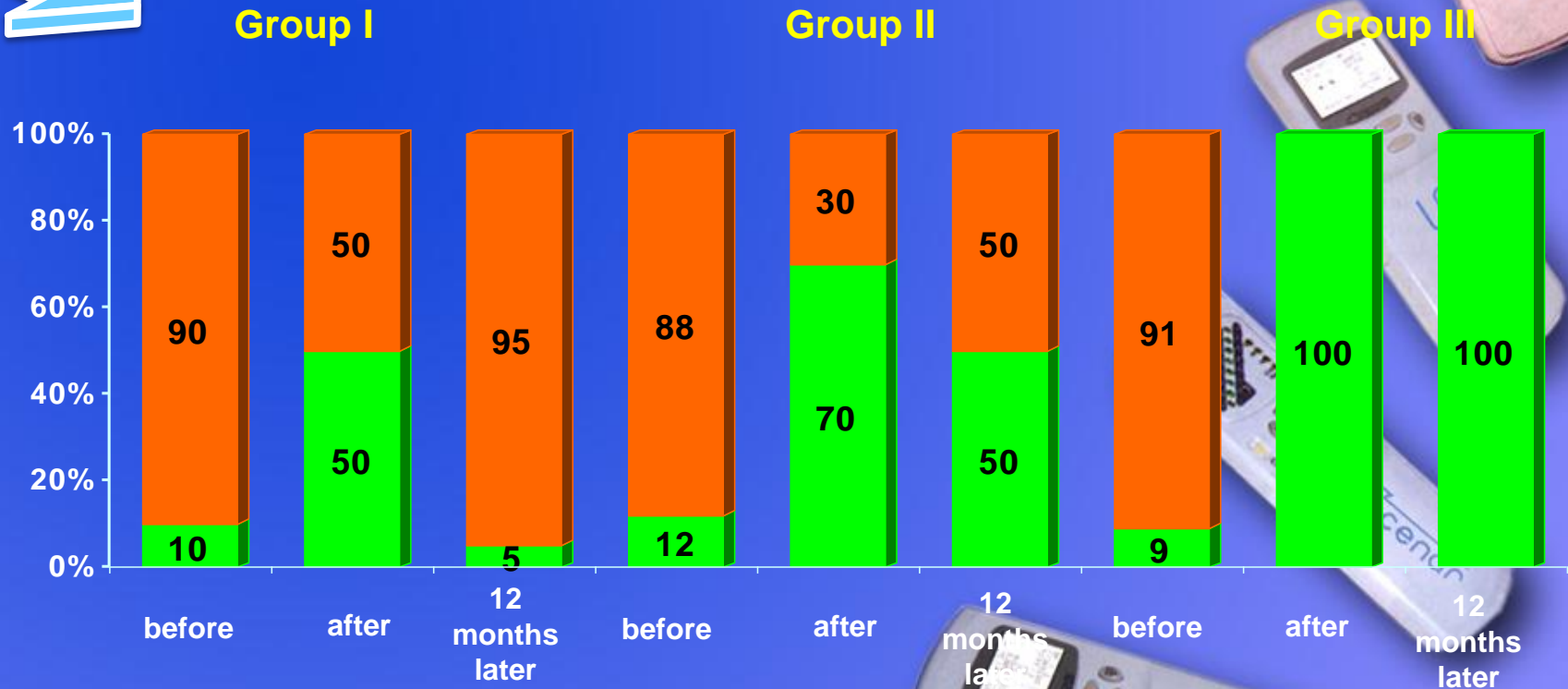
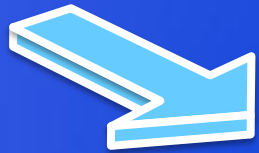


Low visual acuity (<0.1-0.3)
Comfortable visual acuity (0.4-0.6)
High visual acuity (0.7 and higher)



Changes of Neurophysiological Indices

Retinal Electrosensitivity



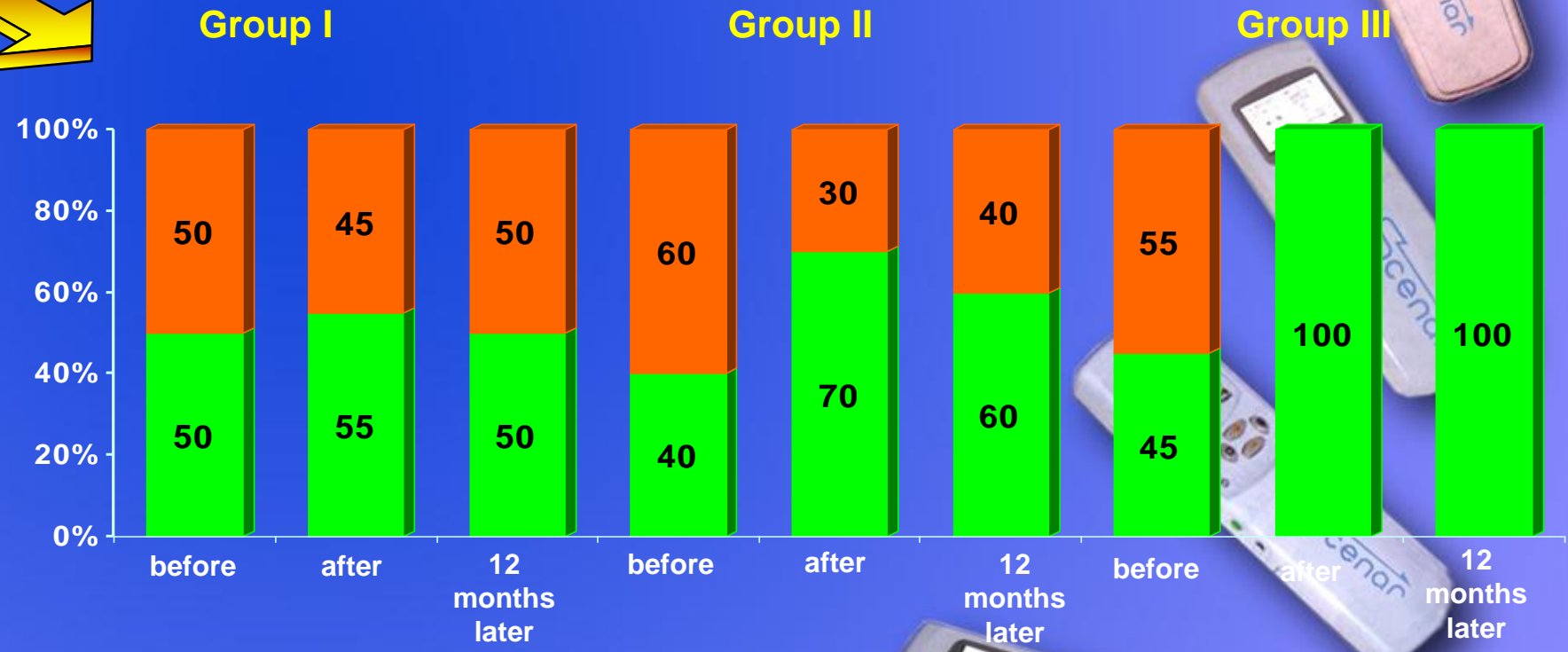
■ > 70 μA
■ $\leq 70 \mu A$ (normal)



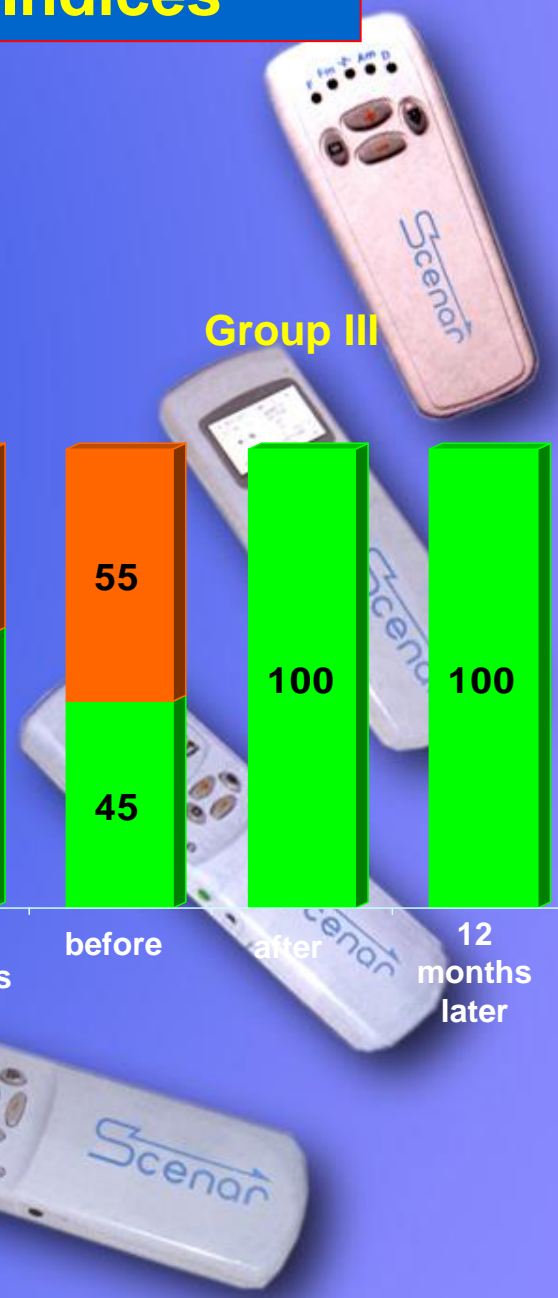


Changes of Neurophysiological Indices

Optic Nerve
Electroliability



< 45 Hz
 ≥ 45 Hz (normal)

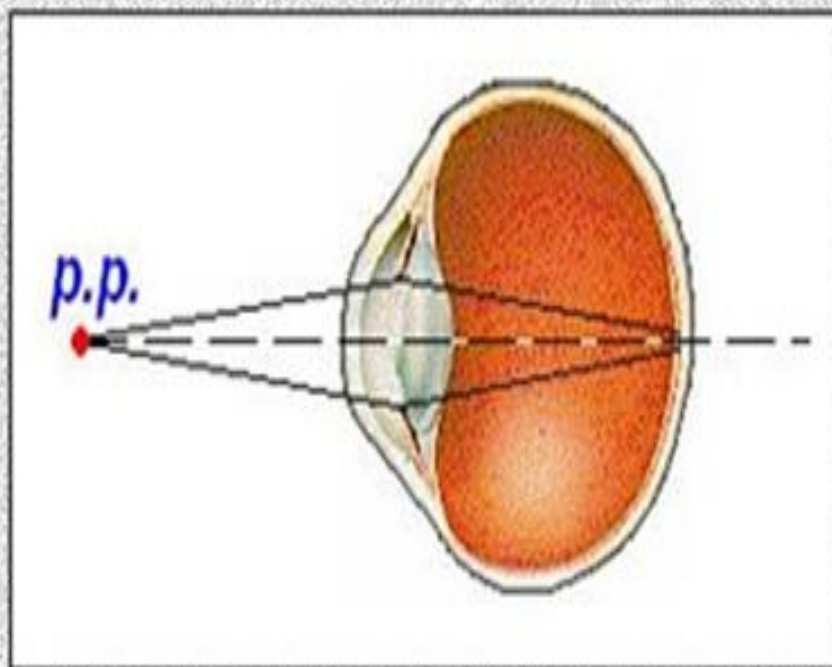


Accommodation

Accommodation is increasing the refractive power when looking from distant to near objects.

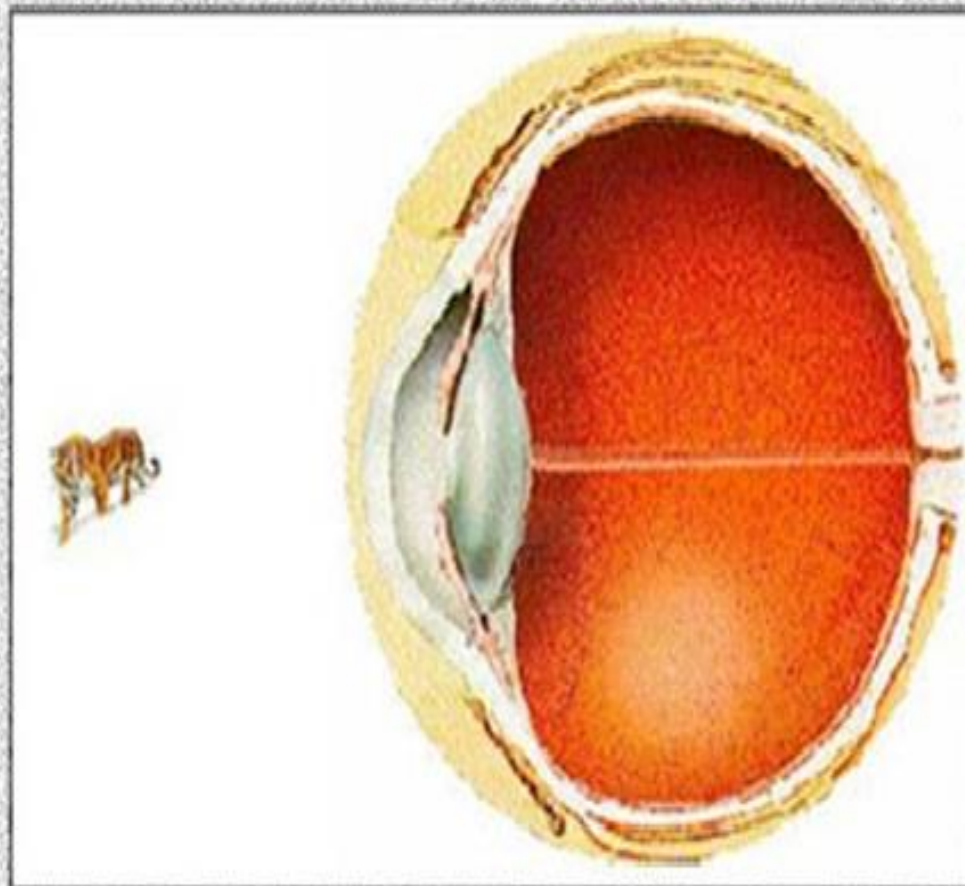
Desaccommodation – the reverse process, i.e. decreasing the refractive power when looking from near to distant objects.

The position of the nearest point of distinct vision (punctum proximum – p.p.) corresponds to the **maximum accommodation**.

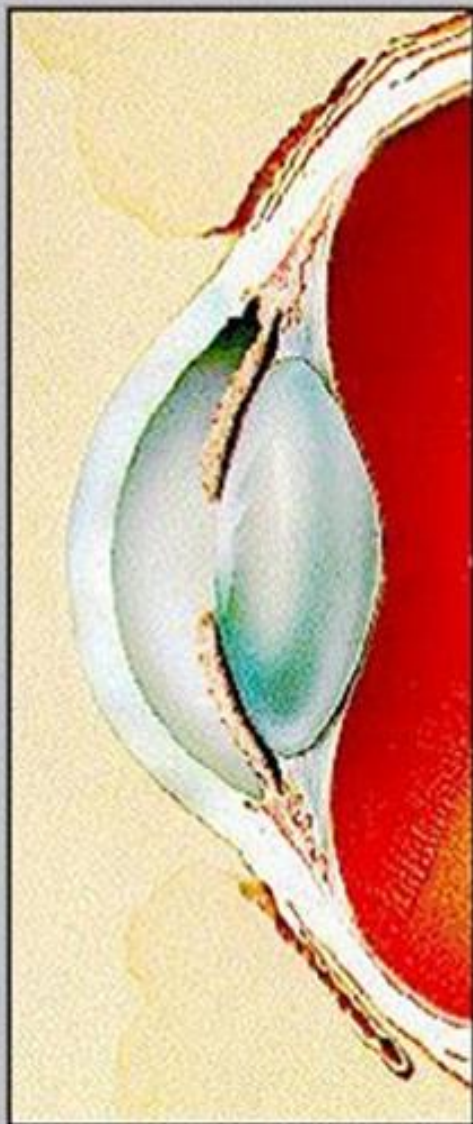


Accommodation mechanism

Blurred image on the retina is a sign of disorder in the refraction system that triggers a control action on the ciliary muscle.



Changes in the eye at accommodation



The pupil constricts during accommodation and dilates during desaccommodation.

Due to contraction of the ciliary body, zonular tension reduces and allows the lens to round up. The front surface of the lens and pupillary edge of iris are pushed forward.

The lens moves 0.25-0.3 mm down.

Changes in the eye at accommodation



The pupil constricts during accommodation and dilates during desaccommodation.

Due to contraction of the ciliary body, zonular tension reduces and allows the lens to round up. The front surface of the lens and pupillary edge of iris are pushed forward.

The lens moves 0.25-0.3 mm down.

Changes in the eye at accommodation



The pupil constricts during accommodation and dilates during desaccommodation.

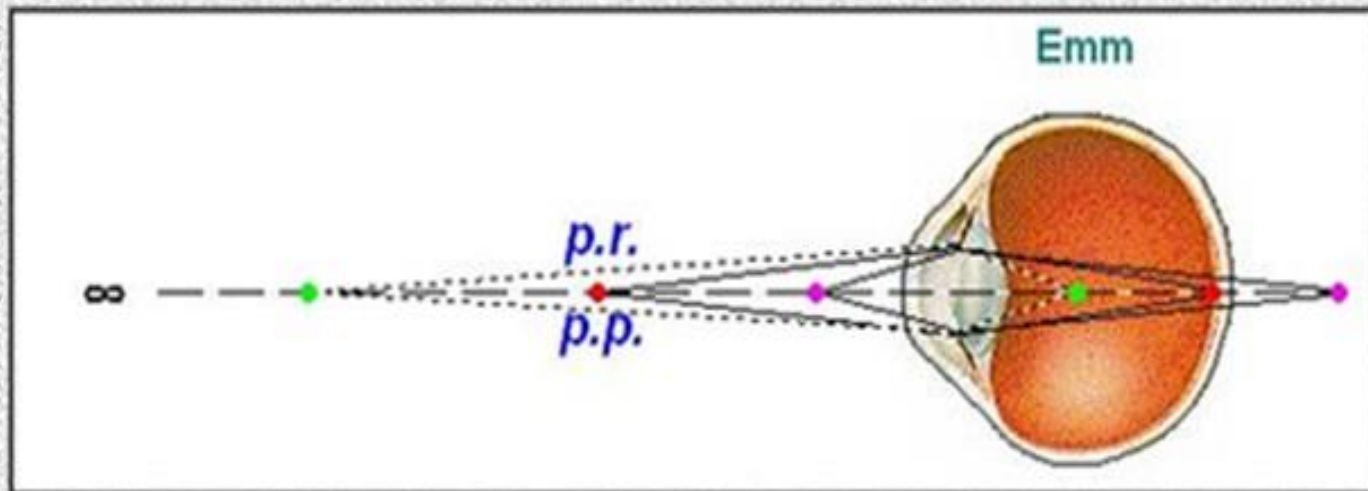
Due to contraction of the ciliary body, zonular tension reduces and allows the lens to round up. The front surface of the lens and pupillary edge of iris are pushed forward.

The lens moves 0.25-0.3 mm down.

Accommodation Spasms

Accommodation spasms manifesting themselves as sudden increase of refraction are called **pseudomyopia** or false myopia. Overstrain of the ciliary muscle turns emmetropic and hypermetropic refraction into myopic one or increases the degree of true myopia.

The near point (p.p., punctum proximum) gets farther from the eye, and the far point (p.r., punctum remotum) gets closer. Accommodation amplitude decreases.



Clinical picture of pseudomyopia

There can be asthenopic complaints: rapid eyestrain, pain in the eyes, in the forehead and temporal areas. In trying to deal with discomfort and difficulties in visual performance, autonomic reactions such as paleness, rapid heart beat, sickness etc. may develop.



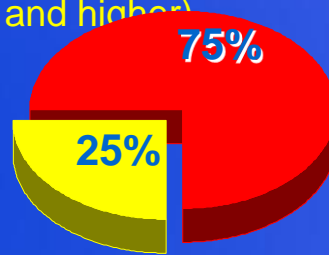


CHANGE OF ACCOMMODATION RESERVE

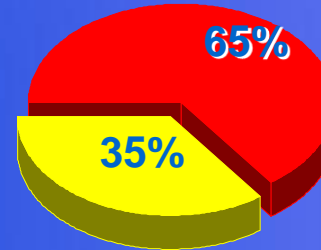
Accommodation Reserve:
■ no reserve (0 – 0.25 dioptries)
■ low reserve (up to 1.5 dioptries)
■ normal reserve (3.0 dioptries and higher)

Before treatment

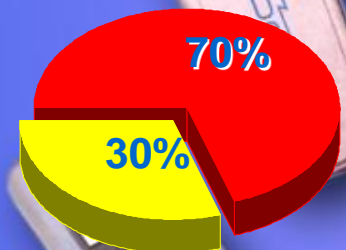
Group I



Group II

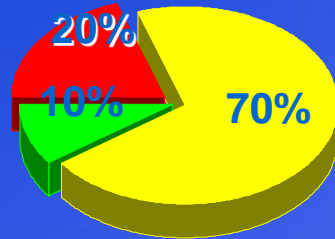


Group III

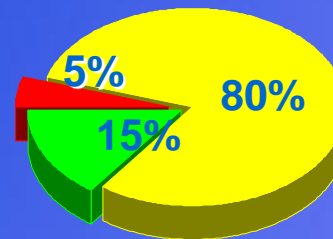


After treatment

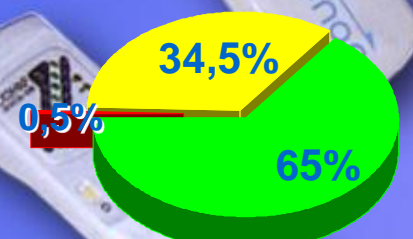
Group I



Group II

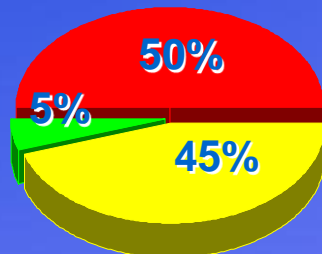


Group III

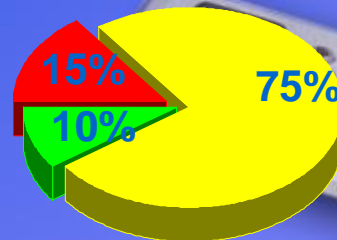


12 months later

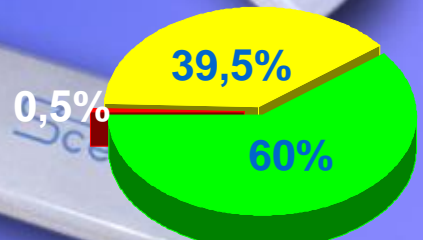
Group I



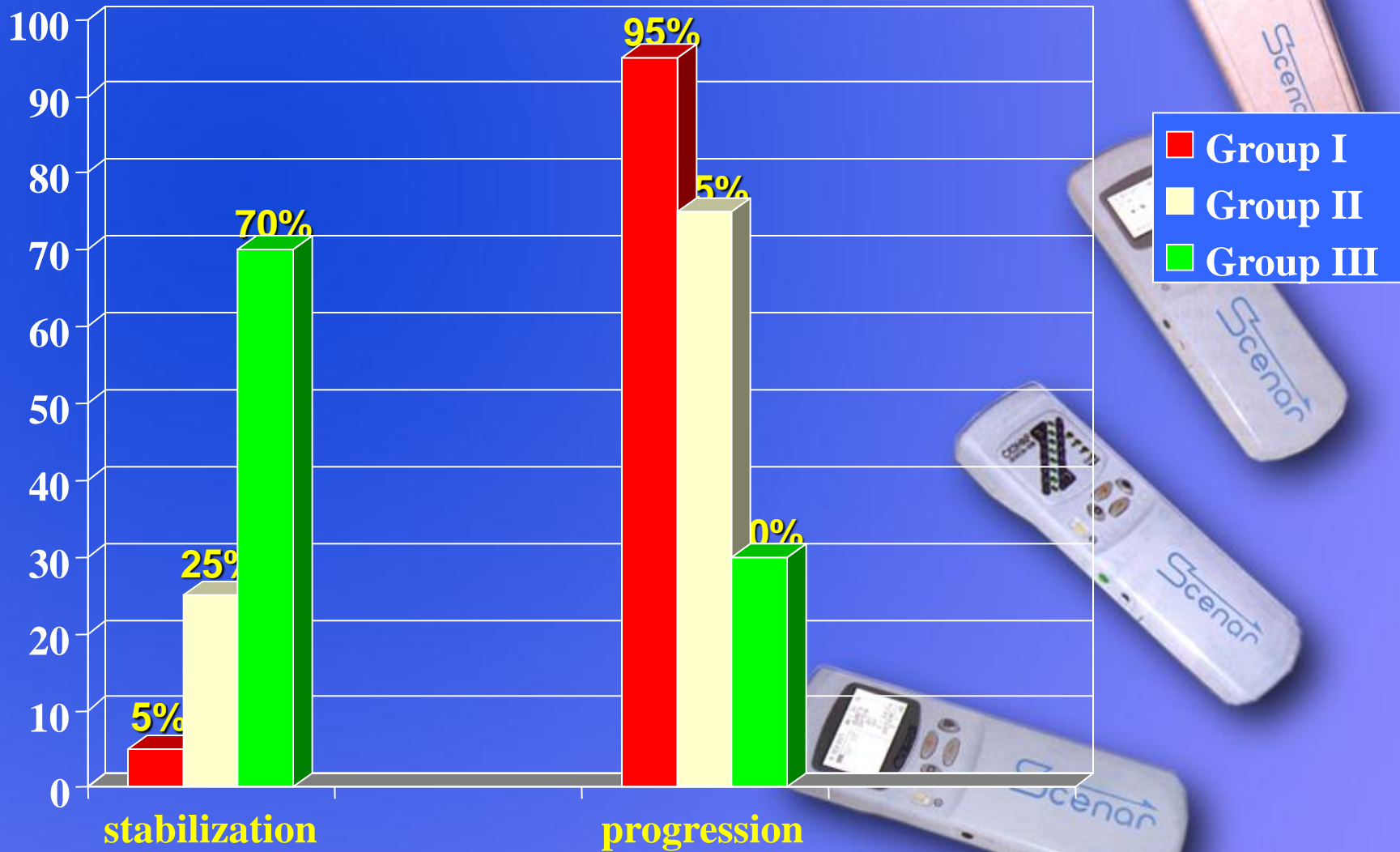
Group II



Group III



Myopia progression after 12 months



Long-term effects of SCENAR-therapy (12 months later)

Beneficial action of SCENAR in nearsighted children:

- In 78% children their vision acuity remained in the visual comfort limits
- Neurophysiological indices became normal in 100% cases
- Functional state of the accommodative apparatus became normal in 60%



CONCLUSION

Including SCENAR-therapy in the conventional management prevents myopia in 80% cases and stops myopia progression in 70%.





Thank you!