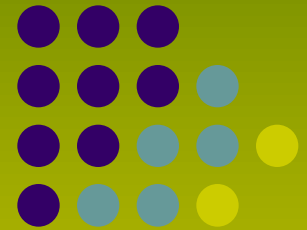


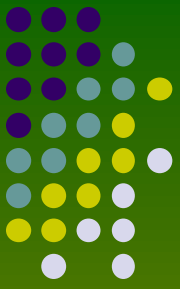
Prisms in the treatment of strabismus

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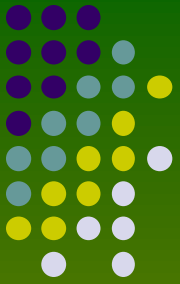


Prisms are means for diagnostic and treatment of strabismus.

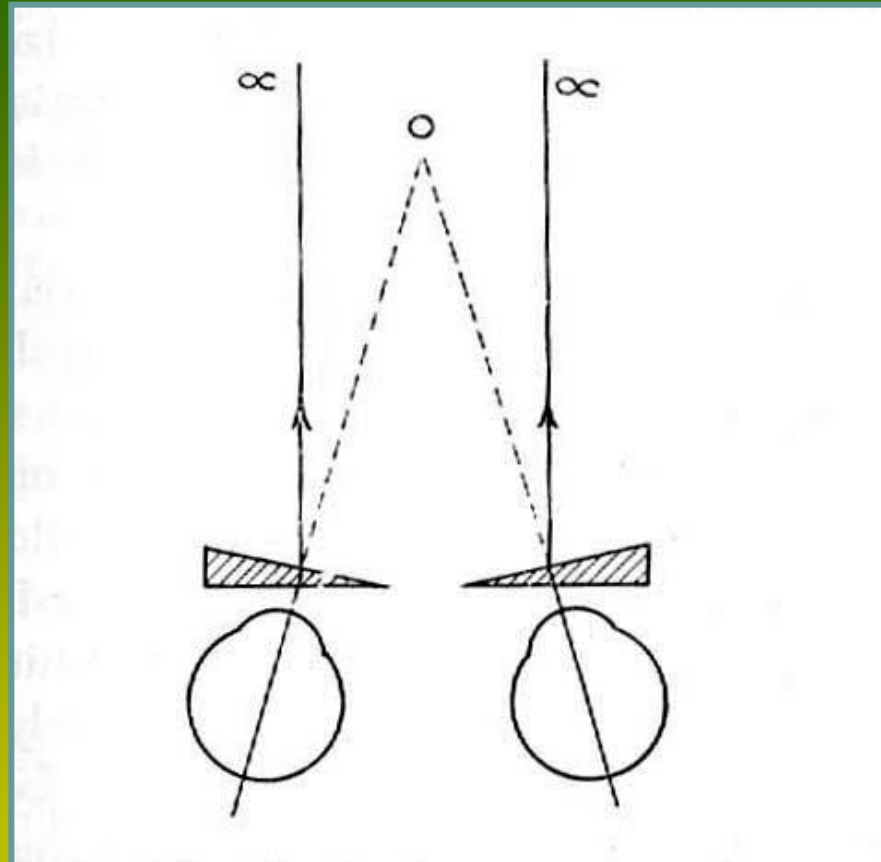
In patients with strabismus prisms use for next aims:

- 1) for measurement of deviation angle,**
- 2) for compensation of deviation angle,**
- 3) for conservative treatment of strabismus (provocation of diplopia, development of fusional reserves),**
- 4) for compensation of forced turning of head in oculomotor disturbances (paralytic strabismus with diplopia, nystagmus).**

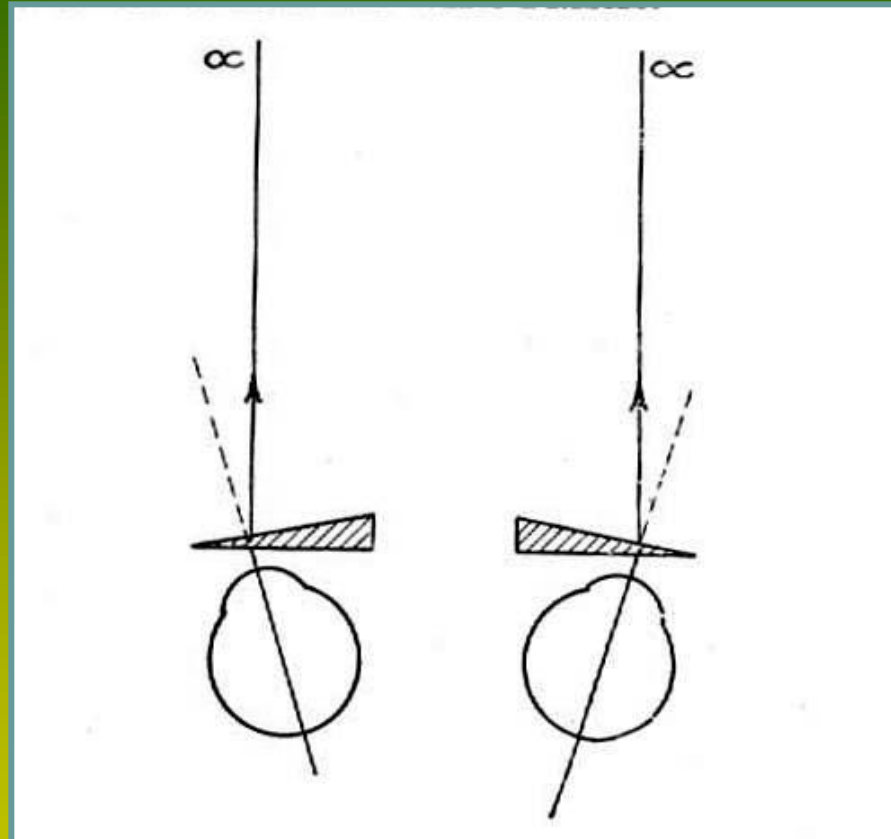
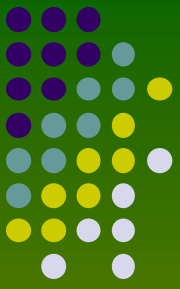
The use of prisms for measurement of strabismus angle



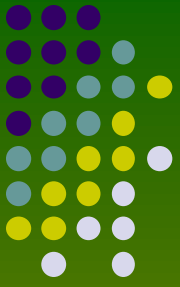
- **To measure the angle of strabismus, prismatic glass is set before a squinting eye by base aside, opposite to his deviation. So, at a convergent strabismus a prism is set by base outwards, at divergent strabismus – by base inwards, at supravergent strabismus – by base downwards etc. The power of the prism is gradually increased until the adjusting movements in the alternating cover-test disappear. This moment corresponds to the magnitude of the angle of strabismus, expressed in prism diopters.**



Placing of prisms in convergent squint



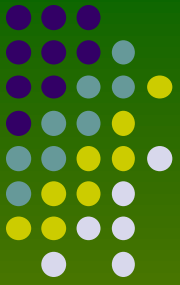
- Placing of prisms in divergent squint



The use of prisms for measurement of strabismus angle

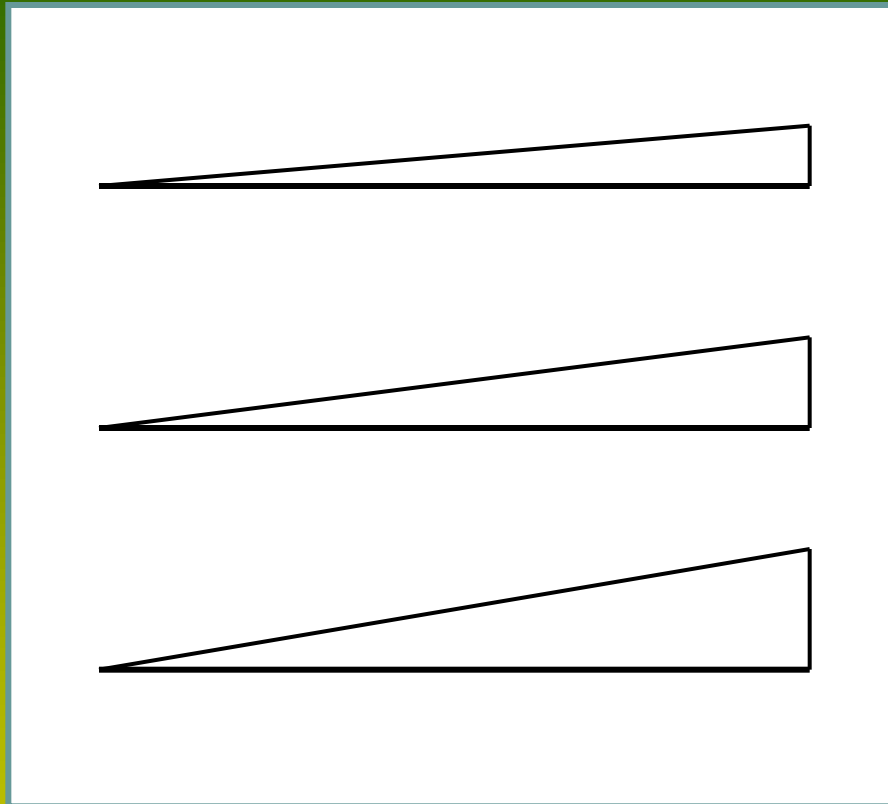
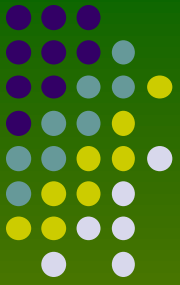
One measure the angle of strabismus for both the distance (when the patient fixes an object while looking at the distance), and for near (when fixing the object at a distance of 30-35 cm). This is necessary because in some cases the angles for distances and nears can differ significantly (for example, in excess of convergence, excess of divergence).

The use of prisms for measurement of strabismus angle



It is possible to use:

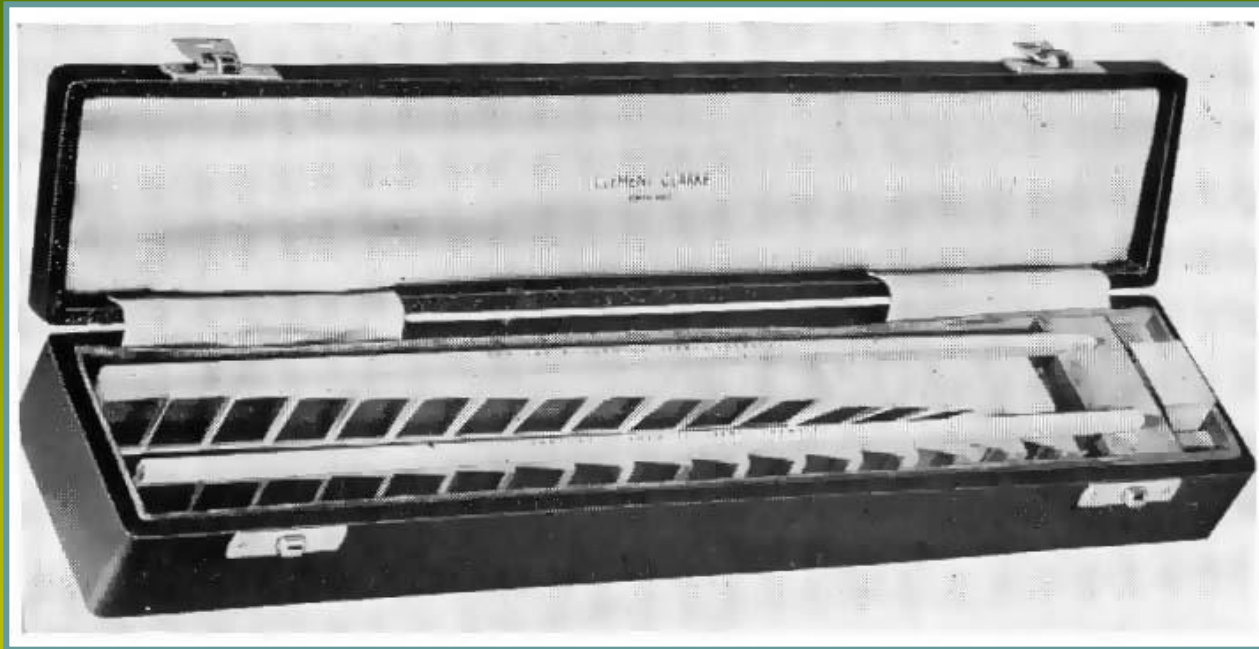
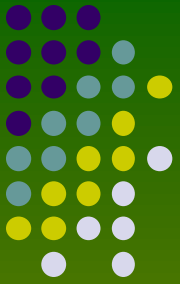
- **Conventional prisms (separate prismatic glasses installed in the eyeglass frame)**
- **Biprism device (prism compensator)**
- **A special ruler with prisms of increasing strength;
Set of 2 rulers with prisms of increasing strength**
- **Prisms of Fresnel. Each glass contains a series of small prisms of the same power**



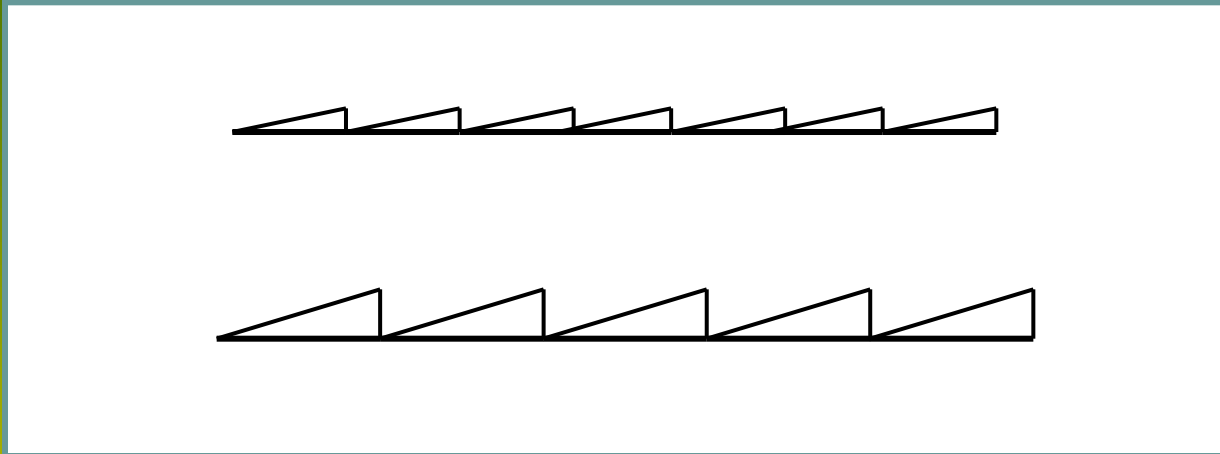
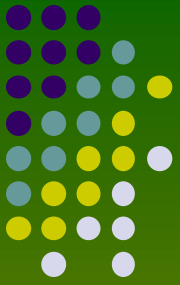
Conventional prisms of different power



Prism compensator (biprism device)



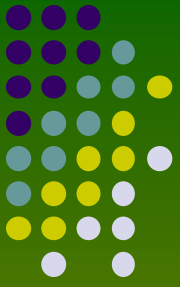
Set of 2 rulers with prisms of horizontal and vertical action



Prisms of Fresnel of different power



Why Fresnel prisms?

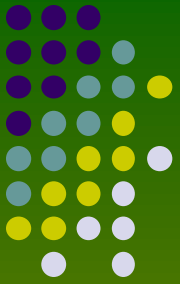


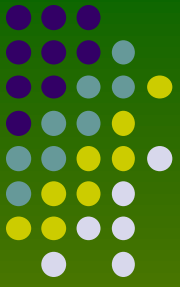
Fresnel, Augustin Jean (1788-1827) – eminent french physicist and optician, member of Parisien Academy of Sciences and London Royal society



Fresnel made many discoveries in physics and optics. In particular, he proposed a fundamentally new method of beacon lighting (Fresnel lens).

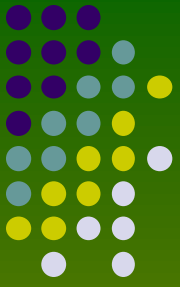
The beacon, in whose equipment Fresnel used the prisms he proposed





The use of prisms for compensation of strabismus angle

- **Thanks to the prism setting in front of the squinting eye, the image of the fixed object in this eye is transferred from the periphery of the retina to the fovea, which creates the conditions for the so-called prismatic orthophory. This helps to eliminate the phenomenon of suppressing the image of the squinting eye and restore bifoveal fusion (and, consequently, binocular vision) under natural conditions.**



Prismatic glasses is most functionally effective in the following cases:

at comparatively small angles of strabismus (up to 10-12 degrees according to Hirschberg, or to 18-22 prism diopters);

in appearance of strabismus after two years of age;

with a relatively recent onset of strabismus (from several months to one year);

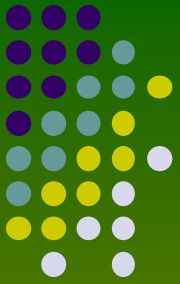
in the presence of a bifoveal fusion on the synoptophor;

in the presence of simultaneous vision when tested on a color device and on glasses of Bagolini;

in the presence of diplopia;

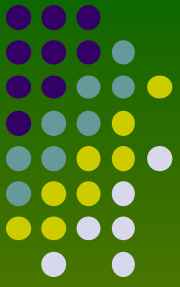
with normal visual acuity of both eyes or with amblyopia of weak degree of squinting eye.

Method of selection of prismatic correction



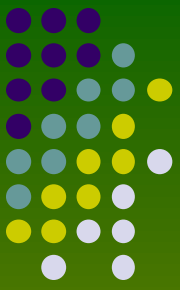
- **As a rule, the power of prisms is distributed evenly between two eyes; if there is a difference in visual acuity between the right and left eye, then a stronger prism is given to the best eye (effect of penalisation).**
- **In the practice of an ophthalmologist, one can use not only soft elastic prisms of Fresnel, but also prisms of domestic (ukrainian) production (Kiev).**

***Our experience of the use of
prismatic correction in children
with small angle of strabismus.***

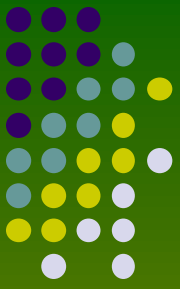


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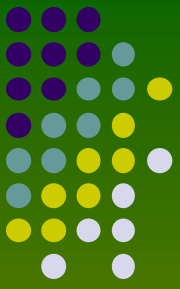
- **The opinions of ophthalmologists regarding the effectiveness of prismatic correction in patients with strabismus are contradictory. The possibility of complete cancellation of prismatic correction with achievement of binocular vision without prisms by various authors is estimated at 7-35%.**



Aim of investigation

▪

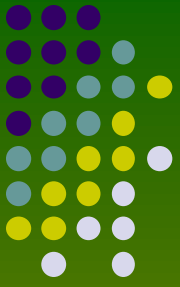
**To estimate the efficacy of
prismatic correction in children
with small angles of strabismus**



Materials: 63 children with concomitant convergent squint, 5-16 y/o, with deviation 10-25 pr. dptr, were observed.

Methods: viso-, refracto-, deviometry, investigation of binocular functions, ocular motility, ophthalmoscopy.

Visual acuity in 45 patients was 1.0, in 18 – 0.5-0.9. 2-3-divisible investigation during 1 hour was performed on prism tolerance test (for exclusion of phenomenon of secondary increase of deviation).



Results

- **Othophoria and binocular vision (BV) were noted in all children in spectacles after prism selection. Every 2-3 months the control of visual acuity, state of eyes and binocular functions was performed. Long-term follow up observations were conducted during 5-28 months. Normal BV in prismatic spectacles saved in 45 children (71.4%). Asymmetrical BV in spectacles developed in 6 (9.5%), that affirmed about late appearance of phenomenon of secondary increase of deviation.**

The nature of binocular vision of patients using prismatic correction



Moment of investigation		Number of patients	The nature of binocular vision (number of patients, %)			
			normal	asymmetrical	simultaneous	monocular
Before prescription of prisms		63		-	63	-
With prismatic correction		63	63 (100,0)	-	-	-
After 5-28 months	With prisms	63	45 (71,4)	6 (9,5)	12 (19,0)	-
	Without prisms	63	3 (4,8)	-	60 (95,2)	-

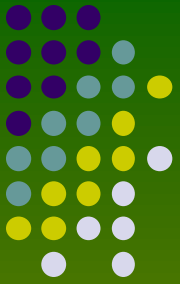
Power of prisms was diminished on 4-8 pr. dptr with preservation of BV in 25 children. Complete abolition of prisms was possible **only in 3 children (4.8%)**.

20 children with normal BV with prisms were operated; after surgery BV was noted:

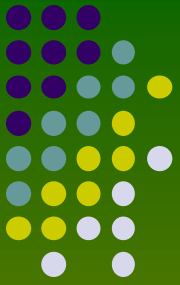
- without prisms – in 7 children
- with weak prisms – in 13 children.

Patients conducted orthoptic treatment: development of fusional ability, exercises with help of special computer programs for restoration binocular and stereovision.

After treatment BV without prisms is marked yet for 6 children.

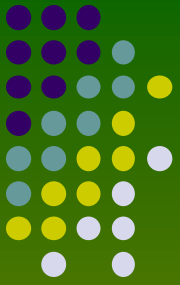


Conclusion



Diagnosis and treatment of oculomotor disorders with prisms should be widely used in the practice of an ophthalmologists. The selection of prismatic spectacles and treatment with prisms require high qualifications of the ophthalmologist and his assistant, great patience, diigence, and care.

Conclusion



- **Use of prisms will allow at least a part of patients with strabismus to be cured without surgery, and preoperative wearing of prisms combined with a subsequent operation will accelerate the recovery of binocular vision in patients.**

ИНСТИТУТ ИМЕНИ В.П. ФИЛАТОВА

Thanks for attention!