


4^e TRIMESTRE


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JOURNAL DU
CLUB TROPIQUE

N° 1



VISION
ET
STRABISME



tropique

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les "Plus"

de TROPIQUE

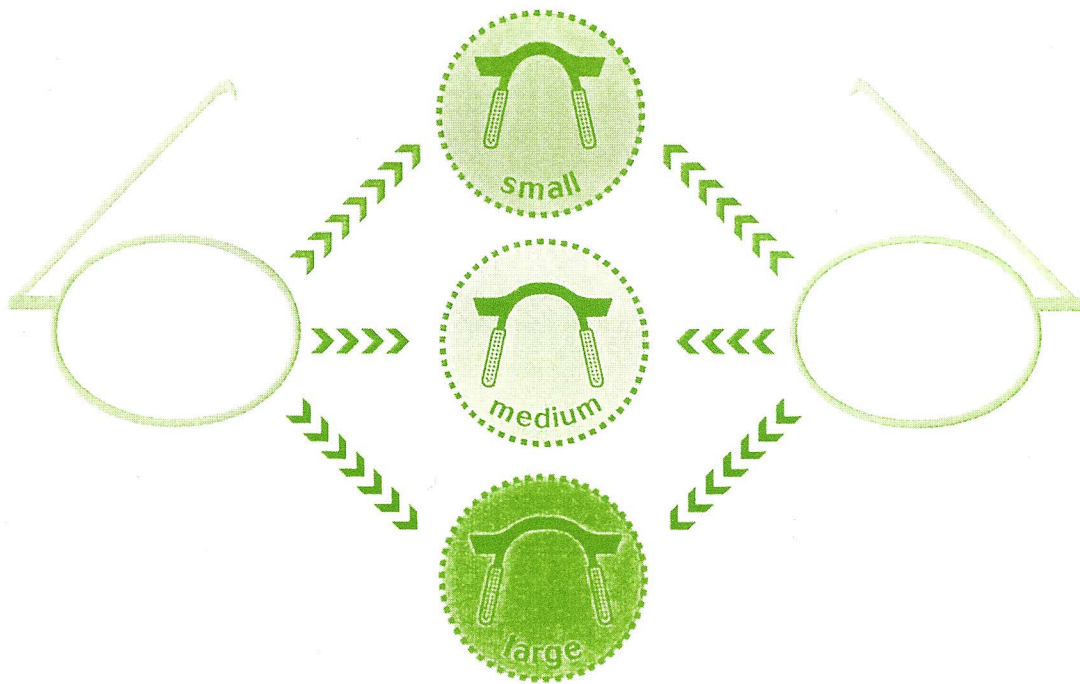
couvrent la totalité des morphologies nasales de type :

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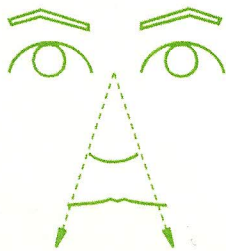
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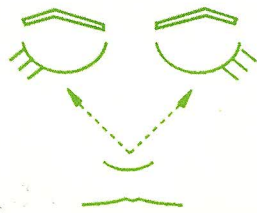
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S. FATEH



EDITORIAL

In response to several requests, we have the pleasure of presenting an english version of our magazine "Vision et Strabisme". This is the first issue of new series. We have chosen 6 articles covering the range of our interests, from improvement of diagnostic, therapeutic and surgical procedures to prevention strategies focusing on amblyopia and strabismus in infants as well as in adults.

The magazine is not restricted to ophthalmologists. It encompasses the interests of all professional devoted to vision : opticians, orthoptists, optometrists, pediatricians...

For years, the editorial board has brought together individuals from the clinical, surgical, basic scientific and optical realms under the connotative name of "Tropic". It is sponsored by an optical company.

We hope that this issue opens a dialogue among readers, a clear incentive for collaborative discussions in the future.

Jean JULOU

OPHTHALMOLOGIC INTEREST IN CHILD HEALTH ASSESSMENTS

Dr J.M. BADOCHÉ, Dr G. HOROVITZ, Mr F. VITAL-DURAND

Question. What is meant by a child health assessment ?

Response. In France, all children should benefit from a medical exam, known as an Assessment at the 9th month, 2 years and at 4 years, undertaken by the treating physician or the pediatrician. At the conclusion of this exam, a report written by the physician is addressed to the "P.M.I. : *Protection Maternelle et Infantile*", the French agency of "Maternal and Infantile Protection", for verification.

Q. What is its incidence on screening visual problems ?

R. If a pathology is found, or a particular risk is suspected, this assessment signals the necessity for a specialized consultation. The family, having been informed, will have to present a special insert to the child's Health Logbook ("Carnet de Santé") during the ophthalmologic consultation in order to get the specialist to take over the case free of charge.

Q. What happens in the case of negligence on the part of the parents ?

R. The P.M.I. agency contacts the treating physician to have them summoned.

Q. Is 9 months really the best age for a first assessment ?

R. One must be aware that health assessments are planned at 8 days and at 4 months, but without an advised ophthalmologic control exam. Nevertheless, one must hope that the physician would not

have waited until this age in cases of evident visual pathology.

Q. Why was 9 months chosen to advise for an ophthalmologic exam ?

R. This is still a very sensitive period of visual development where functional problems will be easier to treat and where a refractive anomaly can be easily corrected.

Q. Are pediatricians sufficiently informed on the ophthalmologic warning signs in very young infants ?

R. An important increase in awareness among pediatricians, general practitioners² and paramedical staff has occurred during the last 20 years (via specialized press coverage, conferences, teaching, training programs...). In addition, the parents are more and more demanding, especially when a family history exists.

Q. What does a visual assessment at 9 months consist of ?

R. The Health Logbook specifies: the search for a strabismus, nystagmus. An eventual complementary exam is advised. The latter only mentions an acuity measurement. It should be accompanied by an orthoptic assessment, an examination of the refraction and fundus, which would be the optimal type of assessment.

Q. How can the visual acuity be measured ?

R. With visual Acuity Cards. These are 25 by 50cm panels that have on one of their halves an attractive pattern, i.e. stripes or concentric circles. The examiner observes the child through a

small hole at the center of the panel and assesses the direction that the child looks in as an indicator of which side contains the pattern. The finest pattern that can attract the child's gaze is considered the highest threshold of his/her acuity: this is the "preferred gaze" technique.

Q. Is this subjective exam easy to undertake ?

R. As for other exams, it requires a minimum amount of cooperation. To facilitate this, we present the cards within the window of a screen and play a sort of peek-a-boo game, a situation which focuses the child's attention.

Q. Does the examination of acuity take long ?

R. It takes 5 to 6 minutes when we are well trained and begin with the condition of "both eyes open", and less if we omit this measure. It becomes more difficult to practice after 12 months of age.

Q. Who practices it ?

R. The orthoptist or ophthalmologist, depending on the organization of each office.

Q. Are there various types of cards ?

R. Yes, the Teller acuity cards (Vistech) consist of vertical gratings, with a square wave luminance profile. The BébéVision Tropicque cards consist of a circularly concentric target (bull's eye) with a sinusoidal luminance profile. The results are comparable.

Q. How are the results expressed ?

R. Unfortunately as "dixièmes" or tenths, as is conventional in France, but a more modern approach would be to use the new international unit, namely the logarithm of the minimum angle of resolution (logMAR).

Q. What does this measurement provide ?

R. A comparative estimation of the acuity, that is to say the presence of an amblyopia, regardless of its depth. It is especially useful to determine the occlusion regimen and to follow the improvement in visual acuity. It is important in cases of poor vision.

Q. What is the purpose of early screening ?

R. From the age of 3-6 months, the assessment can be virtually complete: refraction, fundus, oculomotility, acuity. It is in effect essential to treat strabismus, high ametropias and anisometropias from this early age. Moreover, in cases of an organic lesion (cornea, crystalline lens, retina, etc.), it is important to be able to appreciate the prognosis and undertake a treatment. Indeed, taking on the psychological assessment and follow-up of children with very poor vision and their parents is very important for the future. One must be aware that "low vision" training is possible and in fact, essential, in infants less than one year of age.

Q. Do you think that health assessments are of great importance in the screening of infants that are "at risk" due to hereditary factors ?

R. Most certainly, because these risks are diverse: father, mother, strabismic or ametropic siblings, spectacle wearer, families with ocular pathologies, low birthweight or neonatal pathology. These infants must benefit from a systematic exam, even in the absence of any warning signs.

Q. Are the health assessments at 2 and 4 years which give rise to a certificate and full case management, necessary and sufficient ?

R. Necessary certainly, sufficient, certainly not! At 2 years, the pediatrician cannot easily determine the visual acuity and will not screen for an amblyopia due to a microstrabismus or anisometropia. At 4 years, the exam is easier since the child can respond, but the treatment of the amblyopia at this age often only gives rise to a partial improvement.

Q. Can you specify the warning signs that the physician needs to look out for in young infants and at each assessment ?

R. Anomalies in visually related behaviours :

- disinterest in the environment
- drowsiness
- poor repertoire of expressive gestures.
- clumsiness or awkwardness
- torticollis
- excessive blinking
- closing one eye in sunlight
-

Ocular signs visible on inspection :

- Leukocoria (white pupil : cataract, tumour)
- Strabismus, including intermittent, convergent, divergent, or vertical
- Nystagmus
- Ptosis
- Anisocoria (difference in pupil diameters)

- Megalocornea + tearing + photophobia (think of glaucoma)
- Moderate microphthalmia
-

Signs to look out for:

- P.M.R. (photomotor reflex)
- Paresis of an oculomotor nerve
- Presence of an ocular dominance
-

Q. What is the purpose of the visual exam in the health assessment at 4 years ?

R. It is essential if the child was not screened earlier. This would often involve unilateral amblyopias due to anisometropia or a microstrabismus that went undetected, but also poor vision due to a simple refraction problem.

Q. In conclusion, what would you say to the treating physicians ?

R. The visual exams retain their *raison d'être*, but it would be desirable :

1. That children at risk be systematically seen as of 3 months of age.
2. That all children be examined at 9 months and at 3 years in an ophthalmology department. We would thus screen for an anisometropia or a microstrabismus, major causes of amblyopia. We would avoid accommodative problems and visual fatigue that begin as early as kindergarten. In addition, for certain high ametropias, only an early optical correction will allow one to obtain a good visual acuity.

OPHTHALMOSCOPIC MEASUREMENTS OF THE REFRACTION AND ACCOMMODATION

Dr. J. JULOU

It appears to us, that despite the development of the automatic refractor, an important place remains for a technique to measure refraction as already proposed in 1911 by GULLSTRAND.

We have developed and presented it to the *Société d'Ophthalmologie de Paris*, and extended it to the measure of accommodation. It remains particularly adapted to the examination of strabismic children that we see in most cases between 6 months and 4 years.

FUNDAMENTAL TECHNIQUE

Consists of **STATIC** retinoscopy in the sense that we observe the **position** and not the **movement** of the red reflex.

This observation is made with an ophthalmoscope at high intensity illumination, the light source being situated beneath the axis of observation (for e.g. the Simay, Heine, Welch-Allyn).

The ophthalmoscope is held **immobile** at the classic distance of 1 meter. What emanates from the pupil area consists of a red portion (the red reflex) and another area that is darker. Their positions allows for the measure of the refraction. The ophthalmoscope is first placed vertically to measure the vertical component of the refraction, and then horizontally to measure the horizontal component.

In the vertical position, if the line that separates the red reflex from the shadow

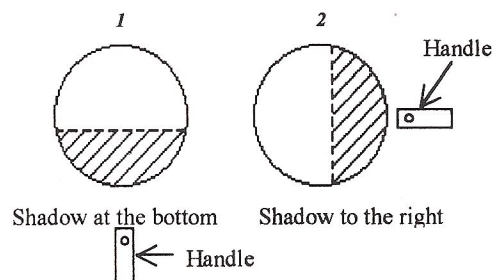
is not horizontal (oblique astigmatism), the handle of the instrument must first be placed perpendicular to the line observed and then, to determine the 2nd axis of the astigmatism, we rotate the axis of the ophthalmoscope 90° from this original position.

INTERPRETATION: two observed cases are possible.

1st case :

1. *Ophthalmoscope is held vertically.*
2. *Ophthalmoscope is held horizontally.*

An emmetrope, hyperope or a myope of -1 diopter.



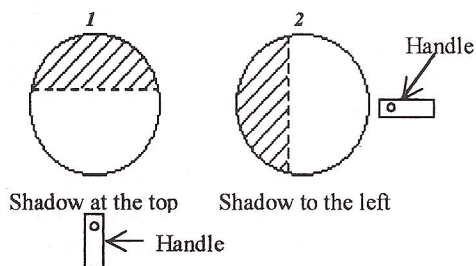
The introduction of convex corrective lenses modifies the position of the shadow and its surface:

- Shadow *en masse* for an overcorrection of +0.50.
- Inversion (shadow at the top) for +1.

2nd case :

1. *Ophthalmoscope is held vertically.*
2. *Ophthalmoscope is held horizontally.*

The subject is myopic by more than 1 diopter.



The shadow is on the opposite side of the handle:

- Shadow *en masse* for an overcorrection of 0.50.
- Inversion for an overcorrection of -1.

MEASUREMENT OF THE REFRACTION

A 1st observation permits, by illuminating the two eyes, an estimation of the ametropia.

- The introduction of overcorrective lenses gives an inversion of the shadow up to a value of +/- 0.50 diopters from the ametropia.
- A difference between the vertical and horizontal findings (or the two meridians 90° from each other) provides the value of the astigmatism.
- the axis of the line that separates the red/shadow portions provides the value of the axis.

IMPORTANT REMARKS

1. An ametropic observer at 1 meter can focus on the subject's pupil.
2. The intensity of the light prevents accommodative spasms and makes cycloplegia unnecessary: a comparative study after 15 days of cycloplegia/atropine confirmed this.
3. Mydriasis dilutes the intensity of the red reflex and renders the observation and measure impossible, while myosis facilitates the exam.
4. The red reflex is imprecise as long as we are at +/- 3 diopters from the refraction. Its surface is proportional to the degree of the optical defect. For e.g. : at -3, the shadow is reduced to a small superior crescent. At +3, the shadow is reduced to a small inferior crescent.

INTEREST IN USING WHEN DEALING WITH A YOUNG CHILD

We encounter two difficulties in examining a very young subject:

- He moves the head and eyes (1).
 - He may be strabismic (2).
1. This method provides quasi-instantaneous results: it suffices to observe during a fraction of a second the position of the components of the red reflex after having drawn the line of sight in the wanted direction.
- We do not use a lens bar (or very little) because the infant always tends to look at it or wants to grab it. We use trial frames adapted for the age, for example "Tropique". We place a pair in the child's hands which allows

the other one to be placed on the nose with greater ease... These spectacles come pre-equipped with spherical (or other) useful lenses.

2. Certain subjects are strabismic.

It is thus difficult to examine the desired eye. We solve this difficulty by specially mounting spectacles with spherical and prism lenses.

Spherical lens powers of +2 or +3 diopters covers the majority of hyperopias.

These lenses have an associated prism that corresponds to the majority of deviations.

- A pair of 2 prisms of 12 diopters = 24 diopters.
- A pair of 2 prisms of 15 diopters = 30 diopters.
- A pair of 2 prisms of 20 diopters = 40 diopters.

It is thus easier to rapidly acquire a precise enough, if not exact, measure of **the refraction and the deviation**, even for an agitated child.

MEASURE OF ACCOMMODATION

We already mentioned in 1965 that we use ophthalmoscopic retinoscopy to study accommodation: it suffices to observe the fluctuations in the appearance of the red reflex during the same basic conditions, 1 meter from the subject.

1. Spontaneous variations exist :

- The subject looks in the distance, and the shadow changes in surface appearance and position.
 - Same observation at near or far to measure presbyopia.
 - The possibility of observing the 2 eyes at the same time allows one to determine if the modifications are symmetric.
- ### 2. The measurement of accommodation is made by introducing a lens or lens bar over the eye being observed or over the other one.
- ### 3. The exam can be undertaken while modifying the reading distance for both or one eye, by observing the other one, with or without the help of a septum.

It is thus possible to study the variations in accommodation in diverse monocular and binocular conditions. This is interesting in the case of the strabismic child, the exam of which hardly lends itself to more sophisticated techniques.

In conclusion, one can say that the precise measurement of the refraction is done rapidly and with extreme simplicity by ophthalmoscopic retinoscopy.

It seems irreplaceable to us in the case of infants and young children.

In addition, it makes the study of the components and variations of **accommodation** possible, without complex instrumentation.

FUNCTIONAL AMBLYOPIA

Dr. G. HOROVITZ

CLINICAL SIGNS

After having ruled out organic amblyopia by a fundus examination, and if possible an examination of the anterior segment with a biomicroscope, it must be said that the evident clinical signs of amblyopia become manifest rather late.

Thus a systematic examination from the age of six months for all infants can bring about a quasi-total disappearance of this very important problem since we know that :

- 1 child in 7 has a visual problem, that is to say 4 children per class!
- Of 700,000 annual births presently recorded in France, 6% of infants are strabismic and among these, 3% will present with an amblyopia, that is :
 - 18,000 infants per age group whereby 54,000 infants are less than 3 years of age.
 - 108,000 children are less than 6 years old.

In addition, we know that treatment will be more effective as well as less intrusive when administered early.

Without an apparent strabismus, amblyopia evolves asymptotically, and it is during a school screening that the loss in visual acuity is noted.

The ophthalmologist will thus be consulted and, under cycloplegia or if he has the habit of using retinoscopy under blur, he will discover an anisometropia :

- astigmatism

- hyperopia
- myopia
- or associated problems

A particular sign can however attract the attention of parents or others. When the child is 2 years of age (or older), the head may turn to fixate with the good eye, either to look at images or to draw.

Example: Amblyopia LE → head turn toward the left (for a right hander).

Microstrabismus often goes undetected. Amblyopia can evolve. Often, retinoscopy will reveal a high latent hyperopia with or without an associated astigmatism. It becomes necessary to undertake an examination of the oculomotor status, as practiced by an orthoptist, as well as an evaluation of binocular vision.

Faced with an evident convergent strabismus, four different presentations can be noted :

- The convergent strabismus is *purely alternating* : there is no need to be concerned with amblyopia.
- The convergent strabismus with a *predominance of alternating* : there is a risk of the development of a relative amblyopia and in this case, it will be difficult to overcome. The case requires a close watch with a prolonged period of follow up, at least until puberty, to avoid a regression in visual acuity which is even more difficult to recuperate.
- The convergent strabismus is *unilateral* : amblyopia is the rule and will quickly develop if not treated rapidly and stopped.

- The convergent strabismus is *unilatéral with paralysis of the lateral rectus* : the clinical signs will be the same and is often associated with a torticollis.

A case of convergent strabismus which is slightly apart is that of "*crossed eyes*". It is congenital with pseudo-paresis of the two lateral recti.

Motor dominance prevents alternating, entailing a sensory dominance that will create an amblyopia. This is especially the case if the recovery of the pseudo-paresis is not symmetric, with the abductions on one side retrained well but remaining incomplete for the other side. The clinical signs will develop quickly between 6 and 8 months of age.

- With difficulty in alternating, one eye will straighten while the other remains blocked and cannot be straightened. Fixation remains foveal.
- Then a nystagmus appears, not only in abduction (motor) but also in the primary position of gaze. Fixation can still be foveal.
- Finally there is a loss of this ability to straighten, and fixation becomes eccentric.

Other clinical signs can be observed at each stage of this degradation :

- First of all, the object to be fixated is well viewed in primary position.
- Abductions being impossible, to follow an object the child turns the head in order to fixate with the good eye, amblyopia establishes itself, but remains relative.



Head rotation

At the ultimate stage, the child turns the whole body to follow the object. It is the "sign of the revolving top".



Body rotation

The case of a divergent strabismus remains to be discussed. We know that in these cases there is never a deep amblyopia. It often occurs early and is intermittent.

The signs that attract attention are in general very revealing: the child shuts an eye in the sunlight and always chooses the same one to close. When tired or during a temper tantrum, this eye will become divergent.

As in convergent strabismus, refraction under cycloplegia is indicated and will often reveal an anisometropia, rarely a hyperopia, but most often a tendency toward a myopia and a more pronounced astigmatism on the affected as compared to the dominant side.

In conclusion, early screening and treatment will restore isoacuity. It must be acknowledged that this treatment must continue over a long period of time, with follow ups even after a "cure". Spectacle wear is naturally indispensable, but it is not this in isolation that can assure a cure.

The different techniques for treatment will be described in an upcoming chapter.

REFLECTIONS ON EMMETROPISATION FACTORS

Dr. J.M. BADOUCHE

Since the beginning of my ophthalmologic practice, I have had the opportunity to examine a great number of children, however at that time, the youngest were 7 years old. In effect, pediatricians and general practitioners waited for the children to be able to read before referring them for an ophthalmologic assessment, thinking that we could do nothing prior to this. These children had thus retained their strabismus, their hyperopia and had their amblyopia for a longtime. Physiological hyperopias decreased, around 7 years and disappeared by around 9 years. hyperopias between 3 and 5 diopters did not change and the hyperopias of more than 6 diopters, corrected only at 6 or 7 years engendered mediocre acuities in the order of 5 to 6/10 (Snellen 20/40, 6/12 to 20/30, 6/9), despite an optimal optical correction.

Twenty years later, thanks to the dissemination of information to pediatricians and child care doctors, the average age of the first consultation was 2 years. I thus had the opportunity to examine approximately 180 children born to my first patients. I found among them a high proportion of hyperopia, often equal to that of the parents, many strabismics (approximately 25 %), but only 2 cases of amblyopia in 2 children that that were examined at a late age of 3 years for geographical reasons. Fortunately, these two amblyopes recuperated with intensive treatment. The other strabismic children, generally seen between 6 and 15 months, presented a more or less pronounced dominance of their fixating eye but amblyopia had not yet really set in. I was able to obtain, in the large majority, isoacuity measures. The few poor cases remained the congenital ones with nystagmus.

It appeared to me useful to study the evolution of the hyperopia in infants seen at the age of 6 to 8 months, with or without strabismus, but all with a family history of strabismus (parents or siblings). The most frequent observation was a moderate hyperopia of +2,50 to +4,00 diopters and some cases of hyperopia from 5 to 8 diopters. In these highly motivated families who wished to prevent strabismus and amblyopia, it was rather easy for me to have these very young infants wear their glasses.

When the infant was equipped with spectacles early and did not develop a strabismus in the following months, generally the hyperopia rapidly diminished, sometimes by 2 diopters between 6 and 12 months. The infant that wore the spectacles well up to that point, would suddenly reject it and the refraction control exam would demonstrate an overcorrection. Around the age of 4 to 5 years, physiologic hyperopia remained in the order of +1,5 diopters with orthophoria and good binocular vision. In certain cases of a hyperopia greater than 5 diopters, the child, having become binocular, had only 3 to 3,5 diopters at the point of entry into the primary school system. We can thus think that the phenomenon of emmetropisation was well on its way.

On the other hand, when the optical correction was not prescribed early enough and the infant developed a strabismus which was not brought into control by wearing spectacles, the hyperopia remained the same during early childhood. At 5 or 6 years, the correction remained from +3,50 to 6 diopters.

It was interesting to note that the high hyperopes from 6 to 8 diopters that were

already strabismic during their first consultation before the age of 1 year, kept the same hyperopia during early childhood. This was always the case even if they were well corrected, even if their strabismic angle decreased but did not go to zero, thus without any possibility of binocular vision.

Here are some telling examples :

Josephine was referred to me for a recent strabismus of ET = 30 at 7 months. A total correction of +4 was prescribed and well tolerated. Sectors were placed to favour fixation by the strabismic eye which was highly dominated. The strabismic angle persisted until about 14 months, and then totally resolved with the spectacles between 14 and 20 months. Orthophoria with the correction was subsequently maintained with a positive Lang stereotest response at 20 years.

The refraction, regularly checked, demonstrated a decrease in the hyperopia around 2 years, with a subsequent decrease in the lens correction, and again at 3 years with the residual angle, without correction, being strongly reduced. At 4 years, she just wore a +2 with orthophoria and good binocular vision. At 6 years, on entering primary school, I left her with +1 RE/LE so as not to risk a relapse of the strabismus with respect to the accommodative effort required with the learning of reading and writing. This child was without spectacles at 7 years, perfectly orthophoric and binocular.

Yannis was referred to me at 6 months for a systematic examination. No strabismus, no functional signs, but an older brother of 6 years was amblyopic with the left eye with a microstrabismus not screened early enough and a hyperopia of 7 diopters. The latter child wore +5,50 RE/LE and the amblyopia had been discovered during a kindergarten health screening assessment. There existed eccentric

fixation with LE, and the acuity of the good eye was only 8/10 (Snellen : 20/25, 6/7,5).

Yannis, perfectly orthophoric, had the same hyperopia as his brother +6 diopters, to the great disappointment of his parents. They agreed together to proceed with preventative treatment, I thus prescribed +3 RE/LE by undercorrecting and kept a close watch on this infant. He remained straight and binocular and the hyperopia was just at +4 at 12 months. It decreased further and the spectacles were readjusted to +2, then +1,50, always maintaining an undercorrection. Later the Lang + and 10/10 (Snellen : 20/20, 6/6). At 6 years, Yannis entered school without a correction (he tolerated a +0,50 RE/LE).

Julie, 8 months, came for a first consultation for a strabismus that appeared around 6 months. The child is cute but does not appear to be very alert. The angle of the strabismus is approximately ET = 50 with the right eye being very dominant. At this first exam I detect a high hyperopia. Under atropine, Julie's behaviour is quite surprising : no reaction when I slide the lens bar from +2 to +4 diopters. At 5 diopters, she appears to take some interest in her environment. At 6 diopters, she tries to grab the lens bar, to touch the exam table, and at a height of 8 diopters, she is completely aroused, looks at me, looks at her parents, bangs her hands on the table, tries to grab the lenses in the trial lens case and all the small objects that can be found within arms reach !!

She had a hyperopia of +9. I corrected to +7. The parents signaled the transformation that had occurred in her behaviour immediately after the wearing glasses. Unfortunately the angle of strabismus has not completely resolved and she remained strabismic with the correction of about ET = 30 and hyperaction of the small obliques. She wore her glasses well. Amblyopia was avoided with occlusion and sectors, but the hyperopia never diminished. At 7

years, although operated on and aesthetically very well, the had 10/10 (Snellen 20/20, 6/6) but still always wore +5,50 RE/LE.

It is thus tempting to conclude that orthophoria with binocular vision is a factor of emmetropisation. It would thus be possible, in infants with a family history of hyperopia and strabismus, to ensure prophylactic treatment of the strabismus by an early correction and to thus permit a more or less rapid decrease of the hyperopia.

In cases without strabismus, the correction must be partial to leave a margin of accommodation to the infant and permit the accommodative/convergence reflex to establish itself normally. A hyperopia of +6 for example in an orthophoric child would be undercorrected on the condition, of course, of the maintenance of the orthophoria. The procedure would be the same in the case of intermittent strabismus.

In cases with a constant strabismus, the total correction is imposed straight-away, with the hope that it will neutralize the deviation. Unfortunately this is not always the case.

If the case refers to an infant who is already undercorrected because of an orthophoria from the start, but then develops a strabismus as he/she grows,

one must, of course, immediately increase the power of the lenses in such a way as to maintain a parallel line of sight and save binocular vision, which would without a doubt permit the decrease in the optical correction over time.

It is true that one can report the fact that strabismic children, even if operated on but without binocular vision, always have spectacles of +2,50 or more at 12 or 13 years, whereas hyperopic children resorbed before 10 years, despite a family history.

Conclusion

I insist on two points :

In the presence of an associated astigmatism, it is imperative to correct in all cases.

It is interesting to compare these medical observations with analogous results obtained in certain surgical cases where binocularity and orthophoria were recuperated. There as well, emmetropisation was reported to occur in a very rapid fashion.

However, the results not being constant, it is impossible to reply to concerned parents about the duration of wearing spectacles.

SURGERY OF EXOTROPIAS

Interview of Dr. F. LODS by Dr. J. JULOU

Dr. J. JULOU : *What is the frequency of divergent strabismus ?*

Dr. F. LODS : This represents 20% of strabismic cases, that is 1% of the population, but by age 60, there are as many divergent as convergent cases.

Dr. J. JULOU : *At what point must surgery intervene ?*

Dr. F. LODS : It is always rather late (between 6 and 12 years) because one needs good orthoptic cooperation.

Dr. J. JULOU : *What types must never be operated on ?*

Dr. F. LODS : On the one hand, the forms without BV nor cosmetic insult (angle inferior to 8 or 10°), because it can include constant exotropias or congenital divergent strabismus. On the other hand, the forms that are quite intermittent with good BV, without signs of asthenopia (convergence is good and compensates well for the deviation, without functional signs of the cephalic type (like headache), no tiredness when reading).

Dr. J. JULOU : *What types sometimes require surgery ?*

Dr. F. LODS : For aesthetic reasons :

1. Exophoria-tropias : if there is no sign of asthenopia, one must keep in mind the importance of the angle when decompensation occurs, of course, but also the frequency of decompensation during the day and the speed of recovery. The demands of the patient is quite variable: the decompensation is intolerable in certain relational and professional situations. One must also keep in mind the familial video-camera which externalizes these deviations!

2. Secondary types :

* Secondary sensory types with an organic anomaly.

* Secondary types, consecutive to a convergent strabismus : spontaneous or surgical.

But all these types risk becoming worse with age.

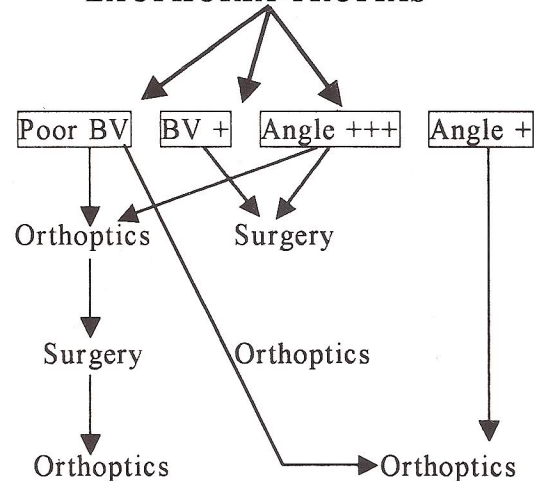
Dr. J. JULOU : *Which types should always be operated on ?*

Dr. F. LODS :

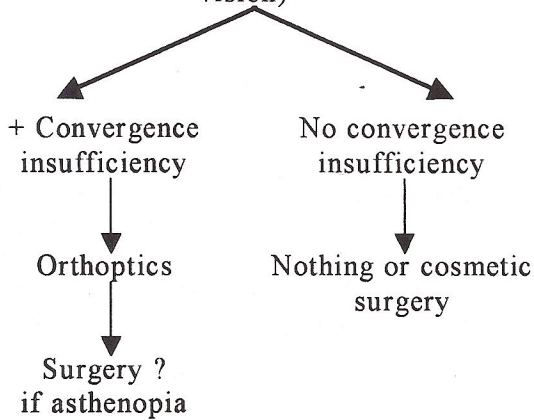
1. Exophoria-tropias with angles greater than 10° because the orthoptic treatment can only be effective on a moderate angle.
2. Exophoria with high asthenopia (convergence is insufficient and does not compensate for the deviation, headache, tiredness when reading).
3. Exophoria-tropias of variable angle, sometimes diplopia but bifoveal fusion.

INTERMITTENT DIVERGENT STRABISMUS
= EXOPHORIA-TROPIAS
+ TRUE EXOPHORIAS

EXOPHORIA-TROPIAS



EXOPHORIAS = (Very good binocular vision)



4. The forms with significant torticollis. Involves motor types : congenital paralysis of III, Duane's syndrome in divergence.

Dr. J. JULOU : Which cases are those where prudence is the rule ?

Dr. F. LODS : In pre-myopic syndromes, primarily myopic anisometropes. Types with significant refractive problems.

Dr. J. JULOU : Which type of surgery ?

Dr. F. LODS :

1. In exophoria-tropias, after medical treatment: correction of ametropias, correction by prisms, prudent and moderate surgical treatment is often indispensable.
 - Bilateral recession of the lateral recti is the intervention of choice even if the PPC is poor: it is often most improved post-op. The dosage must rest on the maximum angle, that is to say the angle observed without fusion, nor accommodation: 0.8 to 1°/mm.
 - Resection or a fold of the medial rectus is also done if the angle is >25°.
 - A Massin-type incision, that is to say limbal -conjunctival incision with small radial incision.

It is expected to obtain an immediate but discrete overcorrection, because the tendency toward regression is foreseeable but inevitable, due to the increase in the inter-orbital distance during growth.

2 - In secondary forms :

- Sensory: treatment of the organic anomaly, if this is possible, must be the first gesture (for example a traumatic cataract), otherwise the surgical treatment will be purely cosmetic: recession/resection of the deviated eye; if the deviation is >20°, we can lengthen the lateral rectus by *fascia lata*, and associate a shortening of the palpebral fissure in cases of high unilateral myopia.
- Consecutive to a convergent strabismus : to establish the surgical protocol a careful analysis of the case history, if possible, is necessary and an orthoptics assessment will most often confirm the absence of BV.

In the forms where the divergence appeared spontaneously after a convergent strabismus, it often means there is the existence of a high hyperopia or amblyopia. Surgery will eventually be undertaken after an exact optical correction.

In the forms subsequent to surgery for a convergent strabismus, two cases can present themselves :

- a) The types with binocular vision, a prism must be used but often a re-intervention is necessary.
- b) The types without binocular vision are the most common, much more frequent than secondary iatrogenic esotropias.

The divergence can be immediate or early:

- Immediate : technical error, most often due to a loosening of sutures. The

incomitance is evident and re-intervention must be rapid.

- Early, without incomitance : it generally is due to an error in the surgical indication plan: occlusion of the dominant eye, the decrease or suppression of the hyperopic correction is most often an interim solution and a re-intervention is necessary on both lateral recti when the angle is $>20^\circ$ and on the muscles already operated on if the angle is $<20^\circ$. In any case the exam under general anaesthesia (GA) permits the evaluation of the iatrogenic factors.
- Late : the surgery can be delayed (the angle can be relatively small and can rest stable for a long time).

Dr. J. JULOU : *Can the pre-op data help in establishing the surgical protocol ?*

Dr. F. LODS : I certainly take into account the [eye] position under AG, but mainly the passive ductions, the position of the muscles, their extensibility. We can get help from the sign of anesthesia : operate or do more on the eye that is the most deviated under GA.

Dr. J. JULOU : *What can be the peri-surgical complications ?*

Dr. F. LODS :

- The prevention of malignant hyperthermic syndrome, exceptional but often fatal, requires a team of anesthesiologists knowledgeable in the problems of anesthesia in children, in particular those related to strabismic surgery.
- Perforation or the loss of a muscle is rare and necessitates appropriate measures immediately.

Dr. J. JULOU : *What can be the post-surgical complications ?*

Dr. F. LODS :

- Overcorrection: post-surgical diplopia is rare and temporary, prisms are to be used if needed. An excellent future prognosis exists if BV is very good, but surgical overcorrection of intermittent divergent strabismus with poor BV can give rise to a microesotropia and not an esophoria.
- The risk is of regression due to the increase in the distance between the orbits and the decrease in accommodation.
- Ischemic syndrome of the anterior segment is extremely rare. The vascularisation of the anterior segment is in part assured by the lateral rectus thus, by preference, an incision at a distance from the limbus, dissection of the vascular sheet, and be careful of associated surgery of the recti (Superior and Inferior) (DS, D.Inf).

Non-surgical case :

- *Daphnée* : seen for the first time at 4 years of age for an intermittent divergent strabismus. The refraction using atropine brings us to prescribe:

RE +6.00 (-2.00) 0°
LE +7.50 (-1.50) 0°

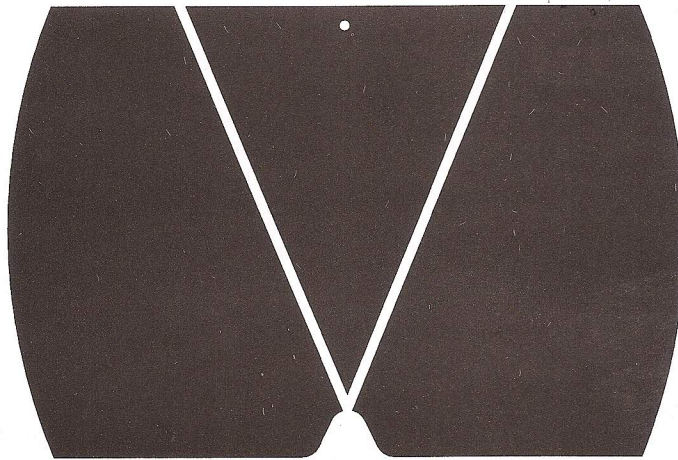
At 14 years, *Daphnée* is orthophoric with her spectacles, her acuities are 10/10 [Snellen : 20/20 or 6/6] for the right eye and 9/10 [Snellen : 22/22, 6/7] for the left eye. She has stereoscopic vision of 40'' using the TNO but she is esophoric-tropic of 2 without spectacles!

Surgical cases :

- *Audrey*'s consultation is for an intermittent divergent strabismus discovered at age 4. She is emmetropic and presents with a stereoacuity of

400" at near and 0 at far. After orthoptic treatment and intervention at 12 years (recession of the two lateral recti by 8mm), she is esotropic by 8° with diplopia and loss of all stereopsis. Correction by prisms is undertaken, and she becomes a microesotropic with recovery of her stereopsis of 400" at near.

- B., 8 years old, presents with an exophoria-tropia with headaches and no PPC. However, his stereoscopic vision is excellent (60") at far and near. After recession of 7 of the 2 lateral recti, he is esophoric-tropic with diplopia; after using prisms everything comes to order in 3 weeks and the recovery of stereoscopic vision is complete.



tropique
Le Cadran Solaire Tropicque
L.J. Mawas et A. Franceschetti

<p>Fixer l'emboche nasale du cadran solaire sur le nez. Fixer un point droit devant soi : un point blanc sur le cadran, un objet sur le mur.</p> <p>Voit deux lignes blanches se transformer en un M et un W imbriqués.</p> <p>Le sujet esophorique voit un W.</p> <p>Le sujet esophorique voit un M.</p> <p>Le convergent de l'œil droit voit un N.</p> <p>Le convergent de l'œil gauche voit un N Inversé.</p> <p>L'alternant voit un V à gauche quand il fixe de l'œil droit.</p> <p>L'alternant voit un V à droite quand il fixe de l'œil gauche.</p> <p>Le divergent de l'œil droit voit :</p> <p>Le divergent de l'œil gauche voit :</p>	<p>IX</p> <p>W</p> <p>M</p> <p>N</p> <p>N</p> <p>V</p> <p>V</p> <p>XI</p> <p>IX</p>	<p>sees the two white lines change into an M and a W superimposed.</p> <p>The esophoric subject sees a W.</p> <p>The esophoric subject sees a M.</p> <p>The right convergent squint sees a N.</p> <p>The left convergent squint sees a N upside down.</p> <p>The alternating squint sees a V on the left when he fixates with the right eye.</p> <p>The alternating squint sees a V on the right when he fixates with the left eye.</p> <p>The right divergent squint sees :</p> <p>The left divergent squint sees :</p>
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USE OF CONTACT LENSES IN STRABOLOGY

L.J. MAWAS, J. CREHANGE, S. DOUSSARD, S.FATEH

Ofaimproved orthoptically and aesthetically.

THE POPULATION BASE

87 patients: 75 convergent and 12 divergent. We eliminated those that abandoned the study after several months (lassitude, local ophthalmological problems, left the district).

THE CONVERGENT STRABISMICS

A/ THE CHILDREN

They had perturbed accommodation, a requirement for clear vision, especially for near, a dominant eye and sometimes a treated amblyopia on the road to recovery. Until now, they were at least 6 years of age (in actual fact the youngest was 5 years, thanks to the ease of disposable lens trials, we hope to treat children that are even younger). Their eyes all partially straighten with their spectacles, and all demonstrated the reappearance of the strabismus with the removal of the spectacles.

CONDITIONS FOR PRESCRIPTION

a) *Motivation*

Parents and children are motivated for cosmetic reasons: with the removal of the spectacles, the strabismus abruptly reappears (with mocking remarks from friends).

Ophthalmologists, orthoptists and opticians must unite their efforts to support the parents and help the children

during the first trials and during the first week of contact lens training.

After the first trial and the disappearance of the "fear factor", the lessening of the deviation is encouraging to all.

b) *Cleanliness*

Rigour, hand and nail hygiene are imperative. Verification of the presence of the lenses in the case by the parents every night (contra-indication: the dissension of the parents). No contact should be allowed with tap water which might carry amoebae.

c) *Pre-adaptation*

The definitive lenses will not be prescribed unless :

- Three control exams are undertaken without incidents,
- The child knows how to remove them all alone,
- The loss of a lens does not constitute a "financial drama", hence the advantage of "disposable lenses".

B/ THE ADULTS

The accommodative convergent strabismus straightens with age as he/she wears spectacles, or so they say...

Indeed, numerous adults remain strabismic with the removal of their spectacles and are unhappy, in particular with respect to their emotional life. Having broken their glasses, they walk into our offices, head down and eye(s) deviating. A certain proportion of them leave the place

transformed, without spectacles and with contact lenses.

C/ RESEARCH GOALS

Contact lenses as well as orthoptic exercises teach convergent strabismics "to know how to see with blur", at far, at near, without lenses, without spectacles, and to behave as non-strabismic hyperopes without glasses.

Requisites for convergent squinters

a) *The ophthalmologist and orthoptist desire :*

The decrease of the deviation in parallel with :

- the functional use of the two eyes by handicapping the dominant eye by an overcorrective lens best allowing the continual use of the central vision of the dominated eye.
- the loss of suppression of the nasal retina of the dominated eye. By exercises based on physiological diplopia and by learning to use it as much as the temporal retina of the fixating eye.
- the normalisation of convergent accommodation, hence the disappearance of the spasm (J.B. WEISS).

Whereby the cosmetic result is also functional: the eyes are straight with normal binocular vision.

b) *The patients desire:*

Stage 1: Be better perceived by others with his spectacles

Stage 2: Be "straight" with lenses

Stage 3: Be "straight" and remain straight with and without spectacles, be in constant binocularity with and without lenses at the end of the treatment.

c) *Material*

Complete and various trial contact lenses in boxes to modulate the overcorrection of the deviation: for a period of successive trial and error.

"Weekly" and "monthly" lenses permit a great flexibility of adaptation and the possibility for families to follow the progression of adaptation at minimal cost.

d) *The adaptation*

With disposable lenses, it is very simple : only one base curve exists for most brands. If two exist, we choose the one that approaches approximately 1mm more than the flattest curve of the subject's cornea as measured with a keratometer. The limit of disposable lenses available are for astigmats of >2D, myopics >9D and hyperopes >6D (actually 9D).

Conventional, Annual-wear soft lenses were historically prescribed for the first time in 1975 for a hyperopic strabismic of 7 years: power = 9D, diameter = 14mm. The base curve tried is +1mm from the flattest reading obtained with a keratometer. For example, a subject with a K1=730 and K2=750, we try lenses with a base curve of 830 or 860.

D/ METHODS

A conventional, preliminary ophthalmologic assessment and ancillary tests done before the prescription of lenses.

Overcorrection of the dominant eye by +1.5D to obtain a visual acuity of 5/10 Snellen 20/40, 6/12.

Overcorrection of the dominated eye by 0.5D so that the visual acuity is about 7/10 Snellen 20/30, 6/9.

The first wear often provokes an anxiety spasm, which necessitates a relaxing walk for half an hour before resuming the control.

a) *First exposure to the contact lenses*

The importance of orthoptic measures is fundamental in the choice of power undertaken "by trial and error".

The usual controls must not be forgotten: lens mobility, tolerance after 4 hours of wear, state of the conjunctiva, corneal sensitivity, lachrymal secretions.

From this first trial, changes to one or both lenses is undertaken, depending on the visual acuity (insufficient or excessive penalisation), depending on the deviation (angle over- or undercorrected), depending on the lens' parameters (modification of the base curve, diameter, the search for the most suitable hydrophilic property and the highest practical transmissibility).

If everything goes well, a second trial lasting 10 hours is undertaken.

b) *Second trial : 10 hours long*

New complete check up. Previsions for following check ups after 3 weeks, then 3 months of wear, unless there is some emergency: eyes red and painful.

E/ THE RESULTS

90% of convergents were cured of their strabismus and obtained the ultimate goal: to be straight with and without lenses.

10% who were much improved with the lenses remained strabismic on removal. They were operated on in adolescence or as adults.

DIVERGENT STRABISMICS

Approximately half were cured after the wear of lenses and associated orthoptic exercises for removing peripheral suppression: divergent patients must learn to see "attentively" without their correction, the two eyes together, and behave as strabismic myopes without spectacles. Those who sometimes continued to diverge were operated on.

The persistence of a deviation in an adult on removal is a good indication for surgery.

The surgical goal is not to abandon the lenses or spectacles, but rather the aesthetic comfort after having removed them.

CONCLUSION

The prescribing of overcorrected soft lenses, which we have used for the last 18 years as conventional wear and disposable wear, is a helpful therapeutic measure to correct accommodative strabismics.

Photo 1 :

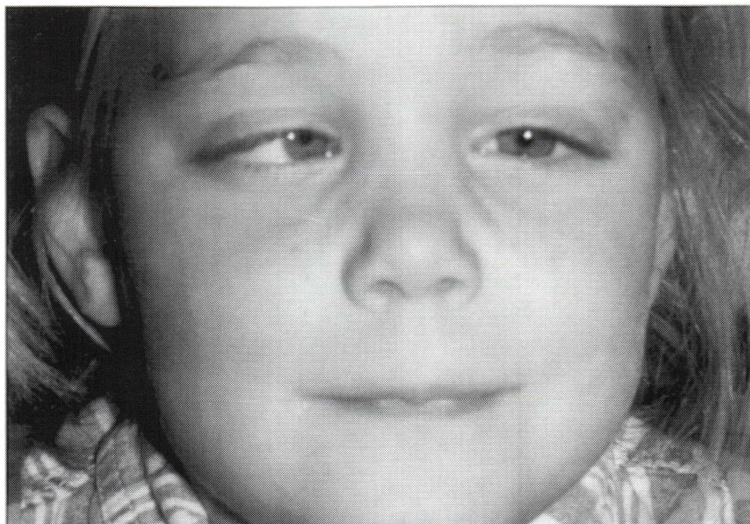


Photo 2 :



Photo 3 :





tropique

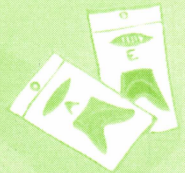
"Made to Measure"

How to firmly fit frames
on the little nose of a toddler ?

- 1** The optician determines the shape of an infant's nose from the set of six.

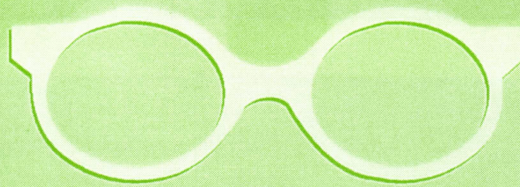


- 2** The optician chooses the silicone pad corresponding to the model.

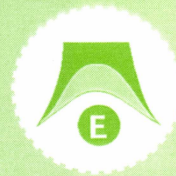
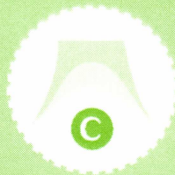


- 3** The silicone pad is inserted and glued, to a specially designed rim, on the TROPIQUE frame.

Select the frame of your choice



The optician fits the appropriate silicone pad



6 small silicone pads, each one available in 4 colors...

