Lens correction of exotropia

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With great zeal and enthusiasm we adopt methods and procedures to insure the success of our contact lens patients, concentrating on types of materials -lens design- and cornea lens relationships but often putting aside considerations of comfort like the accommodative-convergence relationship.

I am re-introducing a procedure and a technique that received considerable interest and patient acceptance in the early 1950's.

Dr. Newton Wesley wrote in the August, 1949, Optometric Weekly Journal his hypothesis concerning the accommodative-convergence relationship in strabismus. He said: "The position of the eyes in strabismus control the refractive status". Meaning that the individual manifests strabismus in the interest of maintaining emmentropia even though he must sacrifice single binocular vision. Recently Dr. Wesley suggested I present an up-date on "The Correction of Divergent strabismus with concave Lenses", to include a 16 mm movie which dramatically demostrates the technique.

Over one hundred cases were used as the basis of the study. The method reduces exophoria and exotropia (*).

PROCEDURE: The patient is seated at the normal distance of 20 feet (6 meters) from the acuity chart and a refractive examination is performed.

With the manifest refraction in place, the patient is instructed to read the smallest letters which he can see. This will usually be 20/20. Convex power is then reduced or concave power increased a .25 diopter at a time to the greatest amount that still enables the patient to maintain legibility of the letters. He is encouraged to continue clearing the target as additional minus power is added until the full minus acceptance is determined.

NEAR TEST: With the patient fixating .62m letters at 13 inches **convex** spherical lens power is increased to full plus blur-out. Patient is encouraged to maintain clarity of the target. Then **concave** spherical lens power is added, again to complete blur-out, encouraging the patient to maintain clarity. The mid point between the plus and minus blur is recorded as a preliminary reference point.

The amplitude of accommodation is determined by the Sheard method: Monoculary patient fixates 62m letters at 13 inches, add minus lenses until blurred, repeat other eye, add two and a half diopters for the fixation distance.

Return to manifest refraction.

With a single letter at 6 meters, the patient is vertically disassociated with prism. Concave spherical lens power is increased before both eyes until one target is seen above the other. The power of the concave lens to achieve this alignment is recorded, and considered a possible first prescription. Not all patients respond to this test.

A line of 20/40 letters half on red and half on green is projected to the 6 meter distance in a darkened room. Start with the reference power from the mid-point between plus and minus blur, add concave lens power simultaneously to both eyes until the patient reports that the letters are blacker on the green. Continue adding concave power an additional 2 or 3 .25 diopters. Then quickly reduce concave power by .50 diopter, and if the patient reports letters even or blacker on the red, then continue to add minus .25 diopter until .75 or 1.00 has been added, and then remove a half diopter. This procedure is repeated over and over in an

(*) Professor, Pacific University, stated: This paper is a classic and should be known by all senior students.

unhurried manner until no further accommodative stimulation is possible. When the removal of the half diopter concave power produces a stable "BLACKER ON THE GREEN", then record this as the maximum amount of sustained accommodation which maybe induced.

On completion of above, patient is instructed to watch and keep clear the smallest line of letters which he can see at 6 meters the manifest refraction prescription which is placed in a trial frame so you may observe the patient's eye movements as concave lenses are added. Encourage the patient to clear the target for each lens added until the eyes appear straight. Corneal Perkinje images are used as a guide. The squint in many cases obeys the rule of 5 degrees exo reduced for each one diopter of concave over correcting lens that is added. Determine the least amount of concave lens power which produces objective orthophoria.

The patient is to wear this lens constantly and visual training is given thru it when indicated. On subsequent progress reports, we may add or subtract lens power.

D. M.

AGE 12	=	R. 20/20
		L. 20/20
CORRECTION		NONE
HISTORY		NORMAL
		BLASTING CAP BLINDED L.E.
AGE 14	=	R. PLANO = 20/20
APHAKIC		L. +10.00 +1.00 X 35 H.M.
DIVERGENCE,		SLIGHT L.E.
AGE 15		UNAIDED R. 20/70
		L. H.M.
CORRECTION		R. -1.50 SPH = 20/15
		L. +10.00 +1.00 x 35 = 20/800
DIVERGENCE		L.E. = 20 D. (ESTIMATE)
AGE 18		UNAIDED R. 20/80
		L. H. M.
CORRECTION		R. -1.75 SPH = 20/15
		L. BALANCE = H.M.
DIVERGENCE		L.E. PRISM =40 FAR
		30 NEAR
		4 L. HYPER
CORRECTION		RX'D R. -7.00 SPH = 20/20
		L. -4.00 SPH = H.M.

The patient was first seen at age 18, but there was detailed history in his record from age 12. There also is refractive data on his parents, two brothers, and a sister which appears in the attached handout. At age 12, this male child had 20/20 vision in each eye, no correction and no previous negative eye history. A traumatic injury at this age produced legal blindness of his left eye from a dynamite blasting cap explosion.

Two years later, age 14, he was

R.E. plano 20/20 aphakia
L.E. +10.00 +1.00 x 35 = hand movement.

A slight divergence of the left eye was noted and recorded. At age 15 his uncorrected visual acuity was R.E. 20/70 and L.E. hand movement. Right eye required -1.50 sphere for 20/15. L.E. no change. Divergence of the left eye was estimated at 20 diopters.

At age 18, he measured -1.75 sphere for 20/15 R.E.O.S. finding was unreliable. Uncorrected acuity was 20/80 R.E. and hand movements O.S. Divergence of left eye by Krimsky corneal reflex and prism method was 40 diopters with fixation at distance and 30 diopters with fixation at near. In addition, the patient manifests 4 diopters left hyperphoria. Following age 18 examination and refraction, the following over-minus correction was prescribed.

R.E. -7.00 sphere = 20/20
L.E. -4.00 sphere = 20/800

The left lens is cosmetic as the patient is legally blind with acuity of 20/800.

The patient wore these lenses for thirty days. He had no headaches, he was not aware of minification of objects and his spacial orientation seemed normal to him after one day. At the end of thirty days a progress report revealed acceptability of the correction. No change was made. Eyes appeared straight even for a reasonable time after

removing the lenses. This is accomplished by advising the patient.

"When you remove your glasses do not try to clear your distance vision. Leave it blurred, and your eyes will be straight".

A video at 24 fps has been made from the 16 fps movie. Thus, the action is faster, but very dramatic. Time has been compressed by not showing every minus .25 diopter change that was made as the patient clears his vision through each lens. An unusual visual anomaly is presented in this case. Dr. Wesley used to demonstrate a phenomenon he called "Monocularity", where a patient with both eyes open can follow a pen light when in the binocular field of both eyes and when it is within the visual field of one eye, but cannot follow the fixation light when it is within the visual field of the opposite eye.

This patient demonstrates "Monocularity": with both eyes open he can follow a light when it is in the binocular field. However, when the light is within the monocular field, he can only follow it with his right dominant eye. When moving light in left eye field only, he loses it. When right eye is closed -he can follow very well even though O.S. is an uncorrected aphakia of 20/800. Patients with 20/20 in each eye may also demonstrate Wesley's "Monocularity".

The film protrays the addition of minus lenses as the left eye straightens with removal of one or two diopters of power, allows the eye to turn out, reapplying the two diopters of power and saying to the patient, "clear it, fine, try hard, there you ve got it, you brought your eye in just fine". The film shows the amount of prism diopters of exotropia and rotating the prism shows how it controls the vertical imbalance of a blind eye.

When the final prescription for proper control throughout the wearing period has been determined, the patient is fitted with contact lenses of the practitioner's choice. In many cases amplitude of acommodation returns.

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