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Application of high cylinder with visual training

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Abstract
Application of high cylinder with visual training

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APPLICATION OF HIGH CYLINDER
with
VISUAL TRAINING

A CASE REPORT

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CASE HISTORY

The patient complained of headaches, dizzy spells and inability to see the blackboard from the back of the room.

At time of examination patient was 14 years of age and in the 9th. grade in the Forest Grove public school system. Her health in general was poor and the parents realizing this had made a complete visual check up as one step toward its improvement. They were having her asthma treated at the time and subsequently her teeth were fixed and tonsils were removed.

The patients complexion was poor, she was hesitant and undecided in her actions, and speech. She had been active in sports in previous years but had been forced to discontinue this activity because of the asthma condition.

The first examination was conducted during the morning clinic, however even then the patient tired easily and the examination was terminated after 45 minutes. It was later revealed that the patient had stayed out of school the remainder of that day and slept all afternoon.

The patient could remember wearing glasses in the 2nd. grade that didn't fit well. She had then stopped wearing glasses until she reached the 5th. grade----wearing them continually after that.

PRELIMINARY FINDINGS

The entrance acuity without lens aid was 20/400 at far for the right, left and both eyes. With the near card held at 16 inches 20/60 was the best for right, left and both eyes.

With the patients habitual the far was right 20/100, left 20/200 and both eyes 20/70. Near was right 20/20, left 20/40 and both eyes 20/20.

A pinhole test at far gave right 20/40-1 and left 20/60-1. It is interesting to note that during this test on the left eye the patient turned her head around to the right as the left eye turned out.

Fields were taken from invisible to visible and to first recognition. There was some interlacing of red and green for the right eye. While the left appeared slightly constricted in comparison. The blind spots showed no apparent enlargement.

The distance pupillary width of 64 mm. was taken by having the patient alternately fixate the open eye of the observer. The near pupillary width of 62mm. was taken by having the patient fixate a central target held at 16 inches.

The patient had always used her right hand for writing and the hole in card test confirmed the dominancy of the right eye.

The cover test showed no apparent eye movement at far. At near the movement was quite obvious and was estimated to be approximately 10 exophoria.

On the near point of Binocularity both eyes followed the target to a point 4 inches from the bridge of the nose. At this point the right eye turned in and the left eye turned out.

In taking the Donders amplitude a 20/20 line was used and the patient was asked to bring it in until the print blurred. This distance proved to be 2½ inches for the right eye. However patient was unable to see the 20/20 line with the left eye. Her habitual prescription was used at this point and even then the 20/60 line had to be used as a reference point. Blurring taking place on this line at 4½ inches.

Fixations near to far and far to near showed blinking with undershooting on the wide lateral. The saccadic fixations gave evidence of movements to refixate, blinking, and undershooting.

External pathological examination showed long and healthy cilia with a palpebrae fissure that was wide but even for both eyes. The upper lid was near the edge of the pupil as one would expect. All lid margins were free of crustations and the conjunctiva gave no evidence of injection. The anterior chamber was deep and clear and free of opacities. Observation from the side indicated an irregular cornea on the left eye. The lacrimal drainage appeared open but the patient's eyes watered to the extant that she had to wipe them frequently. Finger tension was taken and the eyes appeared to be equal.

The ophthalmoscope light, with the head on, was used for pupil responses. The direct responses were slow and the consensual stayed but a moment. The pupils were large and were estimated to be 5 mm. in 15 c.p. illumination.. The direct pupil response in the left eye was spastic and was slower at the near point.

OPHTHALMOSCOPIC EXAMINATION

The ophthalmoscope gave no indication of opacities. The iris was light grey with no abnormal structures showing and the pupil was even and regular. The crystalline lens was clear and the vitreous was free of floaters. The medium pink fundus showed a lack of a clear defined disc margin on the right eye but the left disc was definitely elliptical in shape. The vessel ratio was the expected 3/2.

TABLE I

OPTOMETRIC FINDINGS*			9/24/52 9/25/52 10/ 7/52	1/13/53 1/15/53	
2	Ophthalmometer:	O.D. 44.75M170 46 M 80	-1.00x170		
		O.S. 42.25M175 46 M 85	-4.12x175		
**3	Lat ph thru hab Rx	-2.50	4 Exo	7 xo	
13A	Lat ph at 16" thru hab Rx		one target	18 xo	
4	"Static" retinoscopy	O.D.	-4.00	-4.25	
		O.S.	+4.25-4.00180	+5.75-6.50 x180 +5.00-6.00 x180	Range
5	"Dynamic" retinoscopy at 20"	O.D.	-2.75	-2.25	
		O.S.	+5.25-4.00180	+7.25-6.00 x180	
6	"Dynamic" retinoscopy at 40"	O.D			
		O.S.			
7	Subjective to 20/20	O.D.	-4.00	-4.00	
		O.S.	+4.00-6.50170	+4.00-6.00 x175	
7A	Subjective to best visual acuity	O.D.	-4.50		
		O.S.	+4.00-6.50170		
8	Lat ph thru #7		one target	18 xo	
9	B O to blur thru #7		moves to left	x	
10	B O break & recover thru #7		" " "	4/-2 5/0	
11	B I break & recover thru #7		28/16	5/4	
12	Vert ph thru #7		one target	3 R Hyper	
12	Vert ductions thru #7		6/2 4/0		
13B	Lat ph at 16" thru # 7		16 xo	15 xo	
14A	Diss cross cylinder at 16"	O.D.	-3.25	-3.75	
		O.S.	+5.75-6.50170	+5.50-6.00 x 175	
15A	Lat ph thru 14A		one target	19 xO	
14B	Binoc cross cylinder at 16"	O.D.	-5.50	-3.25	
		O.S.	+5.25-6.50170	+6.00-6.00 x 175	
15B	Lat ph thru #14B		one target	19 xo	
16A	B O blur out 16" thru Hab.		target moves	moved to left at 7 Base out	
16B	B O break and recover thru Hab.		" " left		
17A	B I blur out thru Habitual		16	x	
17B	B I break & recover 16" thru Hab.		24/16	27/8	
18	Vert ph 16" thru Hab.		one target	7 R Hyper	
18	Vert ductions 16" thru Hab.		12/2 4/moves		
19	Minus to blur 13"	O.D.	-14.25		
		O.S.			
		O.U.	-11.00	-8.50	
20	Minus to blur out 16"		-8.75	-5.25	
20	Lat ph 16" thru -8.25		18 xo	8 xo thru -5.25	
21	Plus to blur out 16"		+1.75	+3.00	
21	Lat ph 16" thru +1.75		16 xo	16 xo thru -1.00	

Hab. R -2.50 L. +2.00-2.00 x175 Hab.R-4.00 L.+4.00-6.00x175

* The numbers shown are the numerical designations for the indicated tests as adopted by the Optometric Extension Program.

TABLE II
SUMMARY OF Visual Skills Record

Techniques or Skills	P-Pass F-Fail	Dates Given 10/13/52	1/17/53
Rock	Minus	P	
	Plus	P	
Sim. Perception		P	P
Far-Point Binoc.		P	P
Far-Point Stereopsis		F	P
		(couldn't make out controls)	able to see controls
Far Pericentral Supp.		P	P
Far Central Supp.		P	P
Visual Discrimination		F	F
		2, 1, 2, 1	10, 3, 10, 3
Hand & Eye Coordination		F	P
		Corr. clear from other side	slight corrective
Far Lateral Phoria		P	P
Far Vertical Phoria		P	P
Near " "		P	P
Near Binocularity		P	P
Near Stereopsis		F (32)	F (36)
Near Lateral Phoria		P	P
Near Pericentral Supp.		P	P
Near Central Supp.			P
Near Visual Disc.		F	F
		20, 2, 20, 4	18, 8, 20, 8

A double ruling indicates a progress report was taken at this point. See Table I.

ANALYSIS AND DIAGNOSIS

It appeared impossible at this time to obtain phoria findings especially at near. The patient could only be made to see two momentarily. The target would move as the prisms were rotated. Using a red glass filter and prisms varying up to 15$^{\Delta}$ Base up over left eye and 25$^{\Delta}$ base in over the right eye double vision could be found a times and then only faintly.

The ductions were not obtainable in the base out direction as the target moved from the start.

The visual skills, taken through the patients habitual prescription of R. -2.50, L. +2.00-2.00 x 175, showed a surprising amount of unification in purpose between the two eyes considering the amount of uncorrected cylinder and the difference in the refractive state of the two eyes.

The ability to recognize dissimilar objects simultaneously was present and the patient was able to fuse into one, similar white balls presented simultaneously in the accompanyment with balls of red and blue.

The patient was able to localize objects in space quite accurately even though the visual acuity at those distances was very poor.

In tests involving hand and eye coordination the left eye was obviously being eliminated from the seeing act. A septum assured individual stimulation to each eye. Corrective movements were marked and fading of entire target pre-

sented to the left eye was reported. Only when the left hand was guided by the observer could the subject be made aware that a target actually existed in front of the left eye. As soon as this assistance was removed the subject reported that the entire target disappeared. Upon occluding the right eye the patient could accurately point to numbers situated in the field of vision of the left eye.

The patients performance on the near skills was slightly better than at far. Here a tentative 4.00 cylinder improved the vision.

Retinal rivalry became faintly evident after about 5 minutes of exposure of cross hatched lines under polaroid. The lines appearing as alternate diagonals. This coupled with good depth response on a vectographic scene and a phenomenal float of 12 inches on similar material gave evidence that a vestige of unified vision remained that only had to be cultivated.

At this point another retinoscopy and subjective, # 7 O. E. P., was taken and the axis and cylinder refined. With this prescription, a -4.00 sph. for right eye and a +4.00 -6.00 x 175 for left eye, in place the patient was able to see 20/20 right, 20/60 left. Mounted in a trial frame this same prescription resulted in right +0.5 and left -0.5 on the new visual recognition chart. The habitual prescription on this same chart being right -1 and left -1.5.

The high cylinder was indicated if unification of the

two eyes into a simultaneous visual act was to be achieved. To make its application possible it was decided to combine the lens therapy with visual training in an effort to bring up the vision of the amblyopic eye.

PRESCRIBED TREATMENT

To make conditions favorable for unification it was decided to eliminate as many optical errors as was practical. This consisted of a slab off of 1.5^ on the right eye. In order to equalize images to some extent and at the same time balance the lenses cosmetically a +6.00 base curve with approximately -10.00 inside was chosen for the -4.00 sph. right eye and a +3.00 base curve with approximately -5.00 inside was used for the left -2.00 +6.00 x 85. These were mounted in an adjustable pad frame to insure precise adjustment.

The patient was told that quite a change in lenses was being made and to insure proper adjustment to them a visual training program was necessary.

Visual Training Laboratory

CASE GRAPH

TABLE III

Patient 9 a
Clinician
Time

Home Procedure

Date	Rotations	Calisthenic	Line Rivalry	Movie Series	Jump Ditching	AN	Vectograms	Cheiroscopic	Acuity Reading	Card Testing	Pocket Calendar	Focusing Acuity					
11/11/52	X	X	X	X	X			X									
13	X			X													
18	X		X	X				X									
20				X	X			X									
25	X						X										
12/ 2/52							X				X						
4	X		X				X					X					
6	X			X				X	X		X	X					
13								X	X	X	X	X	X				
18	X		X					X	X	X	X	X	X				
	Christmas Vacation --Home training only																
1/ 8/53									X	X	X	X	X				
	Progress Report																
	Semester Recess --Home training only																
2/ 5/53			X				X		X	X	X	X	X				
7										X	X	X	X				
12										X	X	X	X				

COMMENT

Table III summarizes the training administered. In the early part of the training course the movie series and rotations were stressed. The movie series assured both patient and observer that vision could be stimulated in different areas of the field as the many movements in the juggler scene and banjo player were found. The rotations were given to blend the eye movements into a smooth and efficient act.

The Wottring Rotoscope allowed the combining of many fine features. Here different targets were presented to each eye, for example: a bird for one eye and a cage for the other eye. Varying the illumination helped to insure the presence of both targets and training was carried on through the different prism adjustments until the bird remained in the cage over a range of adjustments. All this time the targets were rotating thus combining a variety of skills.

The AN 1-5 series showed the most marked improvement. These cards used with the telebinocular provided controlled observation of hand and eye coordination. At first the targets doubled with misses on either side depending upon where the number was eliminated. Future sessions found only slight fading of the pointer tips. These tips were restored when the patient tapped on the card. At the conclusion the pointing was accurate with only slight corrective movements and

no doubling or elimination. There had been gross errors in this region before.

This hand and eye coordination was augmented by cheiroscopic drawing which necessitated the perceiving of a picture with one eye and its final transfer on paper by the opposite eye and hand. One of these drawings is shown below.

Vectographic material was given with polaroid. This

O.S. to O.D.
12/18/52

Home training consisted in part of a simple pocket calendar that tended to give the patient flexibility of vision as she looked back and forth from it to a larger calendar on the wall. A card with a small hole through which a string was passed and held to the nose gave the patient impression of a string from each eye meeting at the hole in a V. When one string disappeared the patient was instructed to jiggle the card to make it reappear.

The card was brought closer and closer to the eyes.

Acuity training at home required the use of easily constructed Koenig bars. A square was made and trisected with the outer bars filled in with India ink. The middle white one serving to make the two just noticeable at varying distances. Two such cards of different sizes were given and the patient was instructed to place the card on a chair and move away and still be able to just see two black lines.

The later stages of supervised training was also directed toward an improvement in acuity. Printed cards were used on alternating flash and the patient thus read with impressions received from first one eye and then the other. Other cards had words eliminated from one side or the other requiring good vision in both eyes for uninterrupted reading.

The progress report showed that under the new organization phorias and duction measurements were now possible. The right hyperphoria found in the progress report was disregarded for present since such a measurement was impossible 3 months earlier and continued improvement is expected. Also other tests such as the Jacques diagnostic unit where the hands are entered into the visual act did not bear it out.

The progress report also showed the Snellen acuity to be Far 20/20 for right eye and 20/60 for the left eye. Near was also 20/20 and 20/60. The greatest change taking place in the hand and eye coordination of the visual skills.

Progress reports should be taken at frequent intervals as a check to see if the analytical findings are improving. Training was discontinued since it was felt that a plateau had been reached and there was a desire to see if there would be a steady improvement behind the lens therapy alone. The possibility of future visual training should not be overlooked since there is still much that can be done.

This case is submitted in order to show the value that can be obtained by applying the full cylinder correction with steps taken to insure its success by visual training.

SUMMARY

Optometric therapy takes an important place in society when it, in combination with other health measures, can aid not only in restored enthusiasm for sports to a fourteen year old girl, but relieve the headaches and give the vision required for success in the school room.

This visual success depends not upon half hearted measures but may as in this case require the application of a high cylinder. Such a cylinder requiring a carefully laid out program of visual training to insure its acceptance.