



CAN WE THINK AGAIN REGARDING THE IMPORTANCE OF BINOCULAR VISION THERAPY IN TREATING IXT CASES.....A CASE STUDY

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Abstract:

Background: Intermittent exotropia is a condition in which part of the times when one eye has drifted outwards, and other times when the eyes are straight. Some patients or family members notice the exotropia more when the patient is tired or daydreaming. Prevalence of basic exotropia accounts for approximately 50% of all intermittent exotropia. Practitioners view treating these patients, especially adults with childhood-onset exotropia, as challenging. Contradictory opinions still exist regarding prescribing any treatment for adult strabismus, including surgical realignment and optometric Binocular vision therapy (BVT).

Case reports: An adult patients with moderate-size intermittent exotropia of the basic type who presented with asthenopia, headaches, and diplopia. 10 to 20 in-office BVT sessions were endorsed to reduce the magnitude and frequency of the deviation as well as improve their binocularity and decrease their symptoms. After completing OBT, patients became orthotropic for all distances, had normal fusional vergence ability, and had normal near points of convergence. Advised to continue HBT and Long term outcome was evaluated 1 year post therapy.

Conclusion: Optometric Binocular Vision Therapy plays important role and highly effective in patients with intermittent exotropia of the basic type. Most importantly it eliminated the patients' symptoms of asthenopia and diplopia without the need for surgery.

Index Terms - Vision Therapy, Intermittent Exotropia, Prisms.

I.INTRODUCTION

Divergent squints or exo-deviations are mainly characterized by outward tendency of the visual axes of the eyeball producing a divergent angle between them. It is usually initiated with the initial phoria stage where it's tendency to keep the visual axis of two eyeballs straight while both eyes are open but goes deviated as soon as we break the fusion by occlusion of either eye. Intermittent exotropia is more common to develop later in life. Exotropia was found to be the most common type of strabismus followed by esotropia. Intermittent exotropia is such a condition where there is a tendency of fusional control of the eyes to make things single and to make the visual axis straight intermittently with presence or absence of binocularity & depth perception at distance or at near. Many times a proper judgment and corresponding responding treatment is often missed in the clinic. So therefore a proper history and detailed evaluation is very much indicated while deciding treatment options for these cases. Since many of the patients develop asthenopic symptoms and they lack binocularity.

Beside Surgical treatment option we can adopt non-surgical approach depending on the variability and constancy of deviation and quality of fusional response. In the current case we are going to deliberate on how importantly binocular vision therapy can benefit the patients of intermittent exotropia in reliving their symptoms and help regaining binocularity and depth perception. Intermittent exotropia is a common form of strabismus occurring in about 25% of all strabismic cases and in 1% of the general population.^{2,3} As an alternative, various non-surgical approaches to the problem have been tried with varied results⁴. Some authors contradict the role of orthoptic treatment,⁵ while others found it to be effective in certain types of intermittent exotropia,⁶ while still others considered that combined therapy (surgery with orthoptic treatments) is a better approach to accomplish long term stability of results⁷

II. BACKGROUND

Intermittent exotropia (IXT) is the most common form of childhood exotropia^{1,2} with an incidence of 32.1 per 100,000 in children under 19 years of age.¹ The strabismus is characterized by an exodeviation of one eye that is interspersed with periods of ocular alignment.³ Reliable measurement of the deviation is often hindered by the variable nature of the strabismus³ and without careful observation and evaluation IXT can often be missed. A very careful observation at the clinic as well as asking questions to parents/attendants like “how often & frequently you notice the deviation in a day or in a week?” is very much helpful in diagnosing the right case. Of all the exotropia, intermittent exotropia comprises about 50-90% of the cases and is usually preceded by a stage of exophoria.

Till now we have several treatment options ranging from careful observation, Over-minus lenses, Prism(relieving/neutralizing), vision therapy with or without prism &/or Over-minus lenses, patching and lastly surgical. Unlike surgery, vision therapy helps in regaining the fusional reflex which in turn helps in achieving the binocularity and stereo perception by improving the control. Depending on the quality of control or frequency of deviation and laterality we can modify the approach of vision therapy with the combination of prismo therapy or lens therapy. These actually help the patient in doing daily life skills like copying, reading, writing even in driving. This report focuses only on the effectiveness of vision therapy in patients with Intermittent exotropia unrelated to Oblique dysfunction, Special pattern deviation or any muscle paresis sequelae.

III. CASE REPORT (INTRODUCTION TO PROBLEM)

A 23 year old male presented at our clinic with the complaint of binocular horizontal diplopia followed by outward deviation of the right eye for past 6-7 months on 9th August 2020. We have discovered that there was no such evidence of recent head trauma or ocular injury or any onset of high fever or any drastic physical illness since past 1 year. There was no history of hospitalization or any road traffic accident that happened to him. The boy has not any significant birth history. Also he had not even undergone any therapy or surgery for this squinting and diplopia. It was found that he has been through PRP (Pan Retinal Photocoagulation) laser session for 3 times in Right eye in 2019 due to BRVO and vasculitis, he was not on any topical or oral medications at present time. He has not any specific drug allergy history.

Visit 1

On examination it was found that his entering visual acuity was 6/6p in right eye and 6/6 in left eye with Snellen chart and near vision of N6 at 40 cm with the near reading booklet. A dry refraction revealed that only +0.25 dsph in the right eye and 0.00 dsph in the left eye. On the cover test it was found that right intermittent exotropia with poor control for both distance and near. His Intra Ocular Pressure was 16 mm of Hg and 12 mm of Hg respectively for right and left eye. He has been dilated with tropicamide eye drops to evaluate the posterior pole. Dilated refraction was also indicative of the same findings as of dry one. No such discrepancy noted regarding refractive error. Detailed dilated evaluation revealed that status post sectoral laser marks & old vasculitis and vitreous hemorrhage Dry FVP infero-temporal to ONH seen in right eye and small CRA patch seen in left eye. Then he has been referred to the binocular vision and squint department for squint clinic opinion and detailed binocular evaluation. Also Cup disc ratio was normal 0.2 in both the eyes.

Visit 2

A detailed and thorough orthoptic checkup was done at the squint clinic including Hirschberg corneal reflex test, prism bar cover test for distance and near using appropriate fixation target at 6 meter and 40 centimeters respectively and also beyond 6 meters, fixation Preference, Prism bar cover test in all 9 cardinal gazes along with tilting head and ocular motility. Besides motor evaluation, sensory evaluation also being done using worth four dot test(WFDT) both at distance (3 meter) and near (33 cm) with the use of anaglyph filter and titmus stereo acuity at near was checked with the help Titmus fly test by wearing polarized filter. On general physical examination; there was no adaptive head posture or face turn or any facial anomalies detected grossly. Prism bar cover test records intermittent exotropia with poor control of 25 PD for distance and 20 PD for near. The deviation was almost the same or within 05 PD in all cardinal directions and tilts. Ocular motility was full, free and painless in all directions. On the sensory test it was found to be diplopia for both distance and near with absence of stereo Perception at near. Fusional vergence ability and near point of convergence was also in low range.

Plan

Accordingly we have tried with minimum relieving prism to encourage fusion and relieve his symptoms of double vision. So 1/3 prism of original deviation are given to the patient in a trial frame and ask the patient to try appreciating physiological diplopia on Brock string in free space. Surprisingly he was found quite easy in making the desired patterns at near initially and also at distance with some difficulty. So, we prescribed prism in the form of glass to use regularly onwards and asked to revisit again in 2 weeks for better adaptation and office based therapy(OBT) to encourage fusional Vergence and near point of convergence.

Visit 3

He was very much comfortable and symptomatically better than before with prism glasses. Occasional Diplopia only persisted at distance but no diplopia for near with the use of prism glass. On PBCT it was only 12 for distance and orthophoria for near with four lights on WFDT at near and 5 lights at distance with prism glasses.

Initially Started fusional vergence exercise at home with brock string and single aperture rule with prism glasses due to COVID-19 pandemic. We had advised the patient to revisit again in 2 weeks.

On this visit the patient was using only prism glasses and due to his personal reason he could not do the exercises at home. So he didn't do the home ex. On examination we found that the patient was dissociating for near also because of relieving prism and the absence of fusional vergence exercise.

Asked him to continue fusional vergence ex at home with instruments, on next visit Patient was doing home exercise with the Brock String only without the prism glass. He was wearing the prism glasses regularly. Vision and refraction was again repeated and there was no such refractive correction present accordingly. Dynamic Retinoscopy (MEM) monocular estimation method was performed. No such lag or lead was detected at that time. On examination it was observed that his control was improved for distance and near. On PBCT it was only 3 PD BI exophoria on prolonged dissociation and orthophoria for near without prism glasses. On sensory test WFDT; diplopia was only at near and normal Retinal Correspondence was appreciated at distance. Stereo acuity was 3552 sec of arc on fly test. Fusional Vergence was also improved to a certain level with prism glasses. No diplopia in free space seen by the patient without prism glasses.

Patient was asked strictly not to wear prism glasses anymore. Now it's time to plan fusional Vergence exercise without the prism glass to enhance the Fusional range. So we planned to post the patient for office base exercise continuously for 10 days. So for that we have planned 3 exercises namely Brock String, Single Aperture Ruler, Prism Bar BO for distance and near for 30-45 minutes for 10 consecutive days.

Patient was very much happy and contained. Now he only occasionally feels diplopia only when he gets asleep and inattentive or tired. He was doing Brock string exercises at home for at least 15 min a day. On examination it was found that his vision for distance in both the eyes 6/6 and near vision also N 6 in both eyes. Refraction value doesn't indicate any refractive error and also cover test for distance and near was Orthotropic. We performed MEM Retinoscopy and there was no significant lag or lead noted. Also we have checked for fusional vergence ranges. For near fusional vergence was 30 PD BO break and 25 PD BI recovery and distance positive fusional vergence was 25 PD BI break and 20 PD BI recovery. Accommodative facilities were OD 6 CPM, OS 6 CPM and OU 5 CPM. Sensory evaluation for distance and near both normal Retinal Correspondence was maintained. Stereo acuity was 200 seconds of arc at the Titmus fly test.

After 1 year of follow up patient maintaining good fusional amplitude with 100 sec of arc stereopsis with titmus fly test and nrc on wfdt with no diplopia in free space and absence of symptoms.

<u>Vis its</u>	<u>PBCT for Distance (Primary position)</u>	<u>PBCT for Near (Primary position)</u>	<u>Fixation Preference</u>	<u>WFDT at Distance</u>	<u>WFDT at Near</u>	<u>Stereo Perception at Near (Titmus fly)</u>	<u>Fusional Amplitude (Distance)</u>	<u>Fusional Amplitude (Near)</u>	<u>MEM</u>
<u>1</u>	<u>30 PD BI</u>	<u>25 PD BI</u>	<u>Left eye</u>	<u>Right suppressi on</u>	<u>Right suppressi on</u>	<u>Absent</u>	<u>PFV 06/04 NFV 06/04</u>	<u>PFV 08/06 NFV06/04</u>	<u>OU +0.25 Ds</u>
<u>2</u>	<u>25 PD BI</u>	<u>20 PD BI</u>	<u>Alternat or</u>	<u>Diplopia</u>	<u>Diplopia</u>	<u>Absent</u>	<u>PFV 10/08 NFV 08/06</u>	<u>PFV 08/06 NFV 06/04</u>	<u>OU +0.25Ds</u>
<u>3</u>	<u>13 PD BI</u>	<u>Ortho</u>	<u>Alternat or</u>	<u>Diplopia</u>	<u>Diplopia</u>	<u>Absent</u>	<u>PFV 10/08 NFV 08/06</u>	<u>PFV 14/12 NFV 08/06</u>	<u>OU +0.50Ds</u>
<u>4</u>	<u>3 PD BI phoria</u>	<u>Ortho</u>	<u>Alternat or</u>	<u>NRC</u>	<u>Diplopia</u>	<u>3552</u>	<u>PFV 18/16 NFV 12/10</u>	<u>PFV 18/16 NFV10/08</u>	<u>OU +0.50Ds</u>
<u>5</u>	<u>Ortho</u>	<u>Ortho</u>	<u>Alternat or</u>	<u>NRC</u>	<u>NRC</u>	<u>200</u>	<u>PFV 20/18 NFV 14/12</u>	<u>PFV 25/20 NFV 12/10</u>	<u>OU +0.50Ds</u>

IV. DISCUSSION

The main goals of VT for the treatment of IXT are to promote sensory fusion by eliminating diplopia or suppression and to improve vergence reserves in order to restore normal binocular vision. A combination of anti-suppression therapy and accommodation and vergence therapy is recommended⁸ First, any significant refractive error should be corrected, and amblyopia (although rare) if present should be treated.⁹ Actual therapy can then follow, first to equalize monocular skills (i.e., accommodation and eye movements). Therapy is then focused on vergence skills by improving fusional vergence ability and vergence facility at near for CI and at far, intermediate and near for BE and DE. Diplopia awareness and antisuppression training is a crucial part of therapy in patients with DE and BE type IXTs. In-office therapy can be scheduled every week or every two weeks (depending on the patient's availability) with home reinforcement between appointments. Completion and successful treatment takes several sessions, typically 12-24 sessions for CI and 24-36 sessions for DE.⁸

Vision therapy is generally successful in improving symptoms and restoring binocular vision in IXT.⁹ Its effectiveness in treating CI has been well-established in children¹⁰ and adults.¹¹ Coffey et al. reviewed previous studies that evaluated the efficacy of VT in IXT and showed that the pooled success rate of VT (59%) is "essentially identical" to the success rate of surgery (61%) and has the highest success rate compared to all other non-surgical approaches for IXT.⁹ An effective therapy program in addition to patient motivation and commitment plays a crucial role in achieving success. Some disadvantages of VT include treatment duration, time commitment (office appointments and home exercises) and cost. A commonly posed question about vision therapy is how long the effects last. A recent multicenter study showed the effects of vision therapy for CI lasted up to a year after discontinuation of treatment in children age 9-17 years.¹² Pre-therapy patient education about compliance, time commitment and long-term effects is crucial for success. VT can be implemented as the preferred therapy before surgery or after other unsuccessful non-surgical treatments or used in combination with other non-surgical options before or after IXT surgery. For example, overminus lenses (usually -4.00D or -5.00D) are sometimes prescribed as "training lenses" for patients in an active VT program for IXT to stimulate accommodative convergence.

In general, VT has not been recommended for children younger than 6 years due to barriers in understanding therapy concepts and verbalizing feedback.⁸ In older children and adults it could produce successful results. In summary, VT could be applied successfully to improve IXT control with motivation, commitment and compliance.

Prescription of prisms for patients with IXT has varied purposes. Several types can be prescribed. A neutralizing prism reflects the exact magnitude of the deviation and is prescribed for full-time wear. In contrast, a relieving prism corrects a portion of the deviation, resulting in reduced fusional vergence demand, hence its name. Lastly, though rarely used, an over-correcting prism, as the name implies, over-corrects the exodeviation. The idea is that the resulting diplopia from the induced over-correction will stimulate fusional convergence. Relieving prisms and VT can be used successfully in combination. A review of past studies evaluating the efficacy of prism therapy for IXT reported a pooled success rate of 28%.⁹ Before prescribing prisms for IXT patients, the cost of prism glasses, cosmesis (in particular for Fresnel prisms) and prism adaptation should be considered. Because other non-surgical options (VT in particular) offer significant success in removal of symptoms, prisms are not the primary treatment choice.⁸

Vision therapy once again proved that intermittent exotropia can be managed easily without the need of surgery. Adjuvant like prism or over- minus may act as helping hands in encouraging fusional control in patients and subsequently reduces the asthenopic symptoms. Patients should be made aware of the need of the exercise thoroughly and how clinician wants the exercise to be done. That proper understanding enables us to get good results in fusional control reflex both qualitatively and quantitatively. Although the patient has been advised to do home exercise due to COVID-19 pandemic but had asked to revisit at clinic regularly frequently in a very close Follow Ups manner ;so that one can judge the need of continuing any specific exercise or any adjuvant therapy like over minus or prism. In our case we had to ask to stop using prism glass once the patient was interfering with fusional control & we did it. Since at that time the patient was dissociating more for distance and near also wearing prism glass. The limitations of this study instead of single patient, multiple case reports of patients may be tried. So to get a successful result after doing vision therapy a proper and accurate measurement of all parameters should be indicated along with appropriate set of Vision therapy exercises and obviously compliance of the patient toward the exercise. Also an appropriate maintenance (Brock string and Single Aperture Ruler in this case) therapy should always be indicated to avoid further deterioration of current condition or to hold the fusional control maintained at that level.

V. CONCLUSION

The control of intermittent exotropia can be improved with the help of vision therapy active & passive vision therapy. The appropriate time to start the therapy and close follow up to reassess every time to add/remove any particular exercise along with gradual improvement status of that follow up visit is very important. This is why patients should be called up in very close follow up visits. Also if vision therapy is prescribed on home basis ; appropriate understanding of the instructions & procedures of home exercise must be ensured.

VI. ACKNOWLEDGMENTS

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VII. DECLARATION OF PATIENT CONSENT

We obtained all appreciative patient consent forms. The patient had given consent for images and other Clinical information to be reported in the journal.

VIII. FINANCIAL SUPPORT AND SPONSORSHIP

Nil

IX. CONFLICT OF INTEREST

There is no conflict of interest.

X. REFERENCE

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