



Treatment of Very Young Unilateral Esotropia with Binasal Occlusion and Techniques Which Promote the Symmetrical Use of the Body and of the Visual System

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INTRODUCTION

According to Darell Boyd Harmon, “We are a bilateral binocular organism. Asymmetries in bilaterality are reflected in asymmetries in binocularity.” Often, the asymmetries occur in the child’s development of the use of their own bodies out of which emerges an asymmetric use of the visual process. The most prevalent such asymmetric use is esotropia.

Based on our knowledge of vision development and how the thwarting of that development at key points in time can lead to predictable types of asymmetries, we can know when that thwarting occurred based on the clinical presentation in many instances. Once the timing of that developmental challenge and the nature of that challenge are known, then the solution that the child found (using their body and visual system asymmetrically) can be addressed directly.

For maximal effectivity of care, one should address more than just the “eye turn” or the “refractive condition”, one should look at the whole person and work to establish a more symmetrical use of the whole body. As this emerges, it should become easier to establish better symmetry in the person’s use of their visual process. During the transition some techniques such as binasal occlusion can be used to (1) stop further deterioration into a highly asymmetric condition (unilateral esotropia with deep amblyopia), (2) reduce the amount of asymmetry and in some cases cause a non-linear jump to binocularity or (3) to almost forcibly take someone out of highly asymmetric pattern and at least get them to alternate their use of the channels (right and left eyes to and from the brain pathways).

Here we use the case of Sophia to demonstrate the use of both binasal occlusion and activities to help her learn to use her body more symmetrically to prepare her for vision therapy at a later date. NOTE: The hope was, and we do see this in many instances, that the use of these treatments alone, at this early age would have been all that was required to move Sophia to full symmetrical use of herself obviating the need for vision therapy later in life. In this case, her asymmetries turned out to be significant enough that our intervention has only moved her along the binocular continuum far enough to be prepared for vision therapy in her future. This level of improvement was greatly appreciated by both her parents and us.

CASE

Sophia, a 2-year-old female, whose parents presented to the school with complaints that their daughter had an eye turn that was getting worse. They reported that it started a few months prior, and it was her right eye that was turned in 100% of the time. They also noticed that their daughter was clumsy and would reach for the bottle only on one side. Rarely did she look to the other side for objects. Sophia’s mother is from Russia and her father is from Memphis, TN. While visiting family in Russia, Sophia was seen by an ophthalmologist and was told that extra-ocular surgery was the only option for her. They came to Southern College of Optometry (SCO) seeking a second opinion. Sophia’s father is a physical therapist and thought that there had to be a way to work out the eye/vision problems with some therapy, though he had not yet found much about vision therapy.

TABLE 1: EXAMINATION DATA FROM THE INITIAL EXAM

Visual Acuity	Distance Unaided: 20/63 OU with Cardiff cards
EOMs	Full with no restrictions
CVF	Fixates to target in periphery OD, OS
Pupils	ERRL (-) APD
Habitual Rx	+7.00 OD, OS broken – measurable but unusable
Retinoscopy	+5.50 OD, OS
Cover Test	No lenses: 40 Constant Right Esotropia With +4.50: ~25 Constant Right Esotropia *no further gains with more plus (beyond +4.50)

Prescribing lenses has often been described as the “art” part of the profession of optometry. This art flows as a result of the philosophy of the practitioner. Based on work in the field of emmetropization, the evidence base of the senior author of this poster and many colleagues who form a core of several OEP study groups, as well as the OEP Clinical Curriculum instructor corps and the Conference on Clinical Vision Care (CCVC), the following directives were in play in coming up with the Rx for Sophia:

- Use the least amount of plus that gets the job done
- Be careful in cutting plus; don’t take too much away too fast
- Leave at least a single to a double buffer uncompensated (+0.75 to +1.50), unless there is a state change with more plus

Based on these principles she was given +4.50 OU in single vision form for full time wear. This is +0.50 more than had we chosen to under prescribe by the full double buffer. It was noted that up to +4.50 OU the angle of turn continued to decrease and the brightness of the near retinoscopy reflex continued to brighten. With any more plus than this all changes in angle and in the retinoscopy reflex stopped improving.

Sophie’s parents were instructed to have her wear the glasses as much of the time as possible. They purchased two frames with elastic straps that went around the back of her head to help keep the glasses in place.

She returned for a follow up visit 4-6 weeks later. Her mother stated that she was wearing her lenses full time, however, there was still a constant right esotropia. It was at that visit that we decided to add binasal occlusion to her lenses. A thin strip of 3M Transpore Tape was applied to both lenses up to the pupillary border.



Figure 1

3M Transpore Surgical Tape is easy to apply to the lenses of glasses and it is easy to peel off and clean the surface upon removal but is resistant to child tampering. The tape can be applied in strip form on the front when checking exactly where the line should be. Typically the strip is placed so that it covers less of the lens in the lower aspect of the visual area. An Exacto knife or scalpel can be used to cut the tape along the groove where the lens inserts into the frame to get a very clean application of the tape.



Figure 2

NOTE: This is not Sophia. This picture is courtesy of Dr. Curt Baxstrom and shows an infant with esotropia. In the left side of the picture the child is fixing with the left eye while the right eye is seen under the tape. On the right side of the picture the child is now fixating an object in the right area of space and the left eye can be seen to be covered by the tape. In this usage the tape is applied for trial purposes and is 3M Magic Tape, not the Transpore tape shown in figure 1, which is the tape that was used with Sophia.

At this second visit a series of bilateral activities were given to Sophie’s parents. The purpose of these activities was to establish a more symmetrical use of her body. By establishing a more symmetrical use of her body we hoped to set the stage for her to discover and then use her visual process more symmetrically. See “Some Bilateral Activities for the Young” at the end of this poster for the specifics of what activities were suggested.

Two months later Sophia returned to the clinic for another follow up. At this visit, her esotropia was alternating, about 85-90% of the time, and her parents not only noticed that her eye wasn’t turned into her nose, but they also shared that Sophia seemed much more social and generally in a better mood most of the day. She was starting to investigate her environment and reach for things that she would not have before. They continued with the activities at home, and they were happy with the way their child is progressing and how she looks. The binasals were kept on and the prescription was held at the same +4.50 level.

TABLE 2: EXAMINATION DATA FROM THE THIRD FOLLOW UP

Visual Acuity	Distance with glasses: 20/25 OU with Cardiff cards
EOMs	Full with no restrictions
CVF	Fixates to target in periphery OD, OS
Pupils	ERRL (-) APD
Rx	+4.50 OD, OS with Binasal tape
Cover Test	With glasses: ~15 Constant Alternating Esotropia

Over the course of the next two years the bilateral activities were elaborated upon to keep them interesting. Sophia continued to wear here glasses full time without any problems. Our desire was to reduce the amount of the lens that the binasals were covering, thereby allowing her some binocular overlap and a chance at establishing binocularity with some objects in space. Once the fixation pattern had changed from a full time right eye esotropia to an alternating pattern with nearly equal amounts of time spent looking with the right and left eyes we began to move the binasals inwards toward her nose. At each visit we asked the parents to give us a sense of the amount of time they saw her looking with the right versus the left and these parents became rather good historians.

At first the binasal was shifted nasally on a symmetrical basis and the alternating pattern remained. At one point we tried a small mono-nasal occluder, as part of preparing to remove the occlusion altogether. This worked in the office quite well. The primary way we checked the fixation pattern was to have her look at our face while we sat on a stool about 2-3 feet in front of her while she sat on either her mother or father’s lap. We would move our face to our right and left slowly and watch for the “hand-off” of fixation from the right to the left eye as we moved left and back to the right eye as we moved to the right. If the timing of the shift in fixation was asymmetric in any way, the placement of the occluder was shifted right or left and the movements were repeated.

Sophie was back on our schedule two weeks later. Her parents reported that the symmetry we built up was getting out of whack. So we restored the binasal occluder to reestablish the relatively even use of both eyes for fixation.

CONCLUSION

Sophie is still under our care and comes to the clinic once every 3-4 months. She continues to wear her glasses with the very reduced (shifted towards her nose) binasal occluder and she is alternating very nicely. At each session we look at her without any occlusion on, but with her eye glass prescription on and she is remaining stable. We are waiting to commence office-centered optometric vision therapy when we deem her old enough to benefit from the treatment.

The work we have done is expected to make her vision therapy start from a much better bilaterally symmetrical foundation. This should make the VT, when we do start, go much faster and reach a higher level of cure than had we not taken the measures mentioned above. In addition, by reducing her angle from 40 prism diopters to 15 prism diopters, should a surgery be needed in the future, the amount of recession or resection would be minimized.

High angle esotropes can be managed well with the tools available to the optometrist, reducing or eliminating the need for early and repeated extra-ocular muscle surgeries.

REFERENCES

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APPENDIX

SOME BILATERAL ACTIVITIES FOR THE YOUNG

1. **Hopping:** Feet together, “like a frog”.
2. **Two hand beanbag toss into bucket:** Must be done holding beanbag with both hands and releasing beanbag in an underhand motion. If beanbag not available, a ball may be used, but it should be big enough to hold with both hands.
3. **Suspended ball on string:** Lock both hands together and “hit” ball: do both by punching the ball forward and also do by hitting ball to left or right with the two hands locked together.
4. **Bunting:** Use a suspended ball on a string. Use a paper towel core with hands at each end. Hit ball with center of core repeatedly.
5. **Bowling:** Use a basketball or soccer ball. Lean down with both hands on the ball. Use both hands together to roll the ball across the floor toward a target, either a parent on the other side to “catch” the ball or to knock down a target.
6. **Lifting:** Parent holds out both thumbs. Child reaches up and grasps thumbs of parent, who then lifts them up by both arms. If the child is older, a “chinning bar” can be used to let them pull themselves up with both arms.
7. **Angels in the snow:** Patient lies on their back on the floor with their hands at their sides and their feet together. Hands and arms, feet and legs should maintain contact with the floor throughout the procedure
 - a. First stage: Child moves both arms together from their sides to over their heads, clapping the hands together at the point of farthest extension. Return the arms to the original position and slap them against the sides of the body. Repeat. Keep the motion smooth, to a rhythmic count and be sure the movements are symmetrical.
 - b. Second stage: Spread the feet to the widest position comfortable without bending the knees. Return to the original position and slap the feet together. Repeat, keeping a rhythm.
 - c. Third stage: After success with the above, combine the two motions. Have the hands clap together over the head when the feet are farthest out, and have the hands hit their sides at the exact moment that the feet hit together. Keep a good rhythm.

ADDITIONAL FIGURES



Figure 3

The frame with the 3M Transpore tape on the frame.



Figure 4

The end of the first cut. We begin the cut in the middle of the tape at the bridge and put the blade away from the bridge towards the open area of the glass, pulling the knife edge along the groove where the lens inserts into the frame.



Figure 5

The first cut flap pulled back and the final cut beginning again at the bridge and pulling the blade towards the open part of the lens. Cutting in this direction helps keep the tape in place.



Figure 6

The final right half of the application of the binasal occluder. This would be repeated on the left lens to complete the application of the binasals.