



“Doc, I See Two Wives!” Prism Application on a Diplopic Patient Following a Stroke

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Introduction

Acquired Brain Injuries (ABI) are defined as an “injury to the brain, which is not hereditary, congenital, degenerative, or induced by birth trauma.” Some of the most common causes are stroke, tumors and/or aneurysms. The prevalence of those who have suffered a stroke (CVA) in the United States is 5.8 million Americans.¹ Our role as a vision rehabilitation doctor is to diagnose and treat patients with ocular and visual deficits, counsel the patient as to the visual sequelae resulting from the brain injury, and focus on helping to restore the patient’s function.

Some of the most common symptoms reported by patients are blurred vision, diplopia, headaches, vertigo, dizziness, poor concentration, an inability to sustain visual attention/staring behavior, photophobia, movement of print, and difficulty when reading. When diplopia is present it is important to measure both the direction and magnitude in order to apply the appropriate amount of prism required to regain fusion.

A common tool used to help relieve the diplopia is through the application of a Fresnel prism. A Fresnel prism is a prism that is made out of flexible plastic with one flat side and the other which has a series of parallel segments, each of which has its surface angled precisely to a specific angle. These angles are all the same and result in a uniform prismatic effect over the whole surface of the prism. The prism can be cut easily and the flat surface can be applied directly to the spectacle lens and it will stay in place, in most cases, almost indefinitely. They are effective in temporary situations, such as palsies from micro vascular insults when

resolution of the diplopia is expected. They can continually be decreased in power over time as the palsy resolves following the stroke. It was through the fitting of the Fresnel prism and the appropriate modifications made in succession to the amount of prism that the patient was able to successfully obtain a single image and resolve their diplopia.



Case Presentation

A 77-year old white male presented to Baptist Rehabilitation Memorial Hospital following a stroke that had occurred July 2013. Four days following the stroke, the patient was examined bedside in the hospital. It was at this time he reported diplopia in all gazes. His diplopia was worse at distance than near. Upon initial examination his visual acuities through his current spectacle prescription were 20/25 OD, OS, OU. D.R. presented with a right esotropia as well as a right hypertropia. They were measured on both cover test as well as using a Maddox Rod. His deviation was non-concomitant and worse in right gaze. The patient obtained single vision with 6BO and 4BD in primary gaze. Rather than apply two different prisms, one horizontal and

one vertical, rough vector analysis of the powers showed that a single 8 prism diopter lens turned to about 35 degrees should give about the same as the powers listed above.

At the hospital we keep a supply of Fresnel prisms for just this sort of case. With the average length of stay of our patients being about 10 days it is imperative that we have what we need to take action to eliminate diplopia as quickly as possible. During the early part of the history and dialogue with this patient we went “all in” stating that he would be seeing single before we left that day. Prior to cutting the prism we applied an 8PD Fresnel prism on the front surface of his right lens. Rather than use a handheld target we have found that using our face and head is a better target for assisting with fusion. One of us stayed about 16 inches or 40 cm in front of him and moved slowly right, left, up and down and then in and out watching that he kept us fused. Having that larger three-dimensional target is helpful in the very beginning. Seeing that we had such a positive result we cut the prism to fit his lenses.

Two days later we returned to see D.R. in the hospital and he was still seeing single. At that moment he began the kidding that would go on for the rest of our times together when he complained that now he had only one wife. She was always present and had fun playing along with her jokester of a husband.

Our goal was to do what we could to reduce the prism over time. If at any point we were unable to reduce the prism then we would have considered adding in vision therapy. They drove a considerable distance to come to us so doing VT, where they would have had to come to SCO weekly would have been difficult. An idea which had worked in

many prior cases managed by Harris was to have D.R. have two pairs of glasses, one with the minimum power needed to get relief from the double vision and one about 2 prism diopters lower in power. The idea was to have D.R. use the weaker pair upon waking each day and seeing if he could handle the challenge. At some point the challenge of the weaker pair would be too much and he would have to switch to the full relief pair. If he could get to a point where he could wear the lower powered lenses full time then the strong pair would be made into the new weak pair, “leap frogging” over the prior power. This was the paradigm we used to help D.R. reduce his need for the compensatory prism.

Upon release, the patient presented to the Southern College of Optometry for a series of follow up visits. At the first visit to the Southern College of Optometry at the end of July, refraction was performed and D.R.s best corrected visual acuities were 20/20 OD, OS, OU for both distance and near. When the new glasses arrived a Fresnel prism with the 8BO rotated 35 degrees over the right lens was applied. He left the old pair of glasses for us to update the prescription and we put a 6BO rotated at an oblique angle of 35 degrees. He was educated on wearing the prism with the decreased amount in the morning and if he got tired and/or began to see double, he would then switch to the glasses with the higher prism amount.

The next follow up was in September 2013 at which he reported that he spent the majority of his day in the glasses with the lower amount of prism. Cover test revealed a small right hyper with eso movement thru the prism. Distance phorias were measured with the von Graefe method to be 8 eso and 2 right hyper. When the eso component was

removed, the patient reported that the chart was still single and clear.

The new prism prescribed at that visit was 2BD over the right lens only. The patient sat for ten minutes to adapt to the prism. He reported single and clear vision with the 2 BD alone. He was sent home with that and was told to return in 6-8 weeks to reevaluate. He was to continue wearing both pairs of glasses; meaning, begin the day with the pair with the vertical power only but if he had trouble it was ok to go to the one with the base out prism as well.

At his last presentation in November 2013 the vertical component was removed completely. He still has the pair with the 2BD OD for days when he gets tired. The patient is able to remove his glasses and not see constant double.

Conclusion

Diplopia is a common manifestation in acquired brain injuries. Relief of the double vision is a common goal for many patients. It is important to take into consideration that a patient will continue to heal weeks, maybe even months following the stroke. Grinding prism into a pair of glasses is not the appropriate treatment plan for many of these patients. Instead, a Fresnel prism, which is temporary and can easily be changed over time as the patient heals, should be considered. Having a patient be able to “leap frog” between the two pairs of glasses with different prism amounts is a method that should be considered to help a patient reduce their dependency on prism.

References

1. Brain Injury Association of America: <http://www.biausa.org/about-brain-injury.htm>