

USES OF FRESNEL PRISMS

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The use of Fresnel prisms is relatively new. I hope to demonstrate in these few case histories that they may be a very definite and worthwhile adjunct to our orthoptic treatment and diagnostic procedures.

The first patient, Mr. J.C. aged 70 years presented with

- i) Right visual acuity 6/60 (due to cataract), left visual acuity 6/6,
- ii) a IV nerve palsy of 4 weeks duration,
- iii) intermittent vertical diplopia, which was distressing him greatly, in spite of an abnormal head posture,
- iv) synoptophore angles: fixing right eye $+1^{\circ}$ R/L 7^{Δ}
fixing left eye $+3^{\circ}$ R/L 10^{Δ} ,
- v) Maddox wing reading : exo 2^{Δ} , R/L 6^{Δ} .

The least prism correction that would allow him to join the diplopia was 8^{Δ} base down in front of the right eye. He was sent home with a Fresnel prism of this strength, and instructions for exercises to increase his field of binocular single vision.

At the second visit, one month later, I was able to decrease the prism to 4^{Δ} base down, as the vertical deviation had decreased to R/L 8^{Δ} without prisms. At the third visit, the synoptophore angle measured, fixing left eye, -1° R/L 5^{Δ} ; he was left without prisms as he could now control the small deviation comfortably with the help of his head posture. He continued with home exercises and at the final visit was symptom free and very happy man.

Admittedly, Mr. J.C. was undergoing spontaneous recovery, and would have improved without the prisms. The Fresnel prism, which only partly corrected the deviation forced him to use his fusional range to correct the remaining deviation, and relieved him of the discomfort of constant diplopia.

Case II J.D., age 8 years, presented with

- i) left eye blind from birth,
- ii) no apparent deviation of the left eye,
- iii) horizontal nystagmus of the right eye in primary position; this nystagmus disappeared in laevoversion,
- iv) compensatory head turn to the right,
- v) visual acuity 6/6 with the head turned.

J.D.'s mother was most concerned with the unsightly head turn, and wondered if anything could be done.

It seemed possible that a base out prism, allowing J.D. to maintain the adducted position of his fixing right eye without turning his head, might be the answer. Measurements showed that his customary head turn involved about 55^{Δ} of right adduction. However, the patient would not tolerate a Fresnel prism of more than 15^{Δ} . He complained that everything looked "stripey" with stronger ones, so he was allowed to go home to try the effect of the 15^{Δ} one for a month. He came back with no head turn while wearing the prism.

An operation had been considered, but his mother was loathe to have this, as J. had only one functional eye. J. is now wearing glasses incorporating a 15^{Δ} prism base out right. Without the trial Fresnel prism, he might have been ordered much weightier glass ones; we helped prove that the head turn could be corrected with a much lighter prism than expected.

Case III. Mr. Y., aged 75 years, had suffered a right IV nerve palsy twelve months previously, which had left him with some right hypertropia and diplopia. He had been prescribed bifocals with an 8^{Δ} prism base down incorporated in the right reading segment.

When seen in the orthoptic clinic, he

- i) complained bitterly of diplopia while reading,
- ii) said all the print ran together and he could not tell whether diplopia was horizontal or vertical.,
- iii) gave measurements by prism cover test while wearing bifocals

at 6 metres : no deviation

at 1/3 metre, through reading segment (with prism): exo 6^{Δ} , R/L 4^{Δ}

In the belief that the vertical deviation was still giving trouble, he was given a 4^{Δ} Fresnel prism base down on the right reading segment (additional to the incorporated prism). Two days later he returned, still complaining. It was then decided to correct the horizontal deviation instead of the vertical, so the 4^{Δ} base down was replaced with a 6^{Δ} Fresnel prism base in. This completely eliminated the symptoms.

Having undergone these trials, Mr. Y was able to have the base out prism incorporated in his glasses. He was very grateful, as the whole process took a week only, and had it not been for the trial of Fresnel prisms he would have been put to the expense of yet another pair of glasses, which he could ill afford.

Case IV is that of Mr. N. who like our first and third patients had suffered a IV nerve palsy, rather dramatically. Ten years ago he had fallen out of bed, landing with his head in the chamber pot, which had to be broken before he could be extricated. Thereafter, once it could be recognised that no spontaneous recovery was taking place, he was prescribed prisms. He wore them for a short time only, as their weight worried him more than the diplopia.

In the orthoptic clinic we found

- i) right IV nerve palsy
- ii) synoptophore angle, fixing right eye $+5^{\circ}$ R/L 14^{Δ}
fixing left eye $+4^{\circ}$ R/L 11^{Δ}
- iii) Maddox wing eso 5^{Δ} , R/L 10^{Δ}

He agreed to try the Fresnel prisms, and was given 10^{Δ} base down in front of the right eye, which was sufficient to join the diplopia. He was so happy to be "cured" that he said he preferred the "Stripes" to the weight of the glass prism. He now wears the Fresnel prism as a permanent fixture on his glasses.

These four cases illustrate some of the very useful roles that Fresnel prisms may play in orthoptics. We have used them to relieve diplopia while encouraging further effort during recovery from IV nerve palsy (Mr. J.C.), and to guide our management of a head turn associated with nystagmus (J.M.) and of ill-defined diplopia for near work (Mr. Y.); finally we have found the Fresnel prism accepted for permanent wear by Mr. M., when

conventional prisms were rejected. Fresnel prisms have proved an exciting and illuminating adjunct to our orthoptic diagnosis and treatment.

Acknowledgements

I would like to thank the ophthalmologists in charge of the above cases for allowing me to present them here, and I would like also to pay tribute to my colleagues at the Sydney Eye Hospital Orthoptic Clinic for their advice and encouragement in the treatment of the cases and the writing of this paper.

TRANSPARENCIES

Jess Kirby

The eye that fails in convergence, that has a slow heterophoria recovery, that is partially amblyopic, that produces symptoms because it cannot carry its load; or that intermittently diverges or converges, or is closed for near or distance or in glare - this eye needs encouragement. It needs encouragement more constantly than orthoptics or home exercises can be given, and without the dissociation that part time opaque occlusion causes.

I commend transparencies because they give this support. They are tolerated without trouble, with no cosmetic impairment, and can be adapted to the requirements of each individual case. They have filled a longfelt want in my practice.

"Press-On" transparencies are graded in levels of visual acuity. They replace in a more refined and scientific way, clear lacquer which did not flow evenly, and cello-tape which did not mould to the glass and which moisture caused to swell and distort.

For some years I have used a clear "Con-tact" paper which reduces visual acuity to 6/24, moulds to the glass, withstands water and is almost undetectable. Through it, patients can do simple binocular exercises such as appreciating physiological diplopia, and distant muscle balance control exercises. I also used this method on both adults and children post-operatively, and still prefer it, for some cases, to the use of the "Press-On" transparency. Some adult patients with a history of longstanding asthenopia react more favourably to the 6/24 clear "Con-tact" transparency, whereas those with lesser symptoms wear a "Press-On" transparency which only slightly favours the weaker eye.

However, "Press-On" transparencies have a wider application and are easier to use, especially for adults, since the transparency can be removed quickly and replaced as required. Many adult patients with symptoms cannot attend more than two or three times, and some of these responded slowly to the usual orthoptic methods. Previously with this group, part time opaque occlusion would be suggested. This occlusion was tolerated only by the very strong minded or the desperate. Transparencies are well tolerated, and the result is a dramatic relief of symptoms. Patients can feel the defective eye fail when the transparency is removed, and as the eye improves, they can reduce the time the transparency is worn according to their needs.

The selection of the appropriate type and grading is time consuming. With the correct grading the patient must be able to appreciate physiological diplopia with confidence.

When wearing a transparency, the child adapts to making the defective eye the "thinking" eye. The reaction from parents is good because an intermittent squint is controlled cosmetically. The transparency can be left in place and an opaque occluder can be attached to the other side of the glass, if the defective eye needs this extra boost. But also more importantly the parent can see through it, and if a deviation of the partially occluded stronger eye occurs it can then be removed until the weaker eye again indicates