

THE OCCURRENCE of STRABISMUS & OCULAR PATHOLOGY in an

Institutionalized Sample of Mentally Retarded Individuals

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Abstract

As part of an ongoing multi-disciplinary assessment and intervention project, a group of 39 mentally retarded children and adults received eye examinations. This paper focuses on two aspects of the visual analysis; strabismus and ocular pathology. The occurrence of each of these entities exceeds the expected ranges for a random population and concurs with previously found reported findings in retarded samples. Some 40% of the subjects had strabismus or a lack of binocular vision while 41% had one or more ocular pathologic condition. In most cases, these deficits were not previously noted in the patient's files and/or the consequences of such conditions were not known to the care giving staff.

Key Words

ocular pathology, mental retardation, strabismus, vision

In early 1998 a pilot project was funded to assess the efficacy of a multi-disciplinary diagnostic and treatment approach to the institutionalized retarded population in Israel. The involved professions were optometry, medicine, psychology, physical and occupational, speech and dietary therapies. The project was based on evidence of the multiple system handicaps in the retarded population.¹⁻⁵ It has also been reported that these deficits often go untreated either through lack of diagnosis or unawareness of their importance. High on the list of such deficits are vision and audition.²⁻¹¹ The present study focuses on two areas of the visual analysis; strabismus and ocular pathology. These aspects were chosen because of their possible impact on treatment regimens conducted by the staff at the facilities. Additionally several published studies published by two of the present authors, using animal models have shown the dramatic effects that various forms of sensory disturbance and deprivation can have on the developing visual system.¹²⁻¹⁵ We postulated that at least some in the retarded population could have been subjected to levels of visual-motor deprivation that could be evidenced in conditions such as refractive errors, strabismus and ocular pathology. The influence and impact of refractive errors is definitely of import as has been well documented in previous research.^{3,6,16-19} One might assume that the presence of strabismus would not be a major concern (other than cosmesis) in the treatment of the retarded. However, our experience indicates that in many such cases the treatment staff is not even aware of the existence of strabismus, or which

eye is the intact eye. This can influence the success or lack of success in working with these subjects on visual awareness and visual tracking. Similarly, aside from the medical necessity to treat ocular pathologies, a lack of knowledge of the functional consequences of these conditions can negatively effect treatment strategies.

Subjects

The subjects in the current report were drawn from two facilities housing severely and profoundly retarded adults and children. The majority of the subjects were multi-handicapped with various levels of limb paresis or skeletal abnormalities accompanying the retardation. The total subject population was 39 (20 males and 19 females) with an age range of 12-74 and an average age of 47 (SD= 20.8). All visual testing was performed at the facilities by the principal author in surroundings that were familiar to the subjects and as non-threatening as possible. There was no initial pre-selection of candidates to those specifically suspected of visual deficits: however, after interviewing the care giving staff, those subjects who were suspected of having visual defects were examined first. All subjects seen were full time residents and not part of the day center population of the facilities.

Methods

Subjects were tested utilizing monocular direct ophthalmoscopy (with dilation), cycloplegic retinoscopy, ocular motility targets and transillumination. A cover test and/or a Hirschberg evaluation was performed on each subject along with an assessment of the near point of convergence and pupil reactivity. Assistance in maintaining and stimulating fixation and

Figure 1. Percentage of subjects with ocular pathology, strabismus and neither condition (normal)

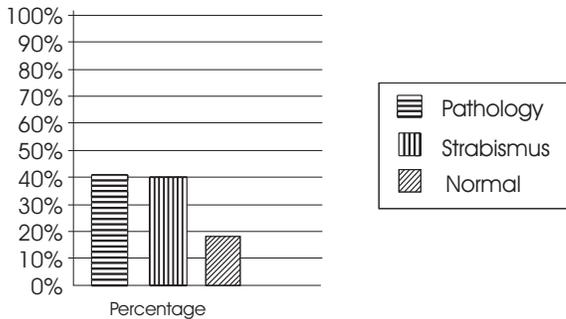
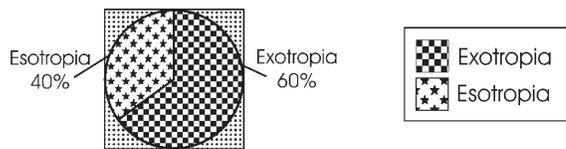


Figure 2. Percentage of esotropia and exotropia in the 40% of subjects with strabismus



tracking was given by staff members at each facility who were known to the subjects tested. In the present sample tested at this time visual acuity assessment was not possible.

Results (Figure 1)

A total of 16 subjects (41%) exhibited ocular pathology. Ten subjects had cataracts including cortical, posterior subcapsular and nuclear types. Sketchy health histories and a lack of previous eye examination information meant we could not determine the frequency of congenital cataracts. Two subjects had keratoconus and three had retinal defects. The remainder of the pathology noted included pterygia, coloboma and phthisis bulbi of unknown origin. Five of the subjects had more than one type of ocular pathology. Two subjects were monocular because of the ocular pathology (phthisis bulbi and keratoconus). Although there was evidence of searching fixation in the affected eye, we did not include these subjects in the strabismus category.

Some 15 (40%) had some form of strabismus. In this group, 60% (9 subjects) were exotropes and 40% (6 subjects) were esotropes (Figure 2). A breakdown of the data does not show a robust association between ocular pathology and strabismus. Eight of the subjects with ocular pathology had strabismus while the remaining seven did not.

Discussion

The amounts of ocular pathology and strabismus in this institutionalized men-

tally retarded sample exceeds those projected for a random population.^{20,21} The present study findings of strabismus and ocular pathology are somewhat higher than a previous report of this same project's findings with a sample of mentally retarded adults.¹⁶ In the present study there was not a significant association between the two conditions. We interpret this to indicate that they are separate entities although they may stem from a common cause of retardation. It is also possible that the strabismus is a product of post-natal environmental factors and early visual-motor deprivation, while this seems less likely for the ocular pathology.

Almost 68% of conditions we found had not been previously noted in the subject's medical files and consequently, these results were unknown to the staff treating them. Staff members working on multi-sensory stimulation were unaware that some patients had no vision in one eye or that some patients could not binocularly fixate visual targets. Even when there was the suspicion of visual or ocular defects, the consequences of such deficits were not known by the treatment staff.

The incidence of ocular pathology and strabismus matches previous data^{2,3,6,9,16-19} in similar samples. The fact that these conditions in the present study were previously unreported also matches other studies reporting a lack of health data in institutionalized retarded samples.^{1,22,23}

As was discussed above, treatment staff at these facilities were attempting to work with these subjects on a daily basis in vari-

ous multi-sensory stimulation techniques. It is not unreasonable to propose that a thorough knowledge of the subjects' visual disabilities could change treatment strategies to be more effective. With this in mind we were able to provide important information such as probable limitations of visual acuity, fixating versus non-fixating eyes, visual tracking capabilities and/or ocular muscle restrictions for many of the subjects.

While it seems clear that the strabismus and ocular pathology were not the primary causes for the subjects' retardation, a lack of awareness of these defects could have had a negative effect on programs instituted to train and educate these patients.

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References

1. Ackland MJ, Wade RW. Health status of Victorian special school children. *J Paediatr Child Health* 1995 Dec;31(6):571-75.
2. Ciner EB, Appel S, et al. Assessment and rehabilitation of children with special needs. *Optom Clin* 1996;5(2):187-226.
3. Berk AT, Saatci AO, et al. Ocular findings in 55 patients with Down's Syndrome. *Ophthalm Genet* 1996 Mar;17(1):15-9.
4. Haire AR, Vernon SA, Rubinstein MP. Levels of visual impairment in a day center for people with a mental handicap. *J R Soc Med* 1991 Sept;84(9):542-4.
5. Gnad G, Wesson MD. A survey of the vision assessment of the developmentally disabled and multi-handicapped in University Affiliated Programs. *J Am Optom Assoc* 1992 Sept;63(9):619-25.
6. Koslowe KC. Refractive errors and visual anomalies as related to the degree of retardation in a Down's Syndrome population. *J Behav Optom* 1998;9(1):7-10
7. Evenhuis HM, Theunissen M, Denkers I, Verschuure H, Kemme H. Prevalence of visual and hearing impairment in a Dutch institutionalized population with intellectual disability. *J Intellect Disabil Res* 2001 Oct;45(Pt5):457-64.
8. Shott SR, Joseph A, Heithaus D. Hearing loss in children with Down Syndrome. *Int J Pediatr Otorhinolaryngol* 2001 Dec 1;61(3):199-205.
9. Warburg M. Visual impairment in adult people with moderate, severe, and profound intellectual disability. *Acta Ophthalmol Scand* 2001 Oct;79(5):450-4.
10. Haugen OH, Hovding G. Strabismus and binocular function in children with Down syndrome. A population-based, longitudinal study. *Acta Ophthalmol Scand* 2001 Apr;79(2):133-9.

11. Maino DM, Rado ME, Pizzi WJ. Ocular anomalies of individuals with mental illness and dual diagnosis. *J Am Optom Assoc* 1996 Dec;67(12):740-8.
12. Yinon U, Koslowe KC, et al. Lid suture myopia in developing chicks: optical and structural considerations. *Curr Eye Res* 1982/83;2: 877-82.
13. Yinon U, Koslowe KC. Eyelid closure effects on the refractive error of the eye in dark and in light reared kittens; *Am J Optom Physiol Opt* 1984;61:271-73.
14. Yinon U, Koslowe KC, Rassin MI. The optical effects of eyelid closure on the eyes of kittens reared in light and in dark; *Curr Eye Res* 1984; 3:431-39.
15. Yinon U, Koslowe KC. Hypermetropia in dark reared chicks and the effect of lid suture. *Vis Res* 1986;26:999-1006.
16. Koslowe K, Yinon U, et al. A multi-disciplinary diagnostic treatment approach with institutionalized and mentally retarded adults: initial report of ocular and visual findings. *J Behav Optom* 1999;10(3):58-61.
17. Merrick J, Koslowe KC. Visual concerns in Down's Syndrome. *Int J Adoles Med Health* 2000 January-March;12(1).
18. Merrick J, Koslowe K. Refractive errors and visual anomalies in Down's Syndrome. *Down Syndrome Res Prac* 2001;6(3):131-33.
19. Haugen OH, Aasved H, Bertelson T. Refractive state and correction of refractive errors among mentally retarded adults in a central institution. *Acta Ophthalmol Scand* 1995 Apr;73(2):129-32.
20. Liebowitz HM, Krueger DE, Maunder LR et al. The Framingham eye study monograph. *Surv Ophthalmol* 1980;24 (Suppl:335-610).
21. Ganley JP, Roberts J. Eye conditions and related needs for medical eye care among persons 1-74 years of age: United States, 1971-1972. *Vital Health Statistics. Series 11* 1983;(228):1-69.
22. Jacobsen K, Magnussen S, Smith L. Hidden visual capabilities in mentally retarded subjects diagnosed as deaf-blind. *Vis Res* 1997 Oct;37(20):2931-5.
23. van Schrojenstein Lantman-de Valk HM, Haveman MJ, Maaskant MA, Kessels AG, Urlings HF, Sturmans F. The need for assessment of sensory functioning in ageing people with mental handicap. *J Intellect Disabil Res* 1994 Jun;38 (Pt 3):289-98.

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