ORTHOPTICS AND SQUINT MANAGEMENT OF THE CEREBRAL PALSIED CHILD

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This paper hopefully will create more interest among orthoptists in working with cerebral palsied children as the openings in this field must expand in view of the multiplicity of ocular muscle defects found.

By definition "cerebral palsy" is a persistent but not unchanging disorder of movement and posture appearing in the early years of life and due to a non-progressive disorder of the brain, the result of interference during its development." Mental retardation may be associated with cerebral palsy but is by no means always present.

Many orthoptists will recall Vicki Elliott's stimulating paper "Cerebral Palsy and Orthoptics" (1975). This paper's aim is to expand on the assessment of visual acuity of non-verbal children, i.e. those children with no speech, and to describe the treatment programme undertaken as well as to comment on surgical management of squint.

A. VISUAL ACUITY ASSESSMENT OF NON-VERBAL CHILDREN.

The following standard methods could be used:

1. **The Sheridan Gardiner Method,** except where limited by the degree of physical handicap (especially of the upper limbs), perhaps has been the most successful.

2. **Snellens 'E' Test** may be used – a child's response could be turning head, hand or eyes in the direction of the arms of the 'E',

Further methods utilising skills taught to these children by Speech Therapists, Occupational Therapists and School Teachers include:

3. **The Yes/No response.** Being self-explanatory in regards to the meaning, the following ways could be considered:

   (a) Smile and frown of facial expression

   (b) Nod and shake of head.

   (c) Head or arm pointing in direction of "yes" or "no" sign on tray attached to a chair.

   (d) Foot tapping for yes and no response for no.

   (e) Movement for yes, sit still for no.

   (f) A child may have his own method to express yes or no, e.g. a certain action or noise.

The child is asked in relation to the visual acuity test, whether pictures or letters, "Is this a . . .?" and he responds accordingly. This Yes/No method is usually accurate, as it is the first way a non-verbal child is taught to communicate.

4. **Communication Symbols** are usually set out on a portable board or tray attached to the child's chair, and as the child learns them, the number is increased. This can be used in association with the picture visual acuity test, the child using his hand or finger and placing it on the relevant symbol. If he cannot see it, he falters or points to the "I don't know" sign. A child may have the letters displayed on a board and will point to them instead.

5. **Deaf Signs** are used by deaf children to communicate an object or idea. Once again the picture visual acuity test is used, and the child matches with the deaf sign.

The next method could probably only be used where one has access to the facilities.

6. **The Clock Face Pointer or Selector** - each have a clock face appearance showing letters plus a pointer which moves to each letter. A Snellen's chart is shown and the child uses this apparatus to show the letter to which the tester is pointing. A foot or hand control may be used and this is raised once the required letter is reached, so the pointer stops at the required letter. The clock-face pointer is used to teach the children how to handle the control and learn the alphabet. They then progress to the selector which, once mastered, can be attached to a typewriter so the child has a means whereby to write.

7. In future the **Catford – Oliver Drum** will be used more widely and may prove to be most advantageous in testing non-verbal children.

One should remember when testing visual acuity:

(a) to communicate with the parent or guardian, teacher or therapists, as to the child's responses, aids used, and so on, so that the most accurate visual acuity can be obtained.

(b) not to assume the child's limitations or potential until several and varied methods have been tried.

(c) to attempt the tests at close range initially and establish how the child will respond.

(d) The child's response may be accurate but slow. Give him time to tell you his answer. Above all, be patient.

B. THE PLAN OF MANAGEMENT

This is summarised by the following chart, which gives an outline of the need for treatment of these children.

TABLE I

OCULAR DEFECTS FOUND IN 233 CEREBRAL PALSIED CHILDREN OVER THE PAST 15 MONTHS AND TREATMENT UNDERTAKEN

DEFECTS NOTED	NO.	%	SATISFACTORY NO.TREATMENT REQUIRED	UNSUITABLE FOR TREATMENT AT THIS STAGE			RECEIVING TREATMENT			
				Age	Physical Handicap	Other	Gls.	Occl.	Orth.	Surgery
Nil Apparent	60	26	60							
Refractive Error Only	6	3					6	1		
Conv. Insuf. Heterophoria	31	13		1	4	1	2		25	
Intermittent Squint	43	18	9	1	2	3	18	16	18	3
Constant Squint, Nystagmus	89	38	23	2	0	1	49	25	3	3
Other	4	2					4			
TOTALS	233	100	92	4	6	5	79	42	46	6
					15		126			

There are three points to be noted from the chart.

1. As found by Elliot, the incidence of squint, heterophoria, refractive error and nystagmus is high. All require attention.

2. A high percentage of children (38%) received occlusion or orthoptics after an initial assessment and refraction. These treatments should be carried out along normal lines as far as possible. Responses to treatment are similar to those from treatment of ocular muscle problems anywhere. Binocular vision, where present, is easily weakened or lost with time, unless helped through orthoptic treatment. Occlusion is always successful, within the limitations e.g. regarding age, as apply for normal children.

3. Despite the high incidence of squint, the percentage of children undergoing surgery is low.

C. SURGICAL MANAGEMENT OF SQUINT

Reasons for the small amount of surgery include:

1. The unstable muscle tone in these children.

2. Many children are also undergoing extensive orthopaedic surgery which is considered to be of prime importance for posture, walking, the use of the upper limbs, and so on.

3. The squints in many children are cosmetically acceptable, satisfactorily controlled if intermittent in nature, or too variable in angle for surgery to be considered.

4. Drug therapy is often administered and may affect the ocular muscle control, and so influence the deviation.

The number of consecutive squints was high, so an investigation of the children with a known ophthalmic history of squint surgery before the age of four years was carried out. The following table was compiled. The children represented below were treated at several different centres before attending the Spastic Centre at Mosman and Allambie Heights.

TABLE II

THE RESULTS OF EARLY SQUINT SURGERY (BEFORE THE AGE OF FOUR YEARS) ON TWENTY TWO CEREBRAL PALSIED CHILDREN

Cosmetically improved	Cosmetically good	Improved control over an intermittent squint	Consecutive squint
4	1	0	17

This shows that 77% of these children now have a consecutive squint. This appears to demonstrate that the muscle tone is unstable. In many children who have not had squint surgery it has been noted that the horizontal angle has varied or decreased with time. The same process may well occur after squint surgery, and therefore result in a consecutive squint. Also, these children, after they have initially presented a constant congenital squint, do not appear to have the capacity to develop any binocular vision.

Therefore surgery should be delayed and consideration given when the problem is cosmetic or has psychological effects on the child. Otherwise a conservative, modified approach such as one procedure instead of two or three, as some of these children had, could be considered. In intermittent squints where binocular vision and satisfactory control can be maintained by other methods such as orthoptics, surgery at a later date would also be more advantageous, and predictable as well.

In recent years, orthopaedic surgeons along with the physiotherapists who handle these children agree that certain surgical procedures are best left until the child is older and muscle tone more stable, unless surgery becomes inevitable due to discomfort or gross changes in muscle actions. Assuming that this current trend in orthopaedic surgery is correct, I consider that early squint surgery in cerebral palsied children is also inadvisable.

The cerebral palsied children who have undergone squint surgery in the past fifteen months at the Spastic Centre were all aged over four years, had been prescribed glasses where needed, occlusion, and/or pre and post-operative orthoptics. The pre and post-operative management with these as with all normal children is important. The results are shown below (Table III) Although there were only six children involved the results are considerably better, and I feel this is due to careful selection, as well as the older age at which squint surgery was undertaken.

TABLE III

THE RESULTS OF SURGERY (ABOVE THE AGE OF FOUR YEARS) ON SIX CEREBRAL PALSIED CHILDREN OVER THE PAST 15 MONTHS

Cosmetically improved	Cosmetically good	Improved control over an intermittent squint	Consecutive squint
1	2	3	0

Working with cerebral palsied children is rewarding and a challenging experience to say the least. As well as orthoptics and screening one has the opportunity to work with a multidisciplinary team, where everyone is working for the best for each child. There is also scope for research. Because a cerebral palsied child's eyesight may well become his most important asset in adulthood, we must work towards improving his vision in all aspects, encouraging his full potential by our interest and enthusiasm in management, so that he may indeed see "The Way Ahead."

REFERENCES:
Seaber, J.H. & Chandler, A.C.(1976) *A Five Year Study of Patients with Cerebral Palsy and Strabismus in Orthoptics – Past, Present, Future,* Stratton, New York, 271-277
Elliot, V.C. (1975) *Cerebral Palsy and Orthoptics.* Aust. Orthopt. J, 14, 7-9.