THE ROLE OF THE ORTHOPTIST IN THE MANAGEMENT OF DYSTHYROID EYE DISEASE

J. Mein *

Many terms have been used to describe the condition in which exophthalmos is linked with limited ocular movement and diplopia, the best known being exophthalmic ophthalmoplegia. In some cases of thyroid disturbance, however, there is exophthalmos with little or no ophthalmoplegia and in others there is ophthalmoplegia without the typical exophthalmos, now recognised through more sophisticated medical diagnosis. For these reasons the older terminology appears to gave been superseded by the more general term, dysthyroid eye disease.

I am fortunate in that I have worked for a long time in a hospital where there is excellent liaison between endocrine and ophthalmic departments, so that all patients with eye symptoms are seen in both clinics. The nature of this disease is such that patients are followed up over a long period of time, both because prolonged medication is required and because it is often impossible to state that a patient is cured and will never have a recurrence of symptoms or a change in his thyroid state. As a result we have had opportunity to watch the patients' progress for ten years or more in some cases.

We decided to present a follow-up of these patients at the Third International Orthoptic Congress in Boston in July, 1975, using an earlier study (Mein 1967) as a guide and for comparison. The paper was written jointly by Brian Greaves and myself and was presented by him in Boston. This paper concentrates on orthoptic rather than ophthalmic management but is based on the same material.

Material

We were able to review a total of 144 patients and these we divided into three groups based on the length of the follow-up period.

Group 1.	followed for up to 4 years	43 patients
Group 2.	followed from 4-10 years	55 patients
Group 3.	followed for over 10 years	46 patients

All these patients were seen in the orthoptic clinic because of diplopia, although it is our practice to see all patients with known or suspect dysthyroid eye disease, even if symptom free, in order to plot a Hess Chart for reference in case of change. All were under the care of the endocrinologist and the ophthalmologist, whether they presented first to the eye department or first in the endocrine department. In some cases diplopia was the presenting symptom but in others it developed much later in the course of the disease when the patient was still hyperthyroid, or when he was euthyroid or even hypothyroid. It has proved impossible to correlate the patient's thyroid state with the onset or progress of his dyplopia.

Because we were interested in long-term changes we concentrated most on Groups 2 and 3 with the longer follow-up time.

The functions of the orthoptic department are:

1. to provide an adequate record;
2. to relieve symptoms;
3. to keep the patient under observation and note any change in his eye condition.

I propose to refer first to some of the methods we use to fulfil these functions and then to present facts which emerged from our follow-up.

Diagnostic Methods

The patient's vision was routinely tested on every visit since this is at risk both from corneal exposure and pressure on the optic nerve. We recorded the cover test, ocular movements

* Visiting Fellow, Lincoln Institute, Melbourne.

and measurement in the primary position, but relied mainly on serial Hess Charts, fields of binocular single vision, fields of uniocular fixation in a few cases, and on photographs to record the patient's appearance and ocular movements. In addition, the exophthalmos was measured in the eye department and the patient examined ophthalmologically.

Serial Hess Charts seem to us to be the best way of showing the patient's progress, always providing that the outer field is recorded. If this proves impossible because of bilateral limited movement then this must be stated. In cases when a meaningful Hess cannot be plotted we plot instead a field of uniocular fixation on the perimeter. This test is dependent on the patient appreciating when he loses foveal fixation, and therefore the best possible vision is necessary: for this reason glasses are worn. We plot fields of binocular fixation in all cases with an area of binocular single vision. Our reasons for using this test so much are:

1. that patients with this condition frequently develop an excellent fusion range and the field of binocular fixation is surprisingly large when compared with the Hess Chart;

2. that the patient's control of his deviation may vary, becoming less good or better whilst the Hess Charts remain unchanged.

Orthoptic Management

We use prisms extensively in the management of these cases, first as Fresnel or occasionally as clip-on prisms for a trial period of up to 6 months, later as a permanent or semi-permanent prescription in the patient's glasses.

Our reasons for their use are:

1. because the condition is notoriously unstable in that it can remain static for many months or even years and then change; surgery is avoided in our department where possible or certainly not performed inside a 2 year observation period. Prisms are a more acceptable alternative to surgery;

2. because the fusion range is so large many patients are comfortable using a prism strength far below their measured angle, for example a patient with 45$^{\Delta}$ of L. hypertropia who has been symptom free for 8 years with a 10$^{\Delta}$ vertical prism.

On reviewing the 101 patients in Groups 2 and 3 of our series we found that the majority had worn prisms at some stage; 48 out of 101 had a wearing time exceeding 3 years, analysis of this number showed that —

15 patients have retained the same prism;

4 have required an increase;

5 have had the strength reduced;

16 have discontinued wearing prisms because they are now comfortable without them, and

8 further cases have been able to discontinue wear post-operatively.

3 out of the 4 patients needing more prism had esophoric deviations and it is well recognised that this happens in such cases irrespective of etiology. There is little evidence that patients with this condition cannot be made comfortable with prisms or that they become dependent on them.

Results of Follow-up

1. **Ocular Movement:**

   Typically these patients show limited elevation which simulates Superior Rectus weakness. There is chin elevation and a tilt to the lower eye which results in binocular single vision but also allows the patient to fix more easily and avoid the discomfort of looking up. Most authorities believe these signs can be related to the inferior rectus which is first involved in inflammatory changes and later becomes fibrotic, thus preventing full upward movement and causing pain on elevation.

   However, the inferior rectus is not the only muscle involved and many cases in this series showed

generalised limitation of movement, limited abduction and limited depression far greater than their limited elevation. In some cases the greatest limitation of movement was in the least proptosed eye.

Many patients presented with unilateral limitation, or with very asymmetrical limitation. We reported a patient in 1967 who had gross unilateral limitation of elevation for some years before his other eye became involved. When this "eye caught up" with the first eye the diplopia resolved and binocular single vision was restored in the lower field. Similar findings occurred in 8 other patients in Groups 2 and 3.

However, to us the most important finding was that a significant number of patients improved spontaneously; 41 out of the 101 patients in Groups 2 and 3 showed significant improvement, our criteria for this being:

(a) objective improvement on Hess charts of a displacement toward normal of at least 1 square (subtending 5^{o});

(b) subjective improvement in symptoms and in appearance;

(c) the ability to discard prisms or accept a reduction in prism strength.

50% of the patients in Group 3 (observed more than 10 years) and 33% of those in Group 2 (observed 4 - 10 years) met these criteria.

It is difficult to explain how ocular movement can improve if there is fibrosis of muscles as it is generally believed such changes are irreversible.

2. **Exophthalmos:**

Another fact to emerge in the course of our survey is that there is variation in the degree of proptosis during elevation and depression of gaze. Exophthalmology readings using a Hertel exophthalmometer were taken by the same observer (B.P.G.) on 109 patients. pivoting the apparatus from the primary position to maximum elevation and depression. In 78 patients the proptosis increased by 2 - 4mm. on elevation and decreased by 3 - 5mm. on depression. The 15 normal subjects tested for comparison all showed a decreased measurement on elevation.

The results in dysthyroid subjects suggest that limited elevation is not explained entirely by fibrosis of the inferior rectus but that this muscle must in fact relax on attempted elevation so that the exophthalmus increases.

Conclusions

The findings of this survey encourage us to believe that the end result in most cases is satisfactory The patient's appearance improves, and he maintains a good field of symptom free binocular single vision. They also confirm our belief that conservative management is indicated in most cases, partly because of much later changes which can occur but also because of the satisfactory spontaneous improvement which is found in a significant number.

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