



Professional Papers No 2

Guidelines for the Diagrammatic Documentation of Strabismus

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This document outlines the approach to the diagrammatic documentation of orthoptic findings which the British and Irish Orthoptic Society (BIOS) recommend.

The BIOS recognises that many orthoptists prefer to use the conventional method of recording their findings (Henderson, 1998), and this paper in no way intends to suggest that a diagrammatic approach is recommended over the traditional approach. Both methods are equally valid and have their advantages, and it is for individual orthoptists and departments to decide which approach they prefer. The aim here is to provide guidance for orthoptists who are already using, or who wish to use, a diagrammatic approach.

Diagrammatic methods of documenting strabismus have been around for many years, and there are a variety of approaches used. The choice of method is at the discretion of the individual practitioner. However, standardisation is one of the main advantages of a diagrammatic approach, with clear benefits for those learning about orthoptics, in particular orthoptic students, and junior medical staff; and for communication both within the profession and across professions. So, at the request of members and in order to promote standardisation, this document outlines the approach to diagrammatic documentation recommended by the BIOS.

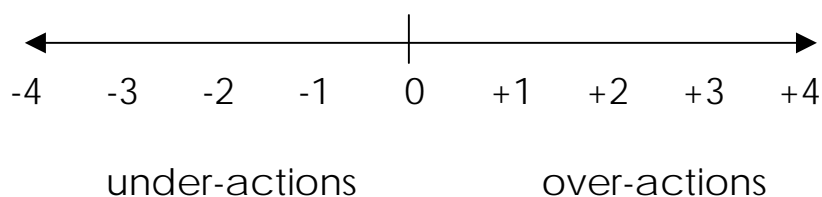
In the Spring of 2003 a consultation exercise was carried out, in which orthoptists using a diagrammatic approach were asked for details of their method. The majority of orthoptists who replied reported using the approach

described by Vivian and Morris in 1993, and O'Flynn in 1994, which is based on the method first described by Jampolsky in 1971.

This is therefore the approach which the BIOS recommend. Orthoptists are referred to the original papers for a full description of the method.

Ocular movements

- Versions and ductions from the primary position, into each of the diagnostic positions of gaze, are assessed in the usual way, using either the "British Method" or the "American Method" (see below for explanation).
- Movements are graded on a 9 point scale:



- Zero represents a normal movement
- Under-actions/limitations:
 - **>-4:** eye not reaching the midline
 - **-4:** no movement from the midline
 - **-3:** 25% normal movement
 - **-2:** 50% normal movement
 - **-1:** 75% normal movement
- Over-actions:

The guidelines for recording over-actions are less specific, and in general an over-action will be recorded as equal to the under-action of the contralateral synergist.

- For the oblique muscles there are some more specific guidelines: **+1**: vertical deviation present only in the field of action of the oblique
 - **+2**: small vertical deviation on side gaze, which increases in the field of action of the oblique
 - **+3**: large vertical deviation on side gaze, which increases in the field of action of the oblique, but remains purely vertical
 - **+4**: large vertical deviation on side gaze, which increases in the field of action of the oblique with divergence of the eye
- Shading on the diagram is used to indicate limitations found on assessing ductions (see example 2). Where there is no shading, this indicates that ductions are full (see example 1). Where there is a significant difference between the duction and version in a given position, this should be recorded on the diagram (see example 2).

British/American method of assessing ocular movements

The method of diagrammatic documentation described was developed in the United States, and originally used the "American Method" of ocular movement assessment and grading. Essentially this involves assessing the versional eye movements, and judging purely by observation whether there is any under- or over-action in each direction, by comparing the relative position of the two eyes, and the position of the eyes relative to the palpebral fissures. Occlusion is used purely to assess if movements improve on testing ductions.

The "British Method" involves observing the versional movements, but then going on to perform cover tests in each position of gaze, so that the deviation can be assessed and compared. In practical terms, considering the example of a patient with a concomitant left hypotropia, the American Method would record the left eye as under-acting on elevation, as the eye would not achieve full elevation when versions are assessed. The fact that the eye

started from a hypotropic position and is making a full excursion is not considered, only that the end position is not full elevation. The concomitance of the deviation would be shown by the prism cover tests in up and downgaze. The British Method would compare the left hypotropia on depression, in the primary position, and on elevation, and as there is no change, specifically no increase in the deviation on elevation, the actions of the vertical muscles on up gaze would be recorded as normal, with zeros. The American Method assesses the version movements in terms of end points; the British Method assesses muscles actions, by comparing deviations in different gaze positions. The BIOS recommends the British Method, and this is the approach that the Universities teach to undergraduate students. However, many doctors who trained in the United States may use the American method, so it is important to be aware of both approaches, and it is for individual departments to determine the approach which best meets their needs.

Cover tests

- These are performed in the usual way, with fixation at 1/3m and at 6m.
- The results are abbreviated as follows:

E - esophoria
esotropia

LET - left

X - exophoria
exotropia

AXT - alternating

RH- right hyperphoria

RHT - right hypertropia

LHypo - left hypophoria
hypotropia

LHypoT - left

Intermittent manifest deviations are classified by using brackets and underlining as follows:

LE(T) - intermittent left esotropia

AX(I) - intermittent alternating exotropia, mostly manifest

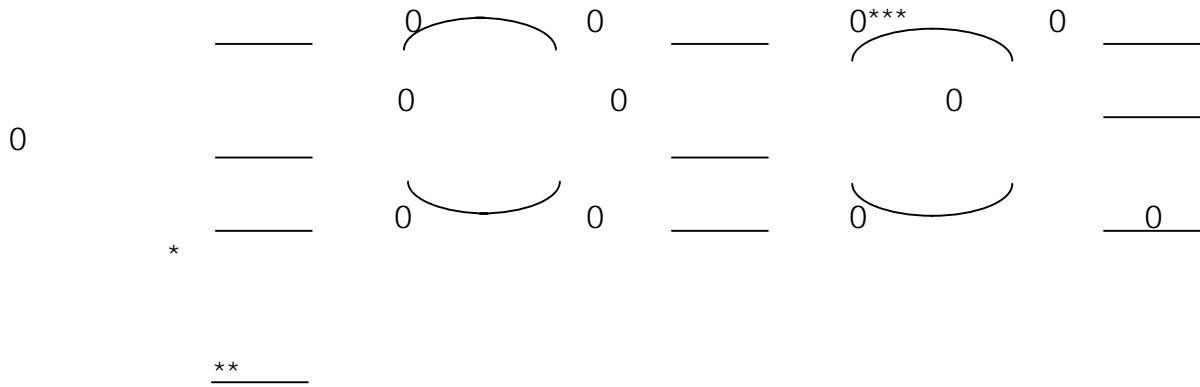
RH(T) - intermittent right hypertropia, mostly controlled

Prism cover tests

- The deviation is measured in the primary position with fixation at 1/3metre and 6 metres.
- The deviation is measured in the secondary and tertiary gaze positions with fixation at **6 metres**, to minimise the effect of accommodation. It is not necessary to measure all nine positions in every patient. Measurements are taken only in the positions required to diagnose and manage the patient, at the discretion of the orthoptist.
- The 6 metre fixation target remains static, and the patient's head is moved to achieve fixation in the required positions.
- Depending on the refractive error, the refractive correction is usually worn for the prism cover tests, to ensure that accommodation is controlled.
- Single prisms may be used for the measurements, and should be held perpendicular to the visual axis. Alternatively, prism bars or the synoptophore can be used.

Recording results

The results from the ocular movement assessment, cover tests, and prism cover tests are recorded on a template:



- The diagram represents the patient's eyes as they face the examiner.
- The distance cover test and prism cover test results are recorded in the positions indicated by horizontal lines, for example * indicates the position of the result of the distance cover test and prism cover test on down/left gaze.
- The near cover test and prism cover test result is recorded below the diagram (position indicated by **).
- The ocular movement gradings are recorded in the positions indicated by '0', for example *** indicates the position of the grading of the movement of the left eye into up/right gaze.

Additional features of ocular movements

- Recorded on the template using the following symbols



shading to show limitations of ductions

pattern

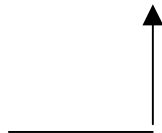


A pattern

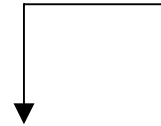


V

downshoot



upshoot



downdrift



updrift

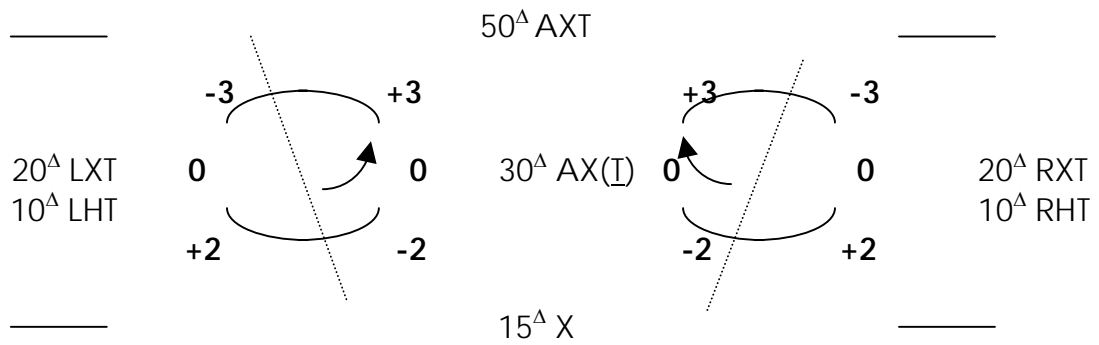


Example 1

Simulated distance exotropia

With V pattern and bilateral inferior oblique over-actions and superior oblique under-actions

Diagrammatic recording:



Near: 10^Δ X with +3.00DS: 25^Δ AX(I)

Commentary:

- *The latent divergence at near, and the intermittent alternating manifest divergence in the distance are shown.*
- *The dotted lines indicate the V pattern.*
- *The arrows indicate the updrift of the right eye on left gaze, and the updrift of the left eye on right gaze. These are consistent with the right hypertropia shown on left gaze, and the left hypertropia shown on right gaze.*
- *The numerical gradings indicate the bilateral inferior oblique over-actions and superior oblique under-actions.*
- *The distance measurements in the primary position can be readily compared with those on side gazes, and on up and down gaze, showing the extent of the V pattern, and the lateral incomitance.*
- *The absence of any shading on the diagram indicates that ductions are full in all directions, and that the minus numbers therefore indicate a relative under-action seen on versional eye movements only.*

The same information is presented in conventional orthoptic form on the next page.

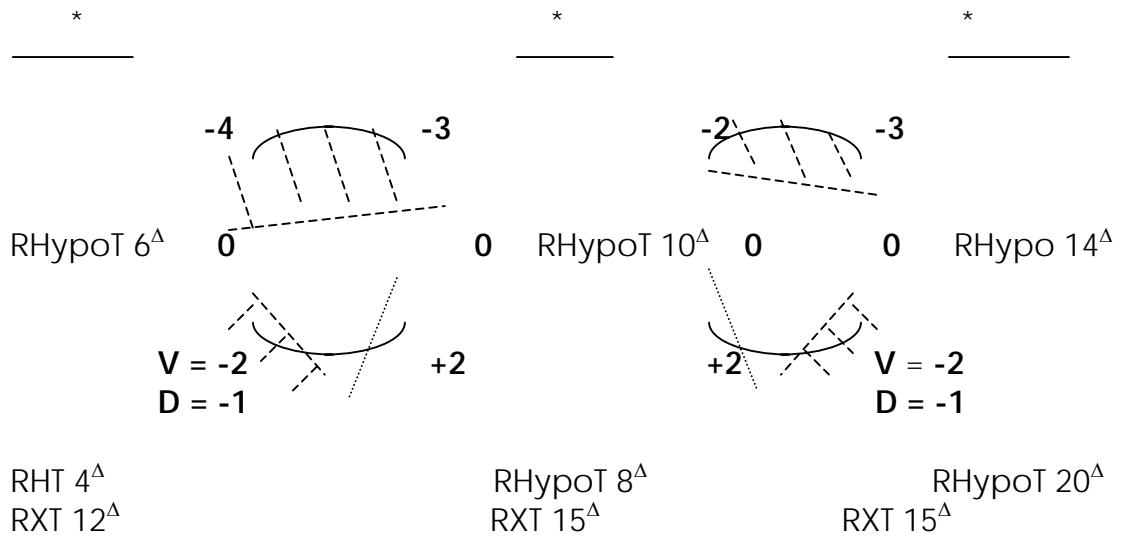
Example 1 continued

Simulated distance exotropia

With V pattern and bilateral inferior oblique over-actions and superior oblique under-actions

Example 2

Thyroid orbitopathy



Near: RHypoT 12^Δ

D = ductions, V = versions

* accurate measurements on elevation not possible due to limited movements, patient unable to fix

Commentary:

- *The right hypotropia is shown. This is present in all positions except on down/right gaze, where the deviation reverses to a right hypertropia.*
- *On depression there is some divergence of the eyes. This is indicated by the use of lines, and is consistent with the exotropia present in the depressed positions.*
- *The minus numbers on upgaze indicate the reduced movements of both eyes in all elevated positions, and the shading indicates that these are due to limitations of ductions.*
- *The minus numbers for the movement of the right eye on down/right gaze, and the left eye on down/left gaze, indicate the failures of movement in these positions. In these positions, the initial -2 under-action, seen on testing versions, improves to a -1 movement when ductions are assessed. Ductions and versions are graded separately for these positions so that the difference is apparent.*
- *The use of shading emphasises the limitations of ductions present for the right eye on down/right gaze, and for the left eye on down/left gaze.*
- *The +2 over-action in the field each superior oblique is shown.*

References

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