

Sensory causes of diplopia- Aniseikonia

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Fusion and Diplopia

- Motor and sensory
- Aniseikonia – barrier to sensory fusion
- Motor fusion impaired by sensory defect

Metamorphopsia


Field defect

Aniseikonia

You miss more by not asking than by not knowing.....*after John Colvin*

ASK EVERY PATIENT WHOSE DIPLOPIA IS
NOT EASILY COMPENSATED FOR WITH
PRISM:

Is the image seen by the RE

- Larger / smaller than the LE
- The same shape as LE
- Paler / darker than LE
- Tilted [ torsion]

Causes of Aniseikonia

Two main clinical causes of Aniseikonia

- Macular pathology
- Anisometropia
1% of aniseikoniaper
DS of anisometropia



Measuring aniseikonia

- Free Space Estimation
- Space Eikonometer (Stereoscopic method)
- Awaya Test (Direct Comparison Method)

MEASUREMENT ARTEFACT - each technique can give a VERY different answer

- Which one is bigger?
- Does it look like an 'E' should?
- Are all parts of it bigger [metamorphopsia]?
- Is the 'E' tilted?
- If a bar of the 'E' is worth 20%, how much bigger is it?



Also check with BD prism in front of other eye - prisms can also cause magnification

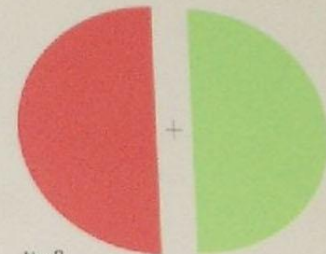
AWAYA'S NEW ANISEIKONIA TEST



No. 0



No. 1



No. 2



No. 3



No. 4



No. 5



No. 6

Use R-G glasses.

Find the pair of semi-circles where the difference in size compensates for the patient's aniseikonia

The Kowal experience

- 12 patients
- Aged 29-86
- M:F 9:3

Presenting symptoms

- 11 Diplopia
- 1 Wobbling of words

- 9 Anisometropia
- 4 Macular causes
 - 3 ERM
 - 1 Macular hole

Aniseikonia

- 11/12 Reported aniseikonia
- The least amount of aniseikonia causing disruption of fusion was 2%
- Largest amount of aniseikonia was 20 %
- Average 6.4% (Mode 5%)

Sensory fusion

- 10/12 had measurable stereopsis
- Range - 'Fly' to 50"
- No relationship between stereopsis and degree of aniseikonia

Motor fusion

- 8/12 - vertical deviation
? vertical fusion is more fragile than horizontal ?
- 6/12 - horizontal deviations
- 2/12 - exophoria with poor fusion range

Optical solutions to increase image size

- Increase front base curve
- Increase central thickness
- Decrease BVD (- lens)
- Increase refractive index
- Size lenses



....often successful!

Treatment - optical

- 5 - modified spectacles + prisms
- 1 - contact lenses
- 1 - reduced prescription of near add on one lens
- 1 - telescopic lenses (+ve CL and –ve spectacle lens) 20% ANISEIKONIA

Treatment - other

- 2 - surgery for exotropia
- 1 - declined treatment
- 1 - failed CL - referred for size lenses

Aniseikonia and motor fusion

- In most patients, aniseikonia precipitates small angle strabismus due to loss of sensory fusion which in turn impairs motor fusion
- Compensation for the strabismus with prisms along with lenses modified to compensate for the aniseikonia worked in 5/7 optically corrected patients

A Prospective Study of Binocular Visual Function before and after Successful Surgery to Remove a Unilateral Epiretinal Membrane

- 2/27: diplopia
- Measured stereo, motor fusion & VA.
- Stereo & total motor fusion ranges reduced
- After successful surgery, stereo function, VA & motor fusion improved mainly in those with shorter duration of symptoms [esp < 18mo]
- Stereo function improved mainly in those with better preoperative stereo

Aniseikonia as a substantial factor in causing diplopia

- Probably rare
- Always unrecognised by referring practitioner
- Need to ask about it - **pt always knows but needs to be asked the right question!**
- Often fixable with prisms and aniseikonic modifications