Vestibular Asthenopia

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I declare no conflict of interest
Asthenopia?

Definition:
- Word from the ophtalmological terminology
- Set of subjective symptoms
  - Visual fatigue
  - Headaches
  - Blurred vision
  - Sensory discomfort
  - Dizziness
- Causes
  - Refractive
  - Muscular
Why?

- Because most of our patients have complaints with visual connotation
- Because these complaints are really asthenopia
- Because we don’t have (in french) other medical words to put on these symptoms
  - Vestibular asthenopia ≠ vertigo
Vestibular Asthenopia?

What is it?

- Vestibular asthenopia is a set of subjective symptoms of discomfort the expression of which is mainly visual and the origin of which is a transient vestibular incident. It can be considered as the result of a global central disorder of the visual stability perception, occurring suddenly like a "computer bug", in response to an initial vestibular pathology without any minor clinical signs. The chain of gaze stabilizing being broken, the processing of visual information becomes chaotic, where the main consequences are hypersensitivity to visual flow preventing central fixation, break of fine binocular vision, fusion disorders and sometimes even of accommodation.
Vestibular system
Vertigo ≠ Vestibular asthenopia

decreased rotatory character depending on the pathology

Weakly rotatory

Very rotatory

Absence of vestibular signs
Hemodynamic vertigo or dizziness
BPPV
Neurinoma
Meniere's disease
Neuronitis

Vestibular Asthenopia

Time (days)
Two reasons

- Intergrative disorder: « mismatch »
- Eyes Sensory-motor disorder:
  - Eyes position (horizontal, vertical, cyclo deviations)
  - Eyes proprioception
  - Accommodation
  - Decompensation of an underlying weakness
    - Heterophoria, monocular neutralization, loss of stereoscopy
    - Bad AC/A ratio
    - (nobody is perfect !)
Accommodation / vergence

Modeling of the control of accommodation and convergence and their reciprocal interactions.
Vestibular initial problem +
  • Heterophoria +
    • Ametropia +
      • Intergration
    • is too much !!

central fatigue

= asthenopia
Treatment

- New rehabilitation device: PSP

Panoramic Stereoscopic Panel®
Aims of this exercise:

1. Intensify sensory conflicts to reorganize the priority of tasks during dynamic vision:
   1. Ensure central vision
   2. Ensure good accommodation
   3. Ensure fusion and stereoscopy
   4. Reduce sensibility to optic flow
2. Reduce neurovegetative reactions
3. Reduce visual-vestibular mismatch
Panoramic Stereoscopic Pannel
Specificities

• Visual frame
• Regularity of the stimulus
• Very merging
• High contrast
• Antireflection
• Parallel and backward of the horopter
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Stereoscopic induced effect
Why does it function?
Why does it function?

Because motion is very slow
Why does it function?

Because the role of attention is essential.
Voluntary fixation privileges parvocellular pathway.
- (N. Kanwisher, E. Wojciulik)
Why does it function?

Magnocellular route (dorsal)

Parvocellular route (ventral) +++
Why does it function?

Because optokinetic and vestibular reflexes are not conform and this combined interaction decreases the vestibular time constant

(Mingjia Dai, Ted Raphan, Bernard Cohen)
Why does it function?

Graph showing:
- Angular velocity
- Half-period of pendular motion with fixation task in the central part of the S.P.P.
- Apparent visual angular velocity
- Vestibular angular velocity
- Time axis
Why does it function?

Because fixation during optic flow combined with vestibular stimulations increases convergence and stereoscopy

(Alexandra Séverac Cauquil, Maxime Rosito and Simona Celebrini)
Very effective exercise

« All in one ! »

= 

« reset of the vestibulo-visual interaction »
Thank you for your attention