

Vestibular Asthenopia

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I declare no conflict of interest

Asthenopia ?

● Definition:

- Word from the ophthalmological terminology
- Set of subjective symptoms
 - Visual fatigue
 - Headaches
 - Blurred vision
 - Sensory discomfort
 - Dizziness
- Causes
 - Refractive
 - Muscular

Vestibular Asthenopia ?

◉ Why ?

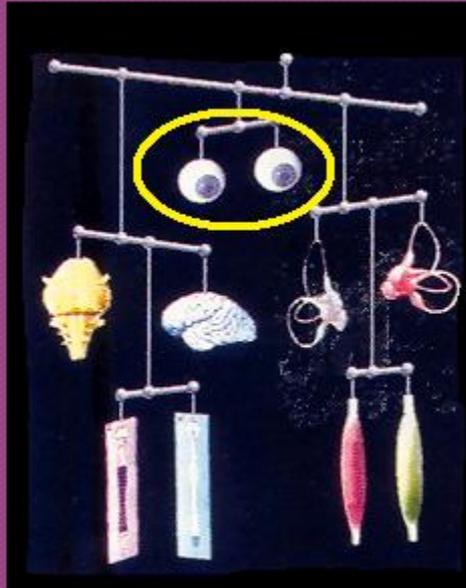
- Because most of our patients have complaints with visual connotation
- Because these complaints are really asthenopia
- Because we don't have (in french) other medical words to put on these symptoms
 - Vestibular asthenopia \neq vertigo

Vestibular Asthenopia ?

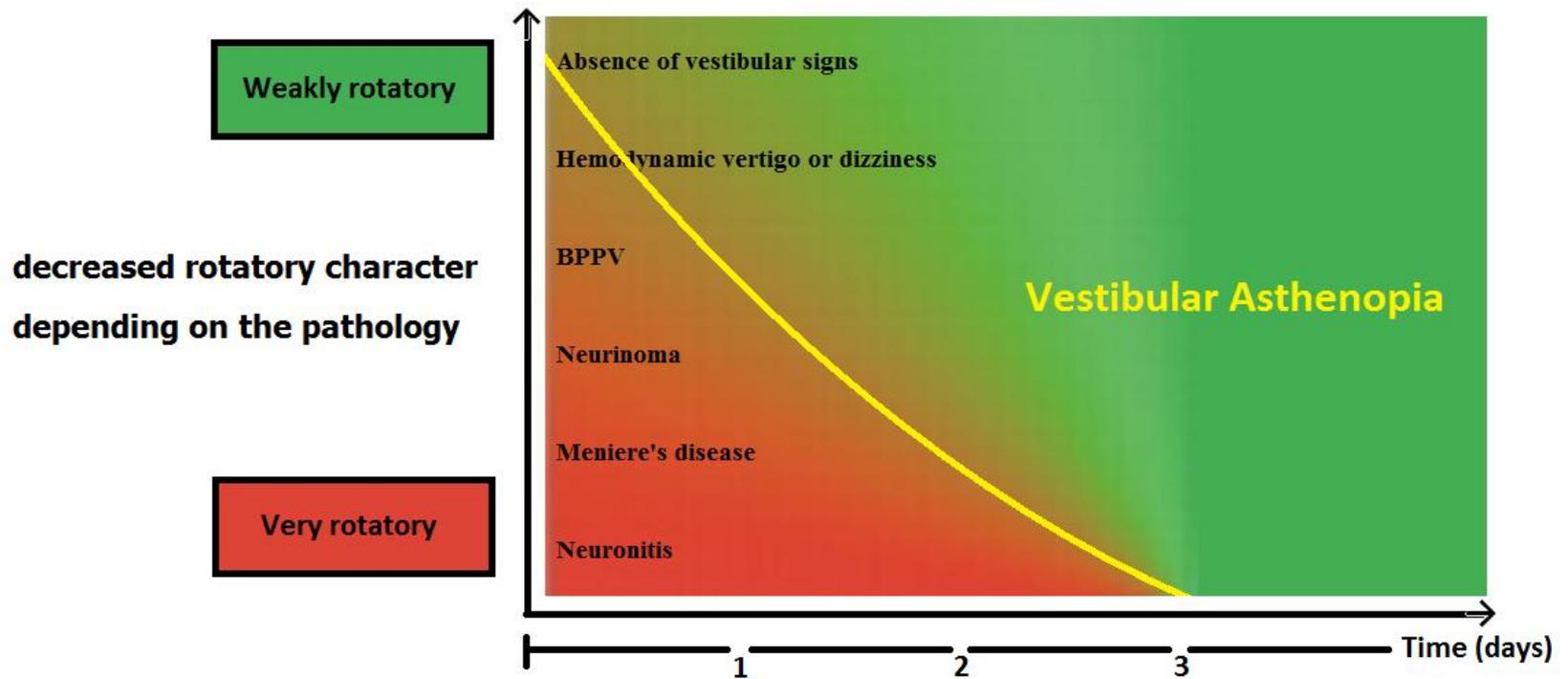
● What is it ?

- 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



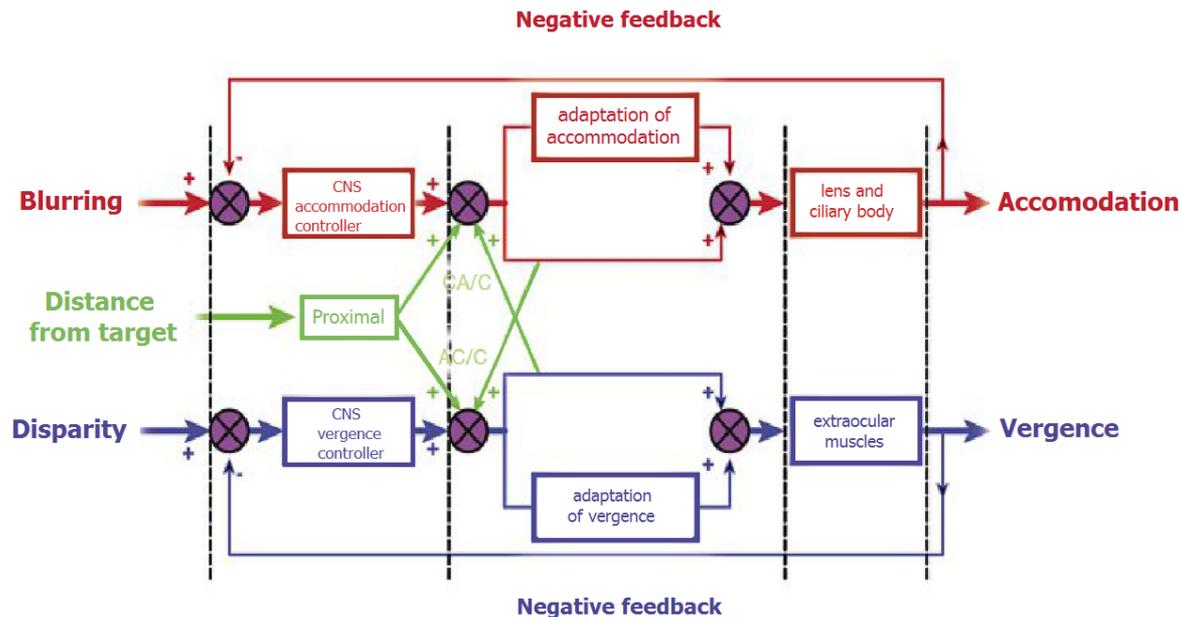
Vertigo \neq Vestibular asthenopia



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.

(reference: Roth A, Gomez A, P echereau A., 2007, redesigned by Brautaset R.L. and Jemmings J.A.M., 2004, and Semmlow J.L. and Hung G.K., 1981)

+ + + + +

○ Vestibular initial problem +

• Heterophoria +

• Ametropia +

• Intergration

• is too much !!



○  central fatigue

○ = asthenopia

Treatment

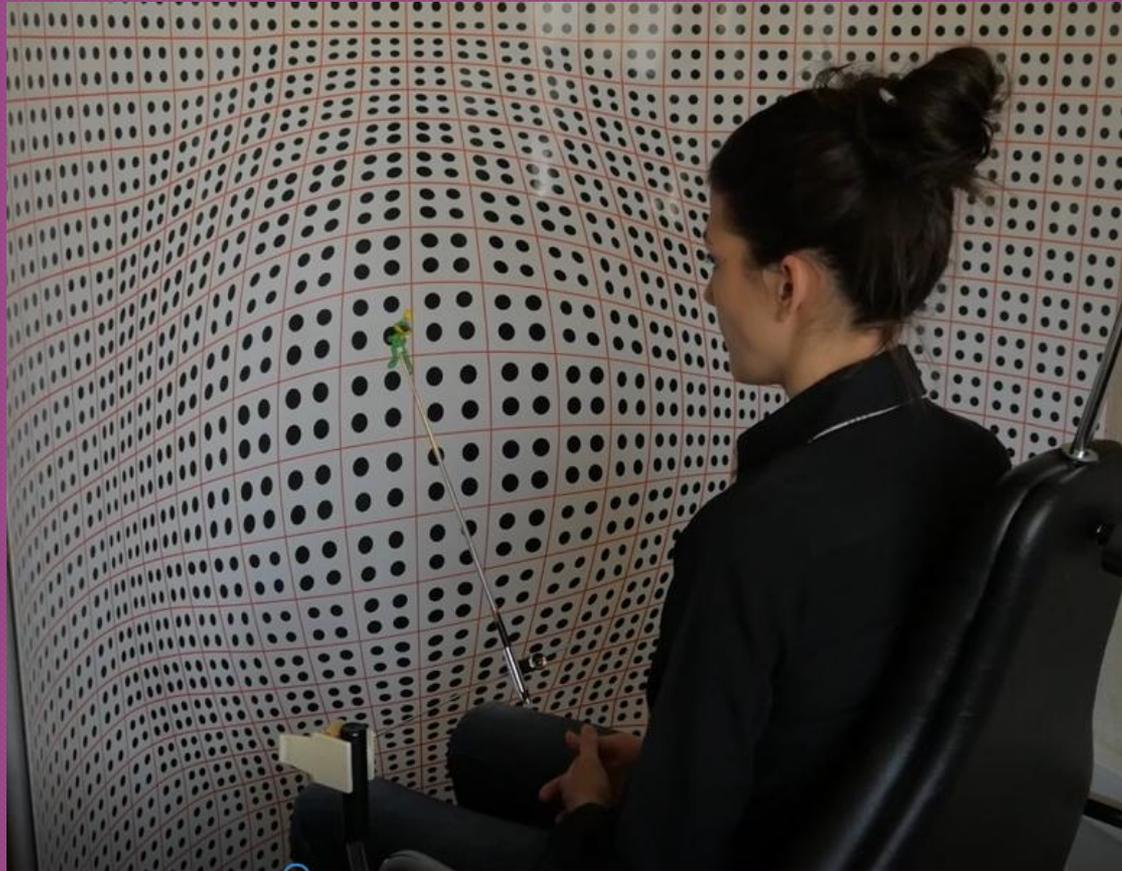
- New rehabilitation device: PSP

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

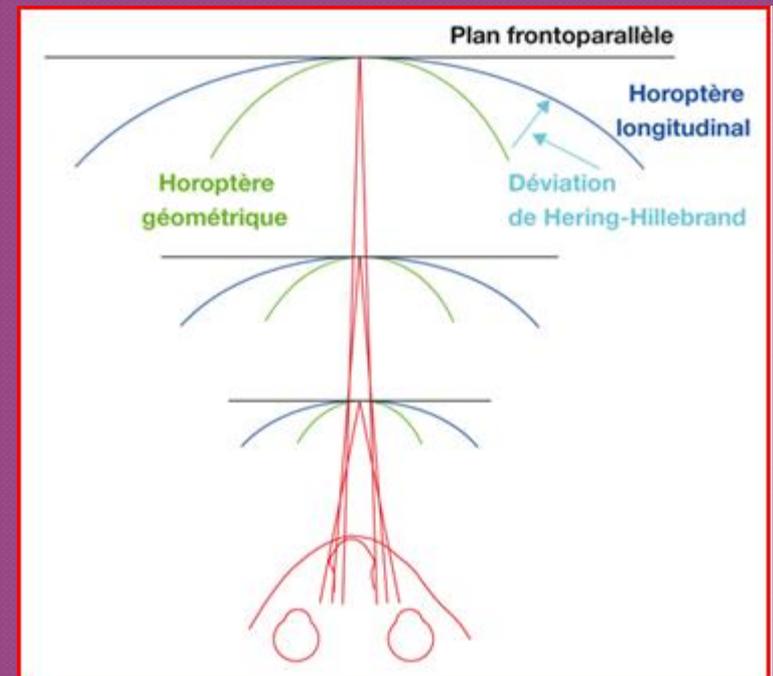
Panoramic Stereoscopic Panel



Panoramic Stereoscopic Pannel

○ Specificities

- Visual frame
- Regularity of the stimulus
- Very merging
- High contrast
- Antireflection
- Paralell and backward of the horopter



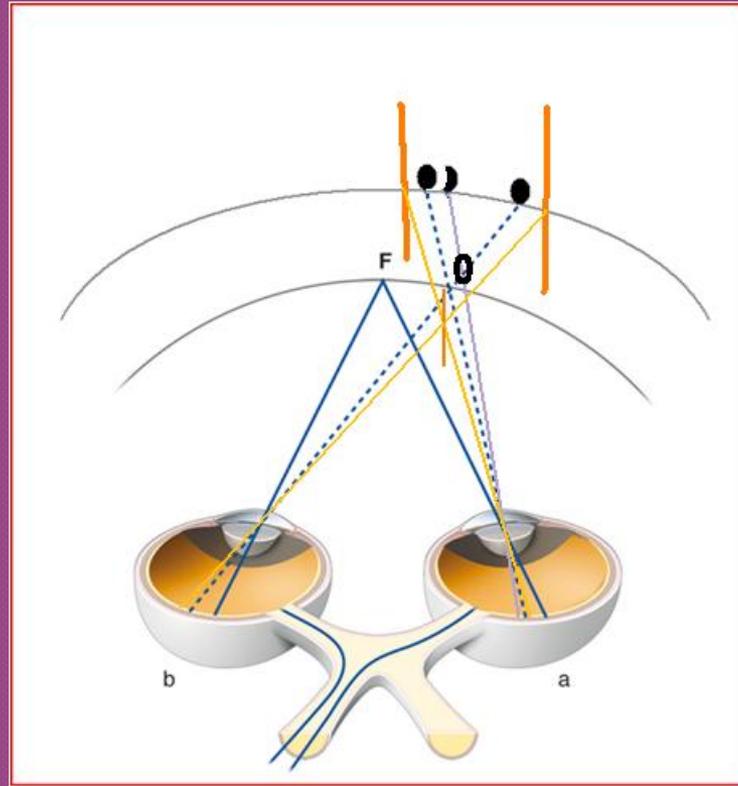
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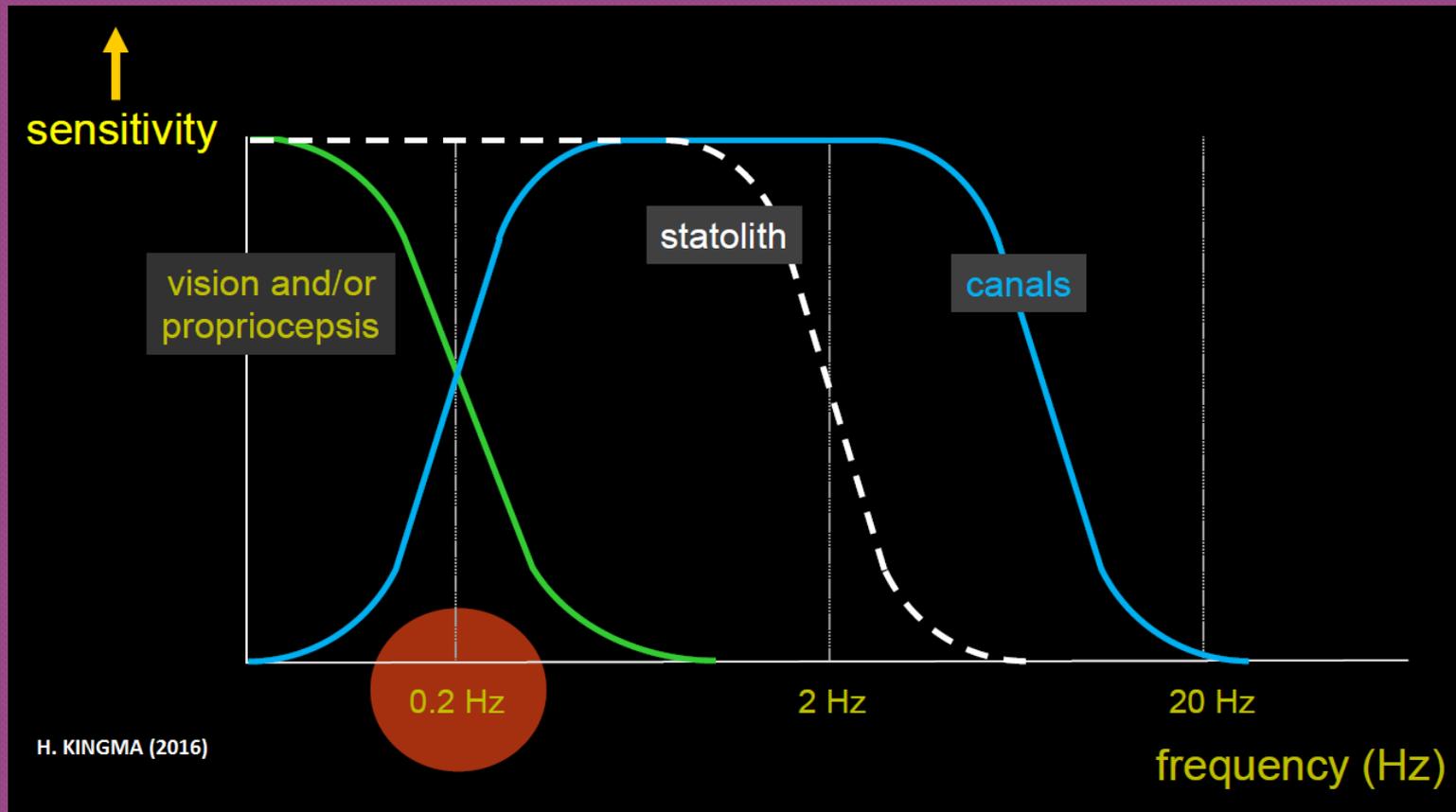
Stereoscopic induced effect



Why does it function ?

Why does it function ?

- Because motion is very slow

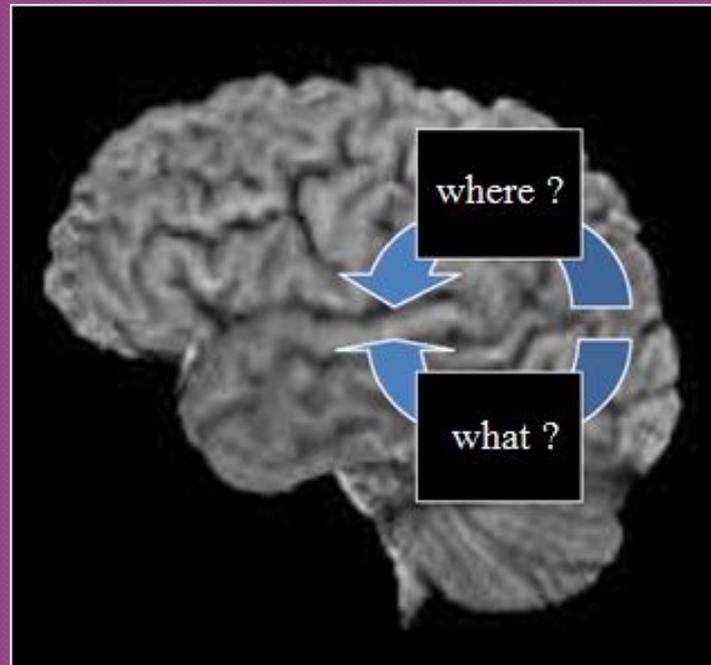


Why does it function ?

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

Why does it function ?

Magnocellular route (dorsal)

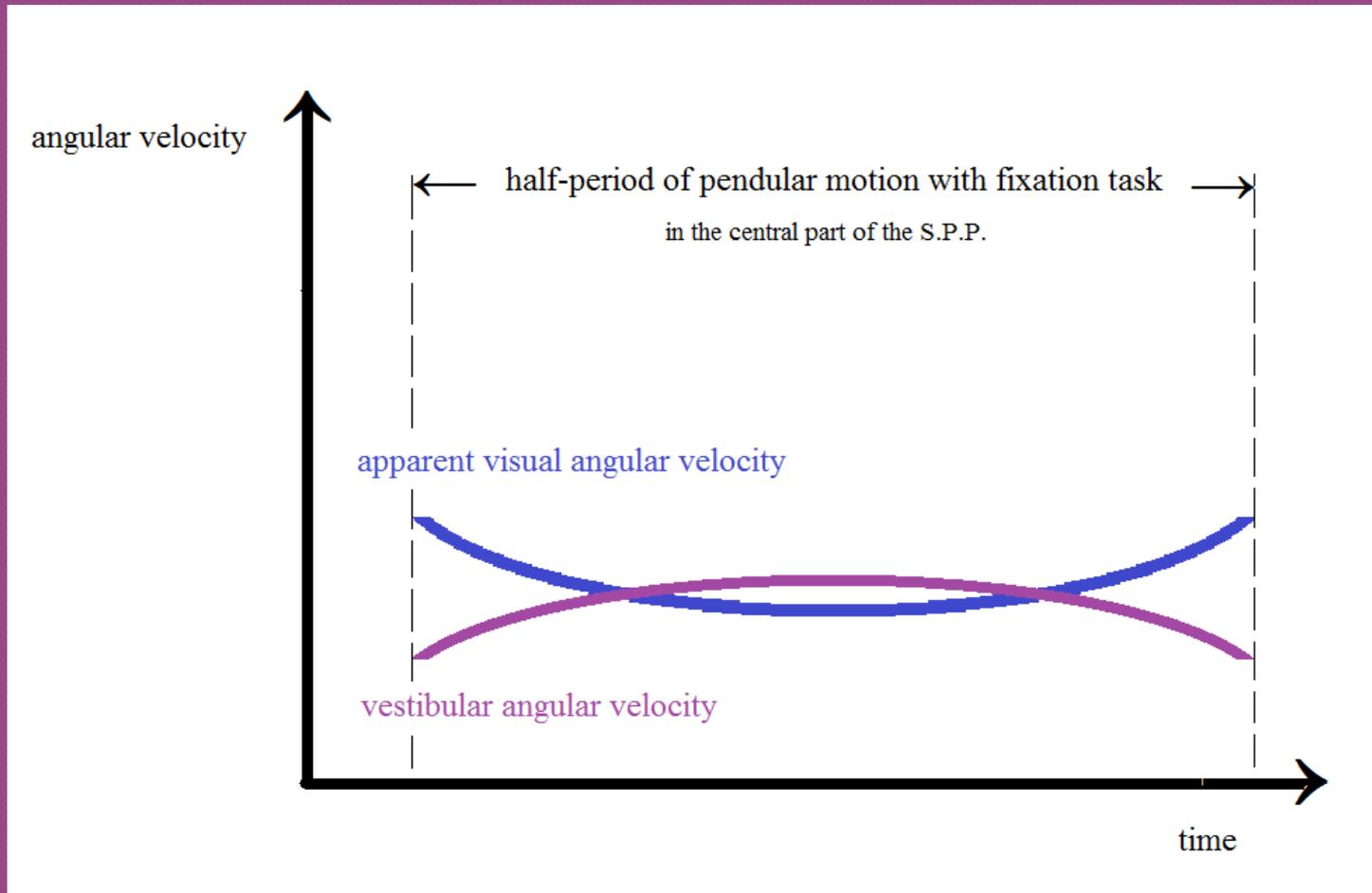


Parvocellular route (ventral) +++

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 ?



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

