ON and OFF Diplopia Principles

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Interactive Poll based questions with many examples of sensorimotor exams and how to understand and interact with patients with intermittent diplopia.

There will be multiple pictures of sensorimotor exams in order to depict these difficult principles in diplopia, showing how similar deviations in primary position, mean many types of ocular misalignments when you fill in the sensorimotor exam form with further measurements and why the optometrist is the most able healthcare professional to do this exam on a frequent basis.

ON and OFF diplopia Transient or Intermittent Binocular Diplopia

2 types of Diplopia :

- REAL on and off PSEUDO on and off
- On and OFF diplopia (binocular)

- Real ON and OFF Diplopia
    - Exam when the diplopia is NOT PRESENT
        i. NEGATIVE sensorimotor exam
            1. When Its Off It Is Really Off
            2. Pseudo On And Off Diplopia
    - Exam when the diplopia is NOT PRESENT
        i. POSITIVE sensorimotor exam, no provoking
        ii. YOU PROVOKE or PRECIPITATE the

Diplopia in the office

ON and OFF diplopia requires: Detective work

- History and Measurements - workup labs, images **&** Consideration of mischief in the following structures:
    - Brainstem
    - Subarachnoid
    - Cavernous,
    - Superior orbital fissure
    - Orbit
    - Neuromuscular junction

On and OFF diplopia (binocular)

- assuming 5 & better 9 gaze positions done via sensorimotor exam

Real ON and OFF Diplopia

- Patient complains of binocular diplopia
- Nothing on exam can explain this
- Provocation and precipitant maneuvers do not produce

Pseudo ON and OFF Diplopia

- Patient complains of binocular diplopia which may be related to
- Exam explains binocular diplopia in 2 ways:
- There is a MILD weakness or restriction of a muscle on exam
    - Example: Patient with weak lateral rectus on left only notices diplopia in left gaze or right head turn
        - Multiple examples of this and how to work-up
    - Provocation or Precipitant maneuvers induce misalignment
        - Alternate cover testing for 20 seconds to uncover a large phoria showing a fusion problem resulting in on or off
        - Maintaining a gaze eccentrically for some time to fatigue a muscle- as in M.G., or induces Neuromyotonia or SOM
        - Changing the viewing eye – as in fixation switch diplopia d. Changing gaze from far to near or near to far (CI or DI or adduction or abduction problem)

ON and OFF Diplopias real vs Pseudo above list is not a complete list and not in order of most common

- Will give multiple poll questions and answers to them via examples of sensorimotor exams pre and post the precipitating event
    - eg. 2 A-2 D to show these important concepts
- REAL On and off Diplopia is perplexing and may be concerning dependent on the history and accompanying features
- Myasthenia is a definite possibility
- One needs to remember about VBI and could this be a TIA. It is unusual for VBI TIAS to be pure diplopia but it does happen and that is a medical urgency.

How a Myastenic patient might present in regard to: REAL VS PSEUDO THIS CONTEXT

- A myasthenic complains about the following to Eye-Care doctors:
    - Diplopia alone - often on and off but CAN be constant
    - Ptosis alone – often on and off but CAN be constant
    - Diplopia + Ptosis – often on and off but CAN be constant

On and OFF diplopia in M.G. can be Real or Pseudo

- Real when no deviation exists on exam or precipitate
- Pseudo when a deviation happens as follows:
- It can be due to a patient with CONSTANT DIPLOPIA but only observes it under a particular position,
    - Example: Like a pseudo left sixth nerve palsy (not due to sixth nerve problem but due to neuromuscular junction problem),
    - Example: A small amplitude abduction defect, may only be observed in left gaze, so the diplopia is always there, but the patient observes only in L gaze
    - The patient has a primary position phoria due to partial weakness, where fusion breaks intermittently.
    - The patient has a weakness that is PRECIPITATED by prolonged gaze in one position. Like if there was no ET in left gaze, but after prolonged left gaze there is and ET in left gaze, there is therefore a precipitant causing the diplopia (fatiguing the eye in left gaze)
- THE EXAM CAN BE ABNORMAL while not having diplopia Phoria, that you are able to break down during exam

Tropia in a particular position of gaze

What Are the Causes of Pseudo On and Off diplopia related to a subtle weakness in one position?

- Two flavors
- A Phoria breaks down and that phoria may be associated with:
  - benign nonparalytic strabismus
  - paralytic/restrictive strabismus
- These you will find at exam time
- The disorder is truly intermittent like MG or neuromyotonia and your strategy is to precipitate an occurrence in office. Or more worrisome this was a TIA. And here you will NOT find abnormality on exam, unless you precipitate it by your exam skills

ON and OFF DIPLOPIAS with PERSISTENT MISALIGNMENT may not mean persistent diplopia as in:

- Those cases where the patient is not aware that there is a persistent problem which is gaze dependent.
- Those cases that the patient does not have diplopia now because they are phoric and controlling their deviation.

Pseudo On and Off Diplopia in patient with misalignment at the time of visit

- EASY ONES
  - Obvious CN III,IV or VI
- HARD ONES
  - A funny finding in the case you thought was obvious (this may not be found if not looked for)
  - Subtle deviations horizontal/vertical
  - No definite CN patterns
  - phoric and tropic component give you inconsistent readings
  - requires significant measurement so one can be sure on follow-up visits there is or isn't change.

(This is not a complete list and not in order of most common)

PLEASE measure your patients because you are only one of a few healthcare professionals that knows how to do this !