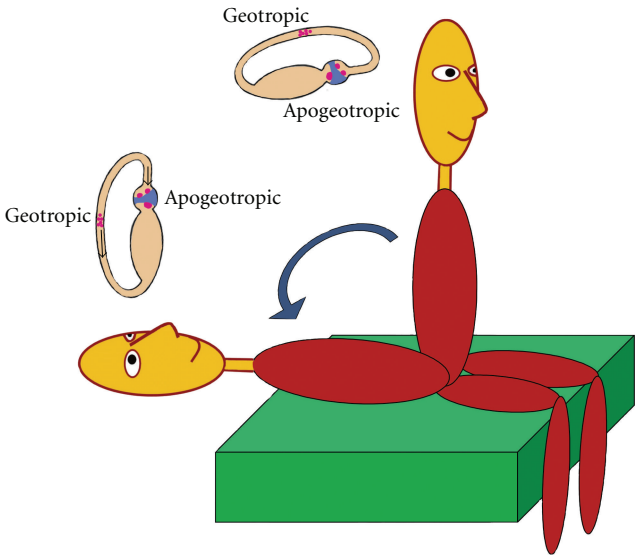

Figure 10: When the patient with horizontal canal BPPV is quickly brought from the sitting to the supine position, a mild horizontal nystagmus may appear, attributed either to ampullofugal movement of otoconia in the horizontal canal (geotropic type), triggering nystagmus toward the unaffected ear, or in cases of cupulolithiasis (apogeotropic type) to ampullopetal deflection of the cupula, resulting in nystagmus directed toward the affected ear.

responsiveness to treatment is not helpful in this case. There is not established therapeutic maneuver for treatment of the anterior canal BPPV, and both standard Epley and reverse Epley maneuvers have been used, as well as various specifically designed maneuvers [36, 37]. To conclude, although the entity of bilateral anterior BPPV has been previously reported [4, 22], any details concerning its diagnosis and treatment are missing. We believe that this diagnosis is presently highly hypothetical.

9. Horizontal and Posterior Canal BPPV

This is the most common case of mixed canal BPPV [37–39]. The involved canals may be either on the same side or on both sides. Diagnosis may be easily obtained, considering the features of the nystagmus on either maneuver. Mixed torsional geotropic-vertical upbeating nystagmus in Dix-Hallpike maneuvers reveals involvement of the posterior canal. Additionally, geotropic or apogeotropic horizontal nystagmus during the supine roll test will be evidence of horizontal canal BPPV. In most mixed cases, the horizontal nystagmus is geotropic due to canalolithiasis, although cupulolithiasis has been occasionally reported [40]. It should be noticed, however, that during the Dix-Hallpike tests, the horizontal canal is also, at least, partially stimulated, and a horizontal component of nystagmus may be evident in conjunction with the torsional-upbeating nystagmus of posterior canal origin [41]. Additionally, it has been shown that horizontal nystagmus, provoked during the supine roll test, exhibits also a vertical and a torsional component [42].

10. Horizontal and Anterior Canal BPPV

Occurrence of this combination is quite unusual, due to rare involvement of the anterior canal. Diagnosis of horizontal canal involvement is evident, according to previously described characteristics of the nystagmus. Anterior canal BPPV may be also diagnosed from the experienced clinician, as already described. The main feature for differential diagnosis from the posterior canal BPPV is the downbeating vertical component of the nystagmus. Additionally, the direction of the torsional component will show if either the ipsilateral or the contralateral canal is involved.

11. Posterior and Anterior Canal BPPV

This combination has also been reported [4, 22], but its diagnosis presents difficulties. Two categories of involvement should be distinguished, on the same side and on different sides.

(i) If the involved posterior and anterior canals are on the same side, then Dix-Hallpike on this side would cause theoretically (1) a torsional component with the upper eye pole moving geotropically and a vertical upbeating component, due to posterior canal disease; (2) a torsional component with the same direction and a vertical downbeating component, due to anterior canal disease. The net result would be only a strong torsional component, because the two torsional components would be added and the two vertical components would be cancelled, as having opposite directions. Dix-Hallpike on the nonaffected ear would cause a torsional component with the upper eye pole moving apogeotropically and a vertical downbeating component, due to anterior canal disease, as previously discussed.

(ii) If the involved posterior and anterior canals are on different sides, then Dix-Hallpike on the side where the posterior canal is involved, theoretically would cause (1) a torsional component with the upper eye pole moving geotropically and a vertical upbeating component, due to posterior canal disease; (2) a torsional component with opposite direction and a vertical downbeating component, due to anterior canal disease of the contralateral side. The net result will be absence of nystagmus, due to vectorial subtraction of the partial components. However, some asymmetry of canal involvement may manifest as mild nystagmus, either torsional, or vertical, or mixed, depending on the intensity of the partial components. Dix-Hallpike on the side of the involved anterior canal would cause a mixed nystagmus, with a torsional component with the upper eye pole moving geotropically and a vertical downbeating component, due to ipsilateral anterior canal disease.

From what has been mentioned above, it is understandable why mixed posterior-anterior canal is so difficult to be diagnosed with certainty. In case of suspicion, separate