The Dix-Hallpike Test

Description

The Dix-Hallpike Test (DHT) is considered the gold standard assessment for the diagnosis of the vestibular disorder Benign Paroxysmal Positional Vertigo (BPPV). BPPV is described as a ‘spinning’ sensation caused by head movement that typically lasts for 15 seconds and may be accompanied by nausea. Individuals classically describe these symptoms when turning over in bed but they may also occur when bending down or looking up (Noda et al 2011). BPPV occurs when free-floating debris enters one of the semicircular canals causing the endolymph to become gravity sensitive resulting in abnormal displacement of the cupula and consequential neural firing (Brandt & Steddin 1993). BPPV may be associated with head injuries and various inner ear problems, however in many cases the cause is idiopathic, occurring at any age but most commonly between 50 and 70 years (Hornibrook 2011). The DHT should be used following a subjective assessment to confirm a diagnosis of BPPV.

The DHT (Dix & Hallpike 1952) consists of a series of head movements conducted in order to stimulate the movement of the debris in the posterior semicircular canal which is responsible for symptoms in 90% of cases (Stavros et al 2002). The test can be carried out by any healthcare professional with knowledge of the vestibular system. The patient starts in a sitting position and their head is turned 45° towards the side to be tested. The assessor then assists them to lie down quickly and extends their neck 20° over the end of the plinth, maintaining 45° rotation. The assessor should be able to see the patient’s eyes and should observe for nystagmus.

A positive response is elicited if rotational nystagmus is noted. The nystagmus will have a delayed onset of approximately 1–2 seconds following movement and it should subside after 10–20 seconds (Furman & Cass 1999). The direction of nystagmus will reverse on returning to a seated position and it will fatigue on repeated testing.

If the test has a negative outcome it is advised to re-test on a subsequent visit to avoid a false-negative result as the accuracy of the test may be affected by the speed of the movement and the angle of the head. This maybe particularly apparent if the individual is resistant to movement due to the anticipation of vertigo and nausea. If an individual’s history is consistent with BPPV and the DHT is negative, the Supine Roll Test should be performed to investigate the involvement of the horizontal semicircular canal (Bhattacharyya et al 2008). This may be the cause in 8% of BPPV cases (Stavros et al 2002).

Belafsky et al (2005) suggest that the DHT is highly specific; however, its sensitivity is unknown.

Commentary

An Australian study of 2751 participants found that individuals with vestibular-dizziness reported notably higher emotional and functional scores, as assessed by the Dizziness Handicap Inventory compared to non-vestibular participants. The authors concluded that vestibular vertigo contributes to increased emotional distress and activity limitation therefore reducing quality of life for these individuals (Gopinath et al 2009).

As the DHT requires a good range of movement it may not be suitable for use on individuals with certain neck pathologies. Absolute contra-indications include cervical instability, cervical disc prolapse, acute neck trauma and circulatory problems like VBI and carotid sinus syncope. However the challenge for the clinician is to determine what constitutes a relative contra-indication in each case. Humphriss et al (2003) suggest a brief assessment of neck movements into rotation and extension and seeing if the position can be comfortably maintained for 30 seconds before conducting the DHT. If neck movement is limited or painful, the Side Lying Test may be a suitable alternative (Humphriss et al 2003).

The benefit of the DHT is that it is a simple assessment that can be conducted in a few minutes with minimal equipment and will definitively determine the presence of BPPV. Following a positive response, BPPV may be treated with the Epley Manoeuvre which, in most cases, provides instantaneous relief from BPPV symptoms and their associated impact on an individual’s life (Von Brevern et al 2003).

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References

Active Straight Leg Raise (ASLR) is a functional test that is primarily used to diagnose pregnancy-related posterior pelvic pain (PPPP). The test is based on the observation that an immediate improvement in pain and the ability to lift the leg can often be provided for women with PPPP by pushing the hips together with hands (Mens et al. 1999).

ASLR is performed in a relaxed supine position with legs straight and feet apart. Patients are instructed to raise their legs 5–20 cm above the bench, one after the other, without bending the knee and without pelvic movement relative to the trunk. A score is provided for each leg on a six-point Likert scale (0 = not difficult at all, 1 = minimally difficult, 2 = somewhat difficult, 3 = fairly difficult, 4 = very difficult, 5 = unable to do). The scores are added to give a total score out of 10. The clinician observes any compensatory motor strategies such as altered breathing patterns, pelvic tilt/rotation during the test. The test is repeated with manual compression applied through the ilia or with a pelvic belt tightened around the pelvis. The ASLR test is positive if the scores improve with pelvic compression; normalised motor control and breathing patterns can also be observed (O’Sullivan et al. 2002). Changes in pain and ability are believed to result from the reinforcement of the force closure mechanism.

The ASLR provides information about the ability of load transfer and motor control strategies in the lumbo/pelvic/hip complex. The diagnostic value of ASLR has been investigated in different patient groups such as non-specific LBP (Roussel et al. 2007) and adduction-related groin pain (Cowan et al. 2004 and Mens et al. 2006a).

Reliability and validity: ASLR in PPPP has high test-retest reliability (eg, r = 0.87 and ICC = 0.83) and sensitivity and specificity for diagnosing PPPP (0.87 and 0.94) (Mens et al. 2001). ASLR has also been found to have a higher sensitivity than the posterior pelvic pain provocation test. Damen et al. (2001) reported that the sensitivity of the ASLR test was 58% and specificity was 97% in a group of women with moderate to severe (VAS > 3) pregnancy-related pelvic girdle pain. In chronic non-specific low back pain, Roussel et al (2007) found the test-retest reliability of ASLR > 0.70. The same study also showed low inter-observer reliability for the assessment of breathing pattern during ASLR.

Commentary

ASLR is a simple to use, reliable, and valid test to diagnose PPPP. It has been recommended for this purpose by the European Guidelines on the Diagnosis and Treatment of Pelvic Girdle Pain (Vleeming et al. 2008). ASLR can also assist the assessment of musculoskeletal disorders in the pelvic girdle and in adduction-related groin pain. Research is improving our understanding of the normal and aberrant motor control mechanisms of ASLR and the effects of pelvic compression on the test. For example O’Sullivan et al. (2002) showed that compressing the pelvis manually can normalise the motor control (reduced descent pelvic floor) and respiration patterns of patients with impaired ASLR. It has also been shown that wearing a pelvic belt improves the force closure of the pelvic girdle that is normally provided by transversus and obliquus internus abdominis (Hu et al. 2010). Doppler imaging of vibrations has been used to demonstrate that the pelvic belt can significantly reduce the sacroiliac joint laxity, at the level of ASIS or pubic symphysis, and improve the performance of ASLR (Mens et al. 2006b).

The ASLR is equivocal as a predictor of future pain and disability of pregnancy-related pelvic girdle pain. More research is also required to investigate the role of ASLR in different patient groups with lumbo/pelvic/hip complex disorders as the clinimetrics in these patient groups are typically poorer than in PPPP.

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References