The Neer sign and Hawkins-Kennedy test for shoulder impingement

Description
Two clinical diagnostic tests that take little time to undertake and are commonly performed by primary practitioners dealing with shoulder subacromial impingement are the Neer sign (Neer 1983) and Hawkins-Kennedy test (Hawkins and Kennedy 1980).

Requirements for testing: The Neer sign constitutes the first part of the Neer injection impingement test where one hand stabilises the patient's scapula while the other hand raises the arm into full flexion (Neer 1983). This was thought to cause the greater tuberosity to impinge against the anterior acromion, damaging the rotator cuff tendons, long head of biceps, and the subacromial bursa, with a positive test indicated by pain (Neer 1983). The second part of the test involved a subsequent xylocaine injection to reduce the pain and thereby differentiate impingement lesions from other causes of shoulder pain (Neer 1983).

The Hawkins-Kennedy test involves flexing the shoulder to 90° then forcibly internally rotating it (Hawkins and Kennedy 1980), although gentle internal rotation has also been suggested (Park et al 2005). A positive sign involves reproducing the pain of impingement (Hawkins and Kennedy 1980). It was originally suggested that the pathoanatomy of this clinical test involved driving the greater tuberosity under the coracoacromial ligament (Hawkins and Kennedy 1980). Hawkins and Kennedy (1980) noted that their impingement test was less reliable than the Neer impingement sign.

Diagnostic accuracy: The Hawkins-Kennedy test has derived negative likelihood ratios between 0.00 and 0.88 and positive likelihood ratios between 1.14 and 2.12 in seven evaluations across three studies (Hughes et al 2008). The Neer sign has derived negative likelihood ratios between 0.31 and 0.93 and positive likelihood ratios between 1.03 and 2.31 in seven evaluations across three studies (Hughes et al 2008).

Two studies investigated the combination of the Hawkins-Kennedy test or the Neer sign for subacromial impingement (Hughes et al 2008). These studies derived negative likelihood ratios to this combination of clinical tests between 0.16 to 0.95 and positive likelihood ratios between 1.04 and 2.81. One study investigated the Hawkins-Kennedy test and the Neer sign in combination to derive negative likelihood ratios between 0.12 and 0.75 and positive likelihood ratios between 1.35 and 2.63 (Ardic et al 2006).

Commentary
Recent evidence suggests the pathoaetiology of shoulder impingement involves a pre-existing dysfunctional rotator cuff causing superior humeral head migration in shoulder elevation that causes damage to the subacromial structures (Lewis 2010).

A recent cadaver study has highlighted that the Hawkins-Kennedy test is less likely to involve the greater tuberosity and causes most compression anterior to the supraspinatus tendon at the rotator interval, while the Neer sign might involve supraspinatus with internal rotation but might involve subscapularis with external rotation (Hughes et al 2011). This study suggested that the position that most compressed the supraspinatus tendon was internal rotation in abduction.

These shoulder impingement tests take little time and are easy to perform; however, if they do not inform clinical reasoning, that is they are not useful in diagnosing impingement, then their continued use must be questioned. Future research needs to seek a valid anatomical basis for impingement testing.

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References