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Overview of Elbow Orthopedic Special Tests

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As detailed in the previous column, another upper extremity area receiving a lot of attention regarding sports, recreational, and industrial injuries is the elbow complex (Scuderi, McCann, & Bruno, 1997). Whereas the previous column outlined the elbow injuries most commonly seen, this column will discuss some of the more common special orthopedic tests involved in attempting to more accurately assess elbow injuries. As previously described, special tests are a component of the overall musculoskeletal examination and are divided into diagnostic categories. Keep in mind that the selection and use of these tests should be focused and thorough and is based on the overall clinical impression, history, and findings from the rest of the physical examination (Dutton, 2008). As a reminder, the following order is often used for the assessment:

> Patient history → Observation → Examination of movement → Reflexes and cutaneous distribution → Special tests → Palpation

Also, please be aware of the fact that one special test alone is generally not sensitive and specific enough as the sole determinant; several special tests may be needed within a category to verify findings. What follows is an overview of common special tests within the different diagnostic categories for the elbow complex along with a brief description of each test and what determines whether or not the test is positive.

Special Tests

As previously described, special tests are a component of the musculoskeletal assessment used to help confirm findings during the examination. Given the numerous tests available, it may be easier to follow if the tests are categorically presented. Below are just some of the special tests commonly performed on the elbow listed by category and test (Magee, 2006). A brief description of each test will follow by category (see Table 1).

Instability

The following tests are designed to test for valgus and varus instabilities of the elbow (Brotzman & Wilk, 2003; Magee, 2006). Valgus force is resisted primarily by the ulnar collateral ligament, whereas resistance to varus force is primarily provided by the radial collateral ligament.

Table 1. Common Special Tests by Diagnostic Category

Category	Special Test
Instability	Ligamentous valgus/varus instability tests
Lateral epicondylitis	Cozen's test, Mill's test
Medial epicondylitis	Medial epicondylitis test
Neurologic dysfunction	Tinel's sign, Wartenberg's sign, Elbow flexion test, Pronator teres syndrome, Pinch grip test

Ligamentous valgus instability test. With the elbow slightly flexed, the patient's arm is stabilized with one of the examiner's hands laterally at the elbow joint (grasping the elbow underneath), while the other hand is placed proximal to the patient's wrist. The examiner then places an abduction or valgus force across the medial side of the elbow while the ulnar collateral ligament is palpated (with the fingers of the hand underneath). It has been recommended to place the arm in a fully laterally rotated position. Normally, the examiner feels the ligament tense when the test is applied. Laxity, decreased mobility, or pain is compared with the uninvolved elbow (Magee, 2006). Increased laxity may be indicative of a 1°, 2°, or 3° sprain.

Ligamentous varus instability test. With the elbow slightly flexed and stabilized with the examiner's hand medially at the elbow joint (grasping the elbow underneath), the other hand is placed proximal to the patient's wrist. The examiner then places an adduction or varus force across the lateral side of the elbow while the radial collateral ligament is palpated (with the fingers of the hand underneath). As with the valgus stress test, normally, the examiner feels the ligament tense when the test is applied. Laxity, decreased mobility, or pain

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is compared with the uninvolved elbow with increased laxity, perhaps indicating a potential sprain (Magee, 2006).

Lateral Epicondylitis

Chronic overuse injury to the extensor tendons may result in lateral epicondylitis (tennis elbow; Magee, 2006). The most commonly involved structure is the extensor carpi radialis brevis tendon, with the most involved site being the teno-periosteal insertion at the lateral epicondyle (Placzek & Boyce, 2006). Because the tendons attaching to the periosteum tend to heal very slowly, repeated microtrauma often leads to tendonitis or disruption and/or degeneration of the tendon (tendonosis).

Cozen's test. With one hand the examiner's thumb rests on the patient's lateral epicondyle while stabilizing the elbow. The patient then makes a fist, pronates the forearm, and radially deviates and extends the wrist, after which the examiner resists the motion. Pain in the lateral epicondyle is a positive sign.

Mill's test. In standing or sitting, the examiner palpates the lateral epicondyle with one hand and passively pronates the patient's forearm while extending the elbow and flexing the wrist with the other hand. A positive test will elicit pain over the lateral epicondyle.

Medial Epicondylitis

Chronic overuse injury to the flexor and pronator tendons may result in medial epicondylitis (golfer's elbow or medial tennis elbow; Magee, 2006). It is usually an overuse injury resulting from repetitive valgus stress on the medial elbow combined with wrist flexion and pronation with subsequent point tenderness emanating from the medial epicondyle (Placzek & Boyce, 2006).

Medial epicondylitis test. The examiner palpates the medial epicondyle with one hand while the forearm is passively supinated and the elbow and wrist passively extended with the other. Pain in the medial epicondyle is a positive sign (Magee, 2006).

Tests for Neurologic Dysfunction

Tinel's sign (at the elbow). With the elbow extended, the examiner taps the ulnar nerve in the groove between the olecranon process and the medial epicondyle. A tingling sensation in the ulnar distribution of the forearm is a positive sign and indicates the area of sensory fiber regeneration of a nerve (Magee, 2006).

Wartenberg's sign. The patient is in a seated position with the hands resting palm down on the table. The examiner then passively spreads the fingers apart and asks the patient to bring them back together again. A positive test occurs when the patient is unable to squeeze the little finger to the remainder of the hand and is indicative of ulnar pathology (Magee, 2006).

Elbow flexion test. In a standing position with arms at the side, the patient is asked to fully flex the elbows in the frontal plane with the wrist extended and the shoulders depressed for 3 to 5 minutes. Tingling or paresthesia in the ulnar distribution of the forearm and hand is a positive sign and indicates the presence of a cubital tunnel syndrome (Magee, 2006).

Test for pronator teres syndrome. Pronator teres syndrome refers to compression of the median nerve between the tow heads of the pronator teres muscle in the forearm (Placzek & Boyce, 2006). As such, patients with this syndrome will often complain of increased pain with resisted pronation. For this test, the patient sits with the elbow flexed to 90°. The examiner then strongly resists pronation as the elbow is extended. Pain may be noted on palpation of the pronator teres area. Weakness, tingling, and paresthesia in the median nerve distribution of the forearm and hand is considered a positive test (Magee, 2006; Placzek & Boyce, 2006).

Pinch grip test. The anterior interosseous nerve is an independent branch of the median nerve and may be compressed below the level of the pronator teres muscle. Patients with anterior interosseous nerve syndrome will show weakness only in the muscles innervated by this nerve. These muscles are the pronator quadratus, the flexor pollicis longus, and the lateral half of the flexor digitorum profundus. This is a motor only nerve branch and therefore no sensory changes will be observed. For this test, the patient pinches the tips of the index finger and thumb together (the OK sign). If the patient is unable to form a tip-to-tip pinch and instead displays a pulp-to-pulp pinch, then this is a positive sign for pathology to the anterior interosseous nerve and is usually indicative of a nerve entrapment (Magee, 2006; Placzek & Boyce, 2006).

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Bio

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