

[IMAGE]

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What Is the "End Feel"?

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Some of the most valuable assessment information is derived from relatively simple procedures such as passive range-of-motion tests. While many massage practitioners have been exposed to the fundamental concepts of active and passive range-of-motion testing, most have not learned how to use this information effectively in a clinical environment.

In this article, we will focus particular attention on the "end feel" that is evaluated during passive range-of-motion testing. Valuable information can be derived from thorough examination of the end feel.

To perform a passive movement evaluation, the practitioner instructs the client to relax as much as possible preceding the movement. It is important to have the greatest degree of muscular relaxation prior to beginning the movement, to improve the accuracy of the evaluation and eliminate muscular effort as the cause of any pain that is felt.

One of the most important factors to investigate with passive range-of-motion testing is the end feel. The end feel is the quality of movement perceived by the practitioner at the very end of the available range of motion. The end feel can reveal a great deal about the nature of various pathologies. James Cyriax, the British orthopedic physician who developed one of the most commonly used systems for physical examination, specified six different end feels when he first described them in his writings.¹

Bone to bone - This is the sensation when motion is stopped by two bones contacting one another. An example is the end feel for extension of the elbow.

Muscle spasm - When muscles are in spasm, they may abruptly halt motion prior to what should be the normal range of motion. It is likely that pain will be felt at the end of this range, because the muscle in spasm will be stretched.

Capsular - This is the end feel described for range of motion limited at the end by the joint capsule. The sensation often described is a "leathery" feel to the end of the motion, such as in external rotation of the

shoulder. A true capsular end feel occurs when the joint capsule is the primary limitation to the end range of motion. Some authors have called this end feel the "tissue stretch" end feel and extended it to other tissues, such as muscles, that may stretch normally at the end of their range of motion. An example of the tissue stretch with muscles would be hip flexion with the knee held in extension, in which motion is stopped by the hamstrings.

Springy block - This end feel is the sensation of motion stopping short of where it should, accompanied by a rubbery or springy sensation at the end. It occurs most often in joints in which a piece of loose cartilage (like the meniscus in the knee) may be blocking full motion and causing the limbs to "bounce back" a bit.

Tissue approximation - This is the end feel in which motion is stopped by two masses of soft tissue pressing on one another. An example is in flexion of the elbow, in which the elbow flexors and wrist flexors press on each other to limit further motion.

Empty - This end feel has no mechanical limitation to the end of the range, but the client will not let you go any farther because of excessive pain. An example would be in shoulder impingement, in which pain from the supraspinatus tendon being compressed will limit how far the arm can be abducted. Mechanically there is no further restriction, but the pain will prevent the individual from allowing further motion.

The end feel for a particular joint may be the joint's normal end feel, or it may be pathological in nature. For example, in elbow extension, the normal end feel would be bone to bone as the olecranon process contacts the posterior aspect of the *olecranon fossa*. If you were performing a passive range-of-motion evaluation with your client and you got a tissue stretch end feel for the elbow in extension, it would most likely indicate some form of restricted range of motion that should be treated.

On the other hand, if you were evaluating medial rotation of the shoulder, you would expect a tissue stretch end feel, and that would be normal for medial rotation. If you performed medial rotation and got a bone-to-bone end feel, it would be abnormal for that joint and would certainly indicate a more serious joint pathology requiring evaluation by another health professional.

Passive range-of-motion evaluation can provide a great deal more information than just how far an individual can move his/her joint. When you know what kind of end feel should be apparent with each joint, you can effectively evaluate and analyze pathological limitations to motion.

Reference

1. Cyriax J. *Textbook of Orthopaedic Medicine, Volume One: Diagnosis of Soft Tissue Lesions*, 8th ed. London: Bailliere Tindall, 1982.
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