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Practice Forum

Dynamic loading posture of the thumb: The Colditz Tear Test

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ABSTRACT

The movement patterns one sees when loads placed on a joint are incrementally increased provides valuable insight as to how a joint functions during different everyday activities. This author describes a simple, yet effective method of assessing the thumb carpometacarpal joint as load demands increase. It may be used as an evaluative tool or as an adjunct to treatment – Victoria Priganc, PhD, OTR, CHT, CLT, Practice Forum Editor.

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Recent data about the mechanoreceptor innervation of ligaments^{1–5} suggests a greater role for neuromuscular training to alter the course of thumb carpometacarpal (CMC) joint osteoarthritis (OA). To establish precise goals for the neuromuscular training, a mechanism for identifying the loaded posture of the thumb is needed.

When patients demonstrate a fingertip pinch pattern upon request, this conscious effort often produces a seemingly ideal balance which is often not the same pattern seen under load. A simple piece of paper is all that is needed to demonstrate the actual dynamic load posture:

1. Patient is seated and the examiner stands beside the contralateral shoulder of the thumb being observed. This position allows the examiner to clearly observe the thumb.
2. Instruct the patient to tear a standard piece of paper in the middle across the shortest dimension using a fingertip pinch on both hands. Instruct the patient to stabilize the paper with the thumb being examined and tear with the hand that is not being observed. (This allows for easier observation of the involved thumb.)
3. After the first complete tear, the patient places the two pieces of torn paper together and again tears across the shortest dimension. The patient continues to put together the torn pieces, thus increasing the number of sheets of paper being torn.
4. Encourage the patient to tear the paper with some rapidity while distracting the patient by chatting about an unrelated matter. The objective is for the patient to tear increasing thicknesses of

paper automatically without concentrating on the position of the thumb.

5. While chatting with the patient, continually observe the posture of the thumb. The most important point of observation is the final attempt by the patient, when the layers of the paper provide more resistance than the patient can possibly tear. This maximum resistance shows the spontaneous posture of the thumb under load which often is an undesirable, imbalanced posture shifting the load at the CMC joint to smaller contact areas.

One would rarely recommend a test maneuver as appropriate for training. Since the Colditz Tear Test is an observational test without a quantifiable result, the tearing maneuver can also be a useful part of the rehabilitation approach with CMC OA patients. To practice balanced thumb muscle recruitment, the patient focuses on tearing the paper while maintaining all thumb joints in the ideal arc, but limits the number of sheets to only that which can be torn while maintaining the desired balanced posture. Over time the thickness can be increased until the maximum is reached.

Tearing increasing thicknesses of paper allows the patient to observe the position of all thumb joints while under load, repeats the desired static posture as the load increases, and increases the resistance as the ability to maintain the posture improves. This easy exercise allows patients to transfer the stability gained into everyday activities such as turning a key, tearing open packages, writing, and other fingertip pinch tasks (Fig. 1).

Successful motor repatterning requires conscious effort, repeated frequently over time. A simple piece of paper is an easy device for observational evaluation and sub-maximal exercise in the optimal posture. This simple evaluation and exercise tool can be

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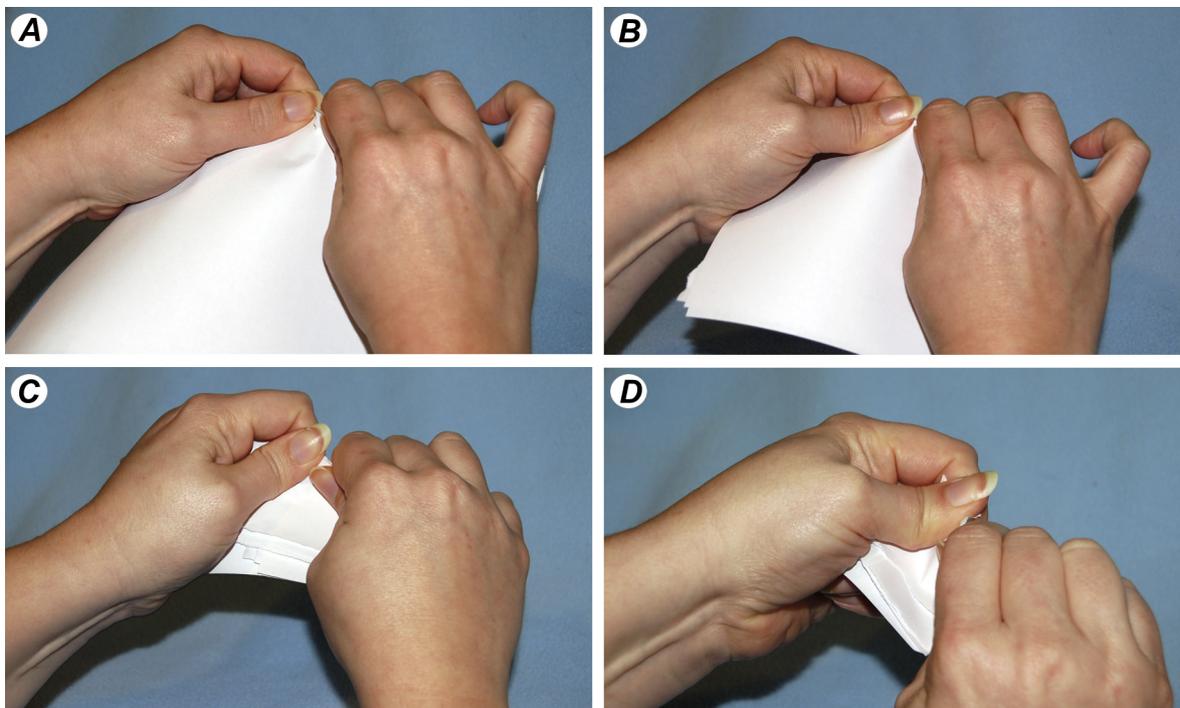


Fig. 1. (A-D) The progressively imbalanced posture of the left thumb is observed as increasing thicknesses of the paper are torn. Copyright Judy C. Colditz, 2013.

one component of a new approach toward treatment of thumb CMC OA.

References

1. Hagert E, Forsgren S, Ljung BO. Differences in the presence of mechanoreceptors and nerve structures between wrist ligaments may imply differential roles in wrist stabilization. *J Orthop Res.* 2005;23(4):757–763.
2. Hagert E, Lee J, Ladd AL. Innervation patterns of thumb trapeziometacarpal joint ligaments. *J Hand Surg.* 2012;37(4):706–714.
3. Hagert E, Mobargha N. The role of proprioception in osteoarthritis of the hand and wrist. *Curr Rheu Rev.* 2012;8:278–284.
4. Ladd AL, Lee J, Hagert E. Macroscopic and microscopic analysis of the thumb carpometacarpal ligaments. *JBJs.* 2012;94:1468–1477.
5. Zhang AY, Nortwick SV, Hagert E, Ladd AL. Thumb carpometacarpal ligaments inside and out: a comparative study of arthroscopic and gross anatomy from the Robert A. Chase Hand and Upper Limb Center at Stanford University. *J Wrist Surg.* 2013;2:55–62.

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Quiz: #286

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- #1. The tearing maneuver can be a useful part of the rehabilitation for thumb CMC OA patients in
- determining the maximum number of thicknesses of paper possible to tear
 - practicing balanced thumb muscle recruitment while tearing five thicknesses of paper
 - increasing strength by tearing the maximum number of sheets of paper each time
 - practicing balanced thumb muscle recruitment while tearing the number of thicknesses of paper that is possible without the arc pattern of the thumb collapsing
- #2. The following are the important points for use of the Colditz tear test with a patient
- standing, the patient remains silent and slowly tears a sheet of paper while looking directly at the thumb, increasing the number of sheets of paper being torn until the patient cannot accomplish tearing; during the entire sequence the therapist observes the posture of the involved thumb
 - seated, the patient tears a sheet of paper, increasing the number of sheets of paper being torn until the patient cannot accomplish tearing. Then the patient holds their final thumb position and demonstrates the final posture to the therapist
 - seated, the patient talks with the examiner and tears a sheet of paper with some speed, increasing the number of sheets of paper being torn until the patient cannot accomplish tearing; during the entire sequence the therapist observes the posture of the involved thumb
 - standing, the patient talks with the examiner and tears a sheet of paper as slowly as possible while looking directly at their thumb, increasing the number of sheets of paper being torn until the patient cannot accomplish tearing
- #3. The following is required for successful motor re-patterning
- conscious effort and frequent repetition over a period of time
 - unconscious effort and frequent repetition over a period of time
 - conscious effort and infrequent repetition over a short period of time
 - none of the above
- #4. The following recent information about the thumb CMC ligaments suggests a greater role for neuromuscular training to alter the course of thumb CMC joint osteoarthritis
- importance of the dAOL ligament
 - presence of mechanoreceptors in the ligaments
 - presence of peripheral nerve innervation
 - absence of mechanoreceptors in the ligaments
- #5. It is important that the tear test be performed using white 30 weight paper
- true
 - false

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