

## Cracking in the Metacarpo-Phalangeal Joint

**Journal Of Anatomy**  
**Vol. 81; Part 2; 1947; pp. 165-173**

By J. B. Roston and R. Wheeler Haines  
 St Thomas's Hospital Medical School, London, UK

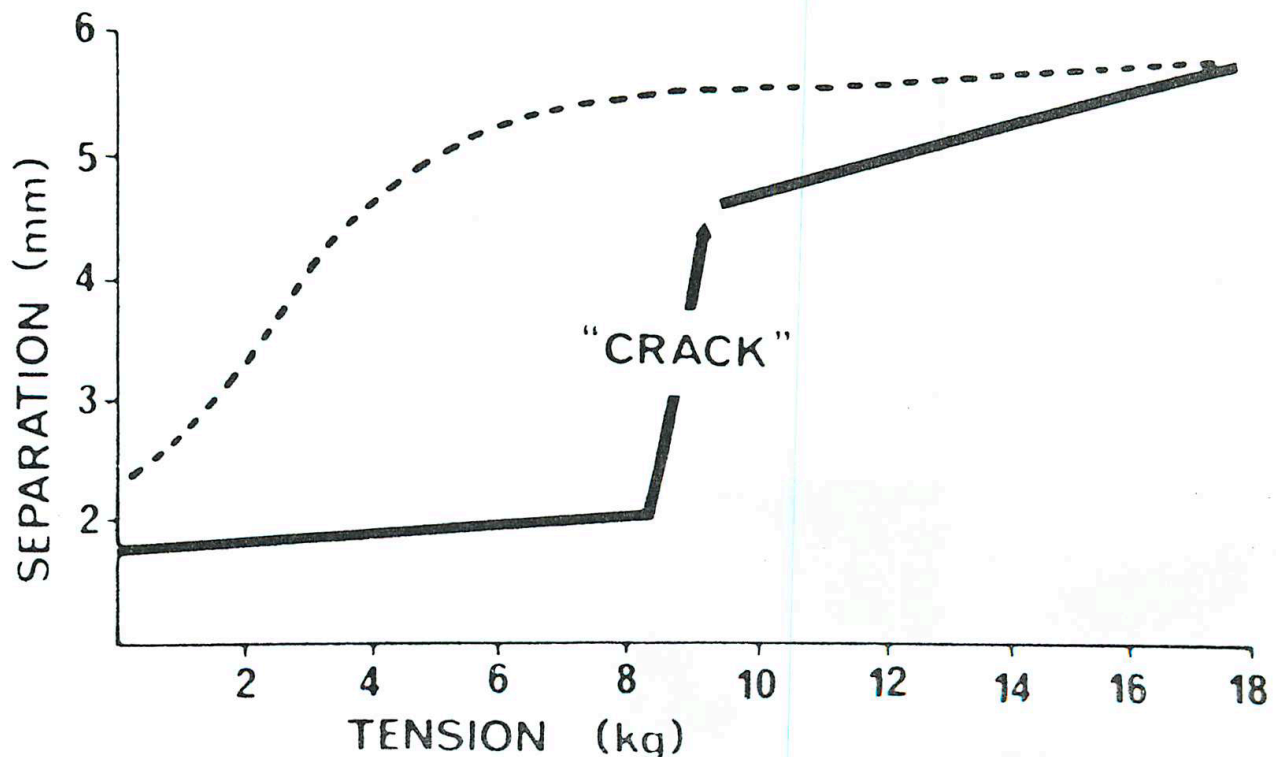
### COMMENTS FROM DAN MURPHY

This is the first study in the literature (1947) to investigate the cavitation of a joint leading to an audible "cracking" of the joint.

### KEY POINTS FROM THESE AUTHORS:

In this study, the subject's middle digit was wrapped with adhesive plaster, and a stout string was tied tightly over this, round the proximal phalanx. The string was then attached to an immovable object through a tensiometer. A preliminary x-ray was taken. The subject was instructed to draw his hand away until the M-C joint "cracked", and the tensiometer recorded the degree of traction. After "cracking," while still under tension, a 2<sup>nd</sup> x-ray was taken, and the degree of joint separation was measured.

When the "crack" occurred, an immediate and significant increase in joint separation occurred from 1-3 mm.



1) These authors identified the following factors:

- A tension of about 6 kg is insufficient to produce a "crack."
- After the joint "cracks" and the increased joint separation is achieved, the increased separation can be repeated for the next 17-22 minutes.
- Further direct tension on the joint will not produce a second crack; the joint is in a "refractory phase."
- After about 20 minutes (17-22 minutes), the whole cycle of joint "cracking" can be repeated.

"The minimum time recorded between two cracks produced by direct tension was 17 min., and never more than 22 min. rest was required before a second crack could be produced."

2) The after "cracking" x-ray showed a gas shadow bubble in the joint.

"The duration of the refractory phase after cracking would correspond to the time required for such a minute bubble to pass into solution."

3) "The commonest cause of failure to produce a crack in [a joint] is inability to relax the muscles whose tendons pass across the joint."

#### SUMMARY FROM AUTHORS:

1) In the resting phase the articular surfaces of the joint are in contact.

2) Light tension, up to about 6 kg, is insufficient to produce cracking, but leads to a preliminary separation of the articular surfaces.

3) "Stronger tensions, of about 7 kg or more, lead to cracking. The noise is heard, the bones spring sharply apart, and a clear space appears in the radiograph within the synovial cavity." This space is a partial vacuum occupied by water vapor and blood gases under reduced pressure.

4) "After cracking, the joint is in a refractory phase and no further cracking can be elicited by direct tension for about 20 minutes."