

# **The trapeziometacarpal joint. Anatomical value of the DRL and AOL in surgical approach.**

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## **Abstract**

### **Introduction**

The dorsoradial ligament (DRL) and anterior oblique ligament (AOL) have been proposed to play an important role in stabilising the trapeziometacarpal joint (TM CJ).

The primary objective of our study was to provide quantitative anatomical data on these ligaments to enable surgeons to make a founded decision when choosing a particular approach in their surgical procedure.

### **Materials and Methods**

Nine thumbs from 7 fresh-frozen cadavers were used. In 2 cases, we analysed ligaments of bilateral hands. Six specimens were male, 3 were female, with an average age of 71 years. All specimens underwent X-rays and MRI (3T Achieva, Philips Medical Systems). Seven demonstrated Eaton stage I and two Eaton stage II arthritis.

The origin and insertion of both the DRL and AOL were identified during a dissection under loupe magnification. Length and width were measured with an electronic calliper (Mitutoyo; 0.01 mm).

Length and thickness of the ligaments were also obtained on the MRI using image software. The average of 3 measurements per sequence and per specimen was used. All data are reported as mean  $\pm$  standard deviation (SD). Student's t-tests were used to compare the dimensions of both ligaments.

### **Results**

The DRL originates from the dorsoradial tubercle of the trapezium and inserts onto the dorsal edge of the base of the first metacarpal. The DRL has a mean length of 10.33 mm (SD: 0.93 mm), a thickness of 1.06 mm (SD: 0.20 mm) and a width of 11.73 mm (SD: 1.32 mm) with a

cross-sectional area (CSA) of 12.23 mm<sup>2</sup>.

The AOL originates from the volar tubercle of the trapezium and inserts across the volar ulnar tubercle of the first metacarpal. The AOL has a mean length of 12.16 mm (SD: 1.13 mm), a thickness of 0.64 mm (SD: 0.11 mm) and a width of 13.54 mm (SD: 3.44 mm) with a CSA of 8.74 mm<sup>2</sup>. Both the thickness and CSA of the DRL are significantly larger than that of the AOL ( $p < 0.05$ ).

### **Conclusion**

Our cadaveric and imaging study demonstrates that the DRL is an important structure of the TMCJ, shorter and significantly thicker than the AOL, which is relatively thin and long. These results suggest that the DRL could play a significant role in stabilizing the TMCJ and should be preserved or reconstructed in TMCJ surgery. Biomechanical tests are, however, needed to demonstrate that the DRL is indeed the most important stabilizer of the TMCJ.