

Partial Ulnar Carpal Excision in a Series of Four Patients Without Subsequent Volar Intercalated Segmental Instability

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Objective:

-To report the absence of volar intercalated segmental instability (VISI) following partial ulnar carpal excision

Background:

-Cadaveric studies have demonstrated volar intercalated segmental instability (VISI) after sequential sectioning of ligaments on the ulnar side of the carpus^{1,2,3}.

-One would expect that a partial ulnar carpal excision for tumor management would therefore result in a VISI deformity.

-We present a series of 4 patients treated with partial ulnar carpal excisions for: rhabdoid-like sarcoma, chondrosarcoma, melanotic schwannoma, and clear cell sarcoma.

-Despite partial ulnar carpal excision (including triquetrum excision) and subsequent clinical loading of the carpus, no patients demonstrated VISI deformities on follow-up imaging.

Methods:

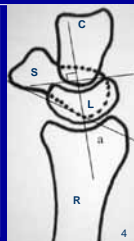
-Lateral wrist radiographs were evaluated to determine lunate position (volar or dorsal tilt), the scapholunate (SL) angle, and the capitolunate (CL) angle on the pre-operative images and post-operative images taken at the latest available follow-up (Figure 1).

-VISI: defined as volar flexion of the lunate relative to longitudinal axis of the radius and capitate when the wrist rests in a neutral position

-VISI: SL angle < 30 degrees

-Information on range of motion, pain, and symptoms of instability was gathered from medical records.

Figure 1: The scapholunate angle is measured between the axes of the scaphoid and lunate. The axis of the scaphoid is obtained by drawing a line tangential to the proximal and distal poles. The lunate axis is drawn perpendicular to a line drawn between the dorsal and palmar poles.



Results (Table 1):

-After an average f/up time of 4.7 years, the lunate remained in a neutral position on the lateral radiograph in all four patients (Figures 2, 3)

-All patients had SL angles within the normal range of 30 to 60 degrees, and the mean post-operative SL angle was 42 degrees (range 31-57)

-The mean change in the SL angle from the pre-operative measurement to the final follow-up measurement was 6.2 degrees (range 1-10).

-The average post-operative CL angle was 34 degrees (range 17-65). The patient with the 65 degree CL angle had a flexed capitate, but his lunate remained neutral and his SL angle was not suggestive of VISI at 48 degrees.

-The mean change in the CL angle was 16 degrees.

-No patients reported symptoms of instability. Two patients had decreased range of motion in wrist flexion and extension, and one patient had mild pain postoperatively

Table 1: Scapholunate (SL) and capitolunate (CL) angles at latest follow-up

Patient	Tumor	F/U Time (years)	SL Angle @ Last F/U	CL Angle @ Last F/U
1	Rhabdoid-like sarcoma	11.4	57	16.8
2	Chondrosarcoma	.1	33.7	33.3
3	Melanotic Schwannoma	3.5	31.5	23.2
4	Clear cell sarcoma	3.6	47.7	65.3

Figure 2: AP and lateral radiographs of patient #1 taken 11.4 years after partial ulnar carpal excision

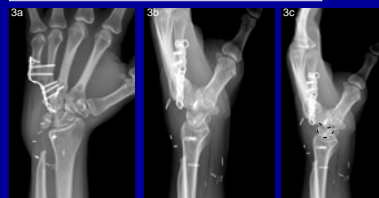
-The lunate, outlined in black, is collinear with the capitate and slightly extended relative to the longitudinal axis of the radius.

-SL angle: 57, CL angle: 16.8



Figure 3: AP and lateral radiographs of patient #4 taken 3.6 years after partial ulnar carpal excision

-The lunate is in neutral, but the capitate is extended accounting for a normal SL angle of 47.7 and an abnormally high CL angle of 65.3



Discussion:

-The absence of carpal instability in this series of four patients was an unexpected finding because it is contrary to what the cadaveric studies would predict after partial ulnar carpal excision.

-Perhaps post-operative scar tissue provided some stability to the otherwise destabilized ulnar carpus, but the lack of VISI in these patients suggests that our understanding of carpal kinematics from prior cadaveric studies is limited.

Conclusions:

-VISI instability was not observed in four patients who underwent destabilizing resections of the ulnar side of the carpus. Stabilizing procedures were not required in any patient due to instability.

-Our current understanding of VISI carpal kinematics is based on limited cadaveric studies, and further research in this area is warranted.