

Supplementary material

Table 1. Published elbow and forearm kinematic studies: range of elbow flexion/extension and forearm pronation/supination

Study	Measurement method	Data source	Elbow flexion/extension(°)	Forearm pronation/supination(°)
Chapleau et al. (2011) ¹⁷	Radiograph and universal goniometer	51 healthy subjects (102 elbows), 18-50 yrs	Radiography: 139.0(7.8); Goniometry: 140.5(8.0)	-
Chapleau et al. (2013) ¹⁸	Radiograph	20 male subjects	136.5(9) (Male)	-
Tersi et al. (2012) ¹⁹	Fluoroscopy; Modelling: ISB	1 healthy male	-	Around 180 (Flex90)
Fu et al. (2009) ²⁰	CT and dual-orthogonal Fluoroscopy	5 uninjured subjects	-	152.8(14.4)
Soucie et al. (2011) ²¹	Universal goniometers	674 (53.6% female) healthy, normal subjects	F: 144.6(5.5); E: 0.8(3.8) (male, age 20-44)	P: 76.9(75.6-78.2); S: 85.0(83.8-86.2)
Gunal et al. (1996) ²²	A universal full-circle manual goniometer	1000 healthy male, 18-22 yrs, right-handed	F: 140.0(5.6); E: 182.8(5.1)	P: 90.4(12); S: 86.5(8.3)
Boone et al. (1979) ²³	Ordinary goniometer	56 subjects, right-handed	F: 140.5(4.9); E: 0.8(2.7)	P:75.0(5.3); S:81.1(4.0)
Rickert et al. (2008) ⁵	Custom made device	752 healthy subjects (403 female, 349 male), 20-95 yrs	-	176.17 (20-30 yrs) 169.42 (male)
Shaaban et al. (2008) ²⁴	Custom-designed jig	50 subjects (25 male and 25 female)	-	P: 81.7; S: 104.2 (Flex90, male, dominant)
Frayssé et al. (2014) ¹	Optical motion capture; Modelling: ISB 1, ISB 2, regression, and functional method; Tracking: point marker cluster	31 healthy, right-handed subjects (17 male, 14 female), mean age 28 yrs	Compared to restrained 100°: ISB1: 89.8(8.7); ISB2: 89.3(8.4); Regression: 94.5(9.1); Functional: 99.9(7.3)	ISB1: 114.7(11.4); ISB2: 114.9(11.2); Regression: 115.1(11.2); Functional: 114.5(11.3)
Andel et al. (2008) ²⁵	Optical motion capture (NDI); Modelling: ISB2; Tracking: rigid marker cluster;	10 healthy subjects (6 male, 4 female), 28.5(5.7) yrs	143(5)	161(16)
Aizawa et al. (2013) ²⁶	Electromagnetic tracking system	20 healthy subjects (10 male and 10 female)	F: 137(7);E: 9(7)	P: 84(9);S: 82(11)
Ligorio et al. (2017) ²⁸	Magnetic-inertial measurement units	15 healthy, right-handed subjects (11 male, 4 female), 28(3) yrs	125.5(2.8)	91.9 (3.3)

Notes: 1). Data are presented as mean (standard deviation).2). F: flexion; E: extension; P: pronation; S: supination; Flex90: elbow flexed at 90°. 3). For studies that had multiple measurements, data from experiments closest to our experimental condition was selected

