# NORMAL RANGES OF MOTION (IN DEGREES) ACCORDING TO VARIOUS AUTHORS

| Joint | AAOS | Boone & Azen | Clark | CMA | Daniels & Worthingham | Dornison & Wagner | Esch & Lepley | Gearhardt & Russe | Hoppenfeld | JAMA | Kapandji | Kandall & McCreary | Weichec & Krusen |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Shoulder* | | | | | | | | | | | | | |
| Flexion | 180 | 167 | 130 | 170 | — | 180 | 170 | 170 | — | 150 | 180 | 180 | 180 |
| Extension | 60 | 62 | 80 | 30 | 50 | 45 | 60 | 50 | 45 | 40 | 50 | 45 | 45 |
| Abduction | 180 | 184 | 180 | 170 | — | 180 | 170 | 170 | 180 | 150 | 180 | 180 | 180 |
| Internal rotation | 70 | 69 | 90† | 60† | 90 | 90 | 80 | 80 | 55 | 40† | 95 | 70 | 90 |
| External rotation | 90 | 104 | 40† | 80† | 90 | 90 | 90 | 90 | 45 | 90† | 80 | 90 | 90 |
| Horizontal abduction | — | 45 | — | — | — | — | — | 30 | — | — | — | — | — |
| Horizontal adduction | 135 | 140 | — | — | — | — | — | 135 | — | — | — | — | — |
| *Elbow* | | | | | | | | | | | | | |
| Flexion | 150 | 143 | 150 | 135 | 160 | 145 | 150 | 150 | 150 | 150 | 145 | 145 | 135 |
| *Radioulnar* | | | | | | | | | | | | | |
| Pronation | 80 | 76 | 50 | 75 | 90 | 80 | 90 | 80 | 90 | 80 | 85 | 90 | 90 |
| Supination | 80 | 82 | 90 | 85 | 90 | 70 | 90 | 90 | 90 | 80 | 90 | 90 | 90 |
| *Wrist* | | | | | | | | | | | | | |
| Flexion | 80 | 76 | 80 | 70 | 90 | 80 | 90 | 60 | 80 | 70 | 85 | 80 | 60 |
| Extension | 70 | 75 | 70 | 65 | 90 | 55 | 70 | 50 | 70 | 60 | 85 | 70 | 55 |
| Radial deviation | 20 | 22 | 15 | 20 | 25 | 20 | 20 | 20 | 20 | 20 | 15 | 20 | 35 |
| Ulnar deviation | 30 | 36 | 30 | 40 | 65 | 40 | 30 | 30 | 30 | 30 | — | 35 | 75 |
| *Hip* | | | | | | | | | | | | | |
| Flexion | 120 | 122 | 120 | 110 | 125 | 125 | 130 | 125 | 135 | 100 | 120 | 125 | 120 |
| Extension | 30 | 10 | 20 | 30 | 15 | 50 | 45 | 15 | 30 | 30 | 30 | 10 | 45 |
| Abduction | 45 | 46 | 55 | 50 | 45 | 45 | 45 | 45 | 50 | 40 | 30 | 45 | 45 |
| Adduction | 30 | 27 | 45 | 30 | 0 | 20 | 15 | 15 | 30 | 20 | 30 | 10 | — |
| Internal rotation | 45 | 47 | 20 | 35 | 45 | 30 | 33 | 45 | 35 | 40 | 30 | 45 | — |
| External rotation | 45 | 47 | 45 | 50 | 45 | 50 | 36 | 45 | 45 | 50 | 60 | 45 | — |
| *Knee* | | | | | | | | | | | | | |
| Flexion | 135 | 143 | 145 | 135 | 130 | 140 | 135 | 130 | 135 | 120 | 160 | 140 | 135 |
| *Ankle* | | | | | | | | | | | | | |
| Plantar flexion | 50 | 56 | 50 | 50 | 45 | 45 | 65 | 45 | 50 | 40 | 50 | 45 | 55 |
| Dorsiflexion | 20 | 13 | 15 | 15 | — | 20 | 10 | 20 | 20 | 20 | 30 | 20 | 30 |
| *Subtalar Joint* | | | | | | | | | | | | | |
| Inversion | 35 | 37 | — | 35 | — | 50 | 30 | 40 | — | 30 | 52 | 35 | — |
| Eversion | 15 | 26 | — | 20 | — | 20 | 15 | 20 | — | 20 | 30 | 20 | — |

*References for the normal values: American Academy of Orthopaedic Surgeons (AAOS). Joint motion: Method of measuring and recording. Chicago: AAOS, 1965; Boone DC, Azen SP. Normal range of motion in male subjects. J Bone Joint Surg (Am) 1979; 61:756; Clark WA. A system of joint measurement. J Orthop Surg 1920;2:687; Commission of California Medical Association (CMA) and The Industrial Accident Commission of the State of California: Evaluation of industrial disability. New York: Oxford University Press, 1960; Daniels L, Worthingham C. Muscle testing: Techniques of manual examination. 3rd ed. Philadelphia: WB Saunders, 1972; Dorinson SM, Wagner ML. An exact technique for clinically measuring and recording joint motion. 1948; Arch Phys Med 29:468; Esch D, Lepley M. Evaluation of joint motion: Methods of measurement and recording. Minneapolis: University of Minnesota Press, 1974; Gerhardt JJ, Russe OA. International SFTR method of measuring and recording joint motion. Bern: Huber, 1975; Hoppenfeld S. Physical examination of the spine and extremities. New York: Appleton-Century-Crofts, 1976; Journal of the American Medical Association: A guide to the evaluation of permanent impairment of the extremities and back. JAMA 1958 (special edition), 1; Kapandji LA. Physiology of the joints. Vols. 1 and 2, 2nd ed. London: Churchill Livingstone, 1970; Kendall FP, McCreary EK. Muscles, testing and function, 3rd ed. Baltimore: Williams & Wilkins, 1983; Wiechec FJ, Krusen FH. A new method of joint measurement and a review of the literature. Am J Surg 1939; 43:659.

†Measurements obtained with shoulder in 0 degrees of abduction.

From Rothstein JM, Roy SH, Wolf SL. The rehabilitation specialist's handbook, 2nd ed. Philadelphia: FA Davis, 1998.