REQUIRED SHOULDER AND ELBOW JOINT ANGLES IN DAILY LIVING TASKS: AN OVERVIEW (P160)

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**Question:** A sufficient active range of motion (ROM) of the shoulder and elbow joint is necessary to perform activities of daily living (ADL). As a contracture in one or more joints can limit ADL, objective information about joint angles required to perform functional tasks without compensatory movements is needed. The present study appraises the literature and presents a synthesis of shoulder and elbow motion angles required for ADL tasks as performed by healthy subjects.

**Methods:** To identify relevant articles, a systematic literature search was conducted in PubMed, Cochrane, CHINAHL and PEDro. In addition articles were identified by hand searches. Prerequisites for inclusion were measurements of shoulder and/or elbow joint angles in healthy subjects performing ADL tasks using a self-chosen movement strategy. Joint angle data had to be given per specific task. Studies were reviewed on study and population characteristics, as well as on the required angles per movement direction per ADL task. Tasks were clustered comprising touching body parts, personal care, eating and drinking and other ADL and leisure time activities. Risk of bias focused on study population, measurement methods and data deduction necessary for our aim.

**Results:** From the 27 included studies, data of 29 study groups was synthesised, containing 3-59 subjects of all ages. Per study 1-18 ADL tasks were performed. In shoulder flexion, most tasks required an angle of 45-90°, however, flexion angles of 90-135° were necessary in one third of all examined ADL tasks with ‘high reach’ as extreme. Shoulder extension angles >40° were extracted in 70% of the reported tasks and internal rotation angles >80° were extracted in 35% of the reported tasks. For both movement directions the general description of the performed tasks included ‘touching the back’ and ‘perineal care’. Abduction shows results similar to flexion; though for abduction the greatest angle was 127° (placing hand behind one’s head). Adduction was only measured twice and not in identical tasks. For external rotation, out of 28 tasks, the extreme angle of 112° was measured during combing hair. In the elbow, the required joint angle for flexion ranged between 35-152°, with almost half of the reviewed tasks needing ≥120° and a quarter even ≥140°. The latter mainly comprised ADL tasks in which the hand needed to be placed at the upper body or head. In 25% of the tasks in which an extension movement was performed, an angle of

**Conclusions:** Shoulder and/or elbow angles required in ADL tasks have been assessed in many studies, though per movement direction most tasks were analyzed in 3 or less study groups and most data were from only a few healthy subjects. Moreover, reviewed tasks did not reflect complete ADL as for instance dressing got very little attention. The present data suggest that full range of motion is not necessary in ADL concerning the shoulder joint. To perform functional tasks almost full elbow motion however is required. These data may substantiate the discussion of patient tailored treatment aims and support evaluation of treatment.