

Effectiveness of Assistive Technology for Adults With Cerebral Palsy: A Scoping Review

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PURPOSE: The transition to adulthood can be challenging for individuals with Cerebral Palsy (CP), including the loss of their health and wellness supports and reduced access to assistive technologies (AT). They frequently have physical, cognitive, and communication challenges, however, we know very little to nothing about the needs and impact of AT for adults with CP. There is also limited data on access to AT and long term usage and utility of AT to support quality of life and participation for this population. This scoping review evaluates the evidence for the effectiveness of assistive technology for adults with cerebral palsy.

DESIGN: A scoping review was conducted in 5 databases. Inclusion criteria were peer reviewed publications published between 2005 and 2021, adults aged 18 and over, cerebral palsy, studies on a US population, prospective or retrospective quantitative studies, and assistive technology. The exclusion criteria were children, adolescents, animal studies, systematic reviews, meta-analysis, and qualitative studies.

METHODS: The screening and fulltext retrieval were completed independently by two reviewers in the Covidence Software. Conflicts were resolved among three reviewers. Data extraction included title, author, year, objective, design, group, type of AT, setting, inclusion and exclusion criteria, demographics, intervention description, and results. The methodological quality for risk of bias in studies that included groups was assessed using Downs and Black (1998) criteria. For case studies, quality was determined based on the depth of the information provided. The PRISMA-Scr (2019) guidelines for reporting were followed.

RESULTS: The original search revealed 3089 studies. After removal of the duplicates, titles and abstracts of 1443 studies were screened and 38 studies were included for full-text review. Of these, 11 studies were eligible for extraction. Five of these studies were group designs and 6 were single case designs. Overall the quality of the studies was “fair” to “poor.” Participants’ ages ranged from 18-80 years with different levels of functional abilities. The majority of the studies did not report race/ethnicity or SES for the participants. We used codes to thematically categorize the types of AT and outcome measures. The types of AT included seating, positioning, and mobility equipment, control devices, and computer interface systems. Studies examined prognosis (1), usability of AT (4), nature and dosage of training (3), and testing AT (3). The outcomes used were primarily performance including speed and accuracy (5), physiological gains (2), and patient reported ease of use and utility (5). Overall, studies reported that for control devices, the level of device sensitivity and speed matters. In the case of seating/positioning/mobility equipment, the use of exoskeletons appears to be beneficial for decreasing the metabolic cost of ambulation. For computer interfaces, programs that focus on systematic training appear to be very effective. However, participants highlighted that perceived comfort, social acceptability and approachability are key components for the utility of the equipment.

CONCLUSION: There is limited data available for the use and utility of AT technology for adults with CP in the US. The studies included had significant design and bias limitations. Several studies provided insight on specific aspects of AT needs, use, and training. Control devices for accessing electronic devices was one of the needs, devices related to improving physiological and participatory aspects of ambulatory ability were important, and training in the use of equipment following individualized coaching strategies appear effective.

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