

Implementing AHRQ Effective Health Care Reviews

Helping Clinicians Make Better Treatment Choices

Physical Activity and the Health of Wheelchair Users

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Key Clinical Issue

What are the benefits of physical activity in patients with multiple sclerosis (MS), cerebral palsy, and spinal cord injury who use or are at risk of using wheelchairs?

Evidence-Based Answer

Physical activity improves aerobic capacity, balance (i.e., reducing risk of falls), walking ability, depression, sleep, female sexual function, global function, and activities of daily living, depending on the population and activity being considered.¹ (Strength of Recommendation [SOR]: B, inconsistent or limited-quality patient-oriented evidence.)

Practice Pointers

Purposeful physical activity in the general population reduces the risk of cardiovascular disease, diabetes mellitus, mental illness, cancer, and all-cause mortality.² Although intentional physical activity, including aerobic exercise with strength and balance training, is recommended for those with physical disabilities,³ data for this

population are lacking, especially for those who use, or are at risk of using, wheelchairs as their primary mode of ambulation.

The Agency for Healthcare Research and Quality (AHRQ) review was conducted to assess whether patients with MS, cerebral palsy, and spinal cord injury who use a wheelchair, or might benefit from wheelchair use in the future, derive benefits (e.g., improvements in cardiovascular outcomes, activities of daily living, mental health, walking ability, balance) from physical activity. The review included 168 studies, 146 of which were randomized controlled trials. Of the 7,511 patients who were included, 44% had MS, 38% had cerebral palsy, and 18% had spinal cord injury. Studies included many types of purposeful physical activity such as treadmill training, aquatic exercises, cycling, robot-assisted gait training, balance exercises, hippotherapy, tai chi, yoga, muscle strength building, and combinations of modalities.

No studies evaluated cardiovascular outcomes such as myocardial infarction or stroke. Studies evaluating cardiovascular health found no benefit

The Agency for Healthcare Research and Quality (AHRQ) conducts the Effective Health Care Program as part of its mission to produce evidence to improve health care and to make sure the evidence is understood and used. A key clinical question based on the AHRQ Effective Health Care Program systematic review of the literature is presented, followed by an evidence-based answer based on the review. AHRQ's summary is accompanied by an interpretation by an AAFP author that will help guide clinicians in making treatment decisions. For the full review, go to <https://effectivehealthcare.ahrq.gov/sites/default/files/pdf/cer-241-physical-activity-wheelchair-updated.pdf>.

This series is coordinated by Kenny Lin, MD, MPH, deputy editor.

A collection of Implementing AHRQ Effective Health Care Reviews published in AAFP is available at <https://www.aafp.org/afp/ahrq>.

CME This clinical content conforms to AAFP criteria for CME. See CME Quiz on page 458.

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Effects of Physical Activity Interventions Compared With Usual Care

Intervention	Strength of evidence (direction of finding)		
	Multiple sclerosis	Cerebral palsy	Spinal cord injury
Aerobic exercise			
Dance (one randomized controlled trial in multiple sclerosis and cerebral palsy)	●○○ (function improvement)	●○○ (function improvement)	○○○
Aerobics	●○○ (sleep improvement)	○○○	○○○
Aquatics	●○○ (balance, activities of daily living, female sexual function improvement)	○○○	○○○
Cycling	●○○ (no clear benefit on walking)	●○○ (function improvement)	○○○
Robot-assisted gait training	●○○ (balance improvement, no clear benefit on function)	○○○	●○○ (activities of daily living improvement, no clear benefit on function)
Treadmill	●○○ (walking, function, and balance improvement)	●○○ (function improvement)	○○○
Postural control			
Balance exercises	●●○ (balance improvement)	○○○	○○○
	●○○ (fall risk improvement)	○○○	○○○
	●○○ (function improvement)	○○○	○○○
Hippotherapy	○○○	●○○ (balance and function improvement)	○○○
Tai chi	○○○	○○○	○○○

continues

Strength of evidence scale

- **High:** High confidence that the evidence reflects the true effect. Further research is very unlikely to change the confidence in the estimate of effect.
- **Moderate:** Moderate confidence that the evidence reflects the true effect. Further research may change the confidence in the estimate of effect and may change the estimate.
- **Low:** Low confidence that the evidence reflects the true effect. Further research is likely to change the confidence in the estimate of effect and is likely to change the estimate.
- **Insufficient:** Evidence either is unavailable or does not permit a conclusion.

VO₂ = volume of oxygen utilization.

Adapted from Selph SS, Skelly AC, Wasson N, et al. Physical activity and the health of wheelchair users: a systematic review of evidence in multiple sclerosis, cerebral palsy, and spinal cord injury. Comparative effectiveness review no. 241. (Prepared by the Pacific Northwest Evidence-Based Practice Center under contract no. 290-2015-00009-1) AHRQ publication no. 21(22)-EHC017. Agency for Healthcare Research and Quality; October 2021. Accessed December 14, 2021. <https://effectivehealthcare.ahrq.gov/sites/default/files/cer-241-physical-activity-wheelchair-evidence-summary-updated.pdf>

Effects of Physical Activity Interventions Compared With Usual Care

Intervention	Strength of evidence (direction of finding)		
	Multiple sclerosis	Cerebral palsy	Spinal cord injury
Motion gaming	●○○ (function, balance improvement)	○○○ (balance improvement)	○○○
Whole body vibration	○○○	○○○	○○○
Yoga	●○○ (no clear benefit on function)	○○○	○○○
Strength interventions			
Muscle strength exercise	●○○ (no clear benefit on walking, function, balance, quality of life, spasticity)	●○○ (no clear benefit on walking and function)	○○○
Multimodal exercise			
Progressive resistance or strength plus aerobic and/or balance exercise	●○○ (walking, balance, VO ₂ improvement)	●○○ (no clear benefit on function, quality of life)	○○○
All types of exercise	●●● (walking improvement)	●○○ (function improvement)	●○○ (function improvement)
	●●○ (balance, depression improvement; no clear benefit on function)	●○○ (VO ₂ improvement)	●○○ (VO ₂ improvement, increased episodes of autonomic dysreflexia, no clear benefit on depression)

Strength of evidence scale

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from physical activity in those using a wheelchair or who may benefit from future use of a wheelchair, based on intermediate outcomes such as the development of hypertension or obesity. Of note, studies of these outcomes ranged from two to 24 weeks, potentially missing benefits of longer periods of exercise.¹

In patients with MS, physical activity (e.g., using a treadmill, cycling, aquatic exercise, Pilates, resistance exercise, gaming-assisted activity, yoga, multimodal combinations) compared with no physical activity or usual care improved

walking ability (19 studies, n = 933; 43 additional meters on a six-minute walking test; 95% CI, 28 to 57; nine studies, n = 471; 1.4 seconds faster on a 10-meter walking test; 95% CI, 0.1 to 2.7); balance as measured by the Berg Balance Scale (17 studies, n = 879; 3.6-point improvement on a 14-point scale; 95% CI, 2.5 to 4.6); female sexual function (one study, n = 62; women in the aquatic exercise group scored 52.1 on the Sexual Function Index vs. 42.8 for those in the control group; $P < .01$); and depression (11 studies, n = 522; clinically significant 0.29 standard mean decrease in depression

score; 95% CI, 0.03 to 0.50). There were also improvements in sleep, activities of daily living, and maximal oxygen consumption. In patients with cerebral palsy, physical activity improved balance, function, and peak oxygen consumption. In patients with spinal cord injury, physical activity improved activities of daily living, general function, and maximal oxygen consumption. Conclusions were limited by small sample sizes, short study durations, lack of clarity on activity intensity in the intervention groups, lack of specificity of activities in the control group, and a paucity of studies with a low risk of bias.

For adults, the American Heart Association recommends moderate- to high-intensity muscle-strengthening activity at least two days a week in addition to 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity aerobic activity per week.⁴ The Centers for Disease Control and Prevention recommends the same activity levels for those with disabilities who are able to achieve them. When patients with disabilities are unable to engage in the recommended levels of activity, physicians should help patients find an activity level and type of exercise that are appropriate for them.⁵ Physicians should continue to recommend physical activity to patients of all abilities.

Editor's Note: American Family Physician SOR ratings are different from the AHRQ Strength of Evidence ratings. Dr. Saquil is a contributing editor for *AFP*.

The views expressed in this article are the authors' and do not reflect official policy or position of the Uniformed Services University of the Health Sciences, Carl R. Darnall Army Medical Center, the Department of Defense, or the U.S. government.

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