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Yoga leads to multiple physical improvements after stroke, a pilot study



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KEYWORDS

Stroke;
Yoga;
Exercise;
Rehabilitation;
Functional recovery

Summary

Objective: To assess change in physical functioning (pain, range of motion (ROM), strength, and endurance) after 8 weeks of therapeutic-yoga.

Design: Planned analyses of data from a randomized pilot study of yoga after stroke.

Setting: University-based research laboratory.

Participants: People with chronic stroke ($N=47$) randomized to therapeutic-yoga ($n=37$) or wait-list control ($n=10$).

Interventions: 16 sessions of therapeutic yoga (twice a week/8 weeks). Yoga was delivered in a standardized and progressive format with postures, breathing, and meditation, and relaxation in sitting, standing, and supine.

Main measures: Pain was assessed with the PEG, a 3-item functional measure of the interference of pain. ROM included neck and hip active and passive ROM measurements). Upper and lower extremity strength were assessed with the arm curl test and chair-to-stand test, respectively. Endurance was assessed with the 6-minute walk and modified 2-min step test.

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Results: After a Bonferroni Correction, pain, neck ROM, hip passive ROM, upper extremity strength, and the 6-min walk scores all significantly improved after 8 weeks of engaging in yoga. No changes occurred in the wait-list control group.

Conclusions: A group therapeutic-yoga intervention may improve multiple aspects of physical functioning after stroke. Such an intervention may be complementary to traditional rehabilitation.

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Introduction

Complementary and alternative medicine (CAM) is becoming increasingly popular, and people with functional limitations or neurological conditions are more likely to engage in CAM when compared to individuals without such limitations or conditions.^{1,2} In fact, it is evident that more personal resources are being spent on CAM than on conventional medicine (including but not limited to massage, imagery, lifestyle diet, herbs, biofeedback, acupuncture).³ As evidence for CAM evolves, CAM has the potential to enhance traditional rehabilitation care by being integrated into traditional therapies.

Multiple techniques are housed under the umbrella of CAM, including mind and body medicine such as yoga. In the West, yoga commonly refers to hatha yoga, considered the foundation of all other yoga practices. Yoga traditionally addresses the physical body, using postures (asanas), diaphragmatic breathing (pranayama), and meditation (dhyana). As yoga generally becomes more popular, it is becoming increasingly utilized as a modality in rehabilitation.⁴ For example, the US Department of Health and Human Services recently stated “yoga is often recommended as a form of total-solution exercise for older adults, although there is little scientific evidence to support this recommendation”.⁵ Yoga has been shown to improve multiple variables of interest in many different study populations, such as older adults^{6–8} and people with neurological disability, such as stroke.^{9–12}

Currently, there is limited evidence when considering the benefits of yoga, specifically related to stroke. There are nearly 7 million people living with the deleterious chronic effects of stroke in the United States and only 14% of the 800,000 individuals who sustain a stroke annually achieve a full recovery after one year.¹³ The remainder of people who have sustained a stroke will live with some residual cognitive, emotional, and physical disability, including pain and decreased range of motion, strength, and endurance.^{14–16} These are long-term and negative aspects of stroke-related disability that impair function and quality of life (QoL).

There are multiple barriers to post-stroke exercise or physical activity.¹⁷ It has been noted that engaging in some level of physical activity after stroke improves fitness, is important in managing sedentary behaviors, and may reduce post-stroke limitations.^{16,18} However, many people with stroke do not engage in physical activity, dislike exercise, or are fearful of such activity. Yoga may be an activity that is perceived to be safe, beneficial to participants, and an activity that people with stroke or other disability can truly engage in. Our own works tells us that yoga may help people better negotiate perceived constraints to engaging in

different activities.⁸ Interestingly, yoga may be an activity that in itself may improve physical functioning, but it may also help to disrupt the perceived constraints to physical activity, allowing for maximized improvements in physical activity and physical functioning.

It is noted that due to neuroplasticity, novel exercise programming may allow for additional recovery during the chronic phases of stroke.¹⁹ Yoga is a novel exercise program or intervention that may allow for improved outcomes in people with chronic stroke. For example, two case-studies regarding stroke and yoga have been completed and results indicate improved balance, aspects of QoL and dexterity.^{9,20} Results from a qualitative data supports perceived improvements in strength, range of motion, and walking.¹¹

We recently published the primary results of our randomized pilot study which showed that individuals randomized to therapeutic-yoga had significant improvements in balance, balance self-efficacy, fear of falling, and QoL.¹² The objective of this study is to assess change in physical functioning after 8 weeks of therapeutic-yoga in people with chronic stroke. We include four aspects of physical functioning, specifically: pain; range of motion (ROM); strength; and endurance. It is noted that all of these variables are commonly impacted after stroke, and are often the focus of rehabilitation interventions. Pain and physical impairments can contribute to functional limitations among patients who have had a stroke, including, decreased independence in activities of daily living and mobility, and reduced participation in society.

Methods

Design

This is a planned data analysis of data derived from a randomized pilot study focused on yoga after stroke.¹²

Participants and randomization

Participants were identified through approved chart reviews or were recruited from local stroke support groups and previously completed stroke research studies. Inclusion criteria for the pilot study and these analyses were; chronic stroke (>6 months); >18 years old; completed all stroke inpatient and outpatient rehabilitation; self-report of mobility impairment; able to stand with or without a device; able to speak and understand English; scored a ≥ 4 out of 6 on the short 6 item Mini-Mental State Examination (minimal cognitive abilities to be able to answer questions and follow directions);²¹ and agreed to commit to two assessments

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