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Yoga after Stroke: Does it Work and How Can I Use it my OT Practice?

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Learning Objectives

- Recognize the impact of impairment in balance and balance self-efficacy after stroke
- Identify yoga as a complement to OT or as a preparatory activity
- Recognize the published findings of the stroke and yoga study and the clinical implications for OT
  - Identification and practice of specific yoga postures and breathing techniques after stroke (throughout the talk….)

WHO IN OUR AUDIENCE CURRENTLY WORKS WITH PEOPLE WITH STROKE?

Stroke

- Defined as:

  'An acute onset of neurological dysfunction due to an abnormality in cerebral circulation with resultant signs and symptoms that correspond to involvement of focal areas in the brain'
- Primary cause of disability in the US
- 3rd leading cause of death
- 800,000 new strokes a year
- Primary rehabilitation diagnosis

O'Sullivan, 2001, Han and Haley, 1999, Stineman et al., 1997

Post-stroke impairment is common…

- Decreased gait speed
- Decreased endurance
- Balance impairment
- Falls
- Fear of falling
- Pain
- Strength and ROM
- **Altered balance self-efficacy**

All are associated with post-stroke declines in **activity** and **participation** and **QoL**

Stroke Writing group, 2010; Pulaski, 2003; Schmid, 2007, 2008, 2009, 2011, 2012

LETS TALK A LITTLE BIT ABOUT SOME OF THESE OUTCOMES

Gait Speed & Endurance

- Gait speed
  - 10 meter walk
  - Maybe the 6th vital sign?
  - Common measure of mobility
  - Related to rehabilitation recovery potential
  - Predictor of health status and functional abilities
  - <0.6 m/s predictor of health care utilization and functional abilities
  - What does it mean?
    - **Related to ADLs/IADLs and functional ambulation**
    - **Can you make it across a street?**

- Endurance
  - How many feet in 6 minutes
  - Common measure of mobility
  - What does it mean?
    - **Can you walk around the grocery store or get to the bus stop?**

Richards, et al., 1995, Imms and Edholm, 1981, Studenski, et al., 2003, Goldei, et al., 1996

SOME PEOPLE THINK GAIT SPEED IS THE MOST IMPORTANT THING TO ADDRESS

PEOPLE WITH STROKE SAY…ENDURANCE…

Combs, Schmid, 2012

Balance after stroke

- Balance impairment common and significant after stroke
- Balance impairment due to:
  - Primary damage of central structures
  - Secondary effects on automatic postural responses and musculoskeletal structures
- Balance impairment significantly associated with post-stroke QoL
- Related to fear of falling, falls self-efficacy, and **fall risk**

Rogers and Martinex, 2009; Tyson 2006; Schmid, 2013

Fall Risk Factors

Moreland, AGS, Tinetti, Cochrane

Disease & Disability	Mobility Impairments	Other
•**Stroke** •Parkinson's Disease •b •**Postural hypotension** •Arthritis •**Neuromuscular function/disease** •Cardiovascular function/disease •Hypo/**hyper-tension** •**Depression** •Multiple Sclerosis	•**Decreased gait speed** •**Decreased balance** •**Decreased lower extremity strength** •**Previous falls** •**Gait deficit** •**Muscle weakness** •**Balance deficit** •Foot problems	•**Age** •**Fear of Falling** •**Cognition** •**Vision** •Hearing •ADL participation •Female gender •Use of AD •Environmental factors •**Comorbidities** •**Polypharmacy** •**Urinary incontinence**

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Falls Rates are High after Stroke

- Most common medical complication after stroke
- Stroke is an independent risk factor for falls
- Falls increase in the hospital and after D/C
  - Twice as likely to fall after discharge

76% of people with stroke report a fall after stroke!

Davenport, et al., 1996; Forster and Young, 1995; Schmid, in 2013

Balance self-efficacy

- Balance confidence
- Associated with community reintegration
- Confidence to complete a task without loosing balance
- Linked with:
  - Balance
  - Fear of falling
  - Motor function
  - Physical function
  - Perceived health status

Salbach, Mayo, 2006; Pang, Eng 2007, Schmid 2012

Balance self-efficacy

- Associated with balance and fear of falling
- **Primary predictor** of activity & participation
- Balance self-efficacy may be more important than physical recovery!!
- Focus on balance self-efficacy to improve activity and participation?
- Psycho-social factors more important than

Balance and Balance Self-Efficacy Are Associated With Activity and Participation After Stroke: A Cross-Sectional Study in People With Chronic Stroke

Arlene A. Schmid, PhD, OTR, Marieke Van Puymbroeck, PhD, CTRS, Peter A. Altenburger, PhD, PT, Tracy A. Dierks, PhD, Kristine K. Miller, PT, Teresa M. Damush, PhD, Linda S. Williams, MD

Post-stroke impairment is common…

- Decreased gait speed
- Decreased endurance
- Balance impairment
- Falls
- Fear of falling
- Pain
- Strength and ROM
- Altered balance self-efficacy

Perhaps **yoga** can address each of these issues after stroke?

Stroke Writing group, 2010; Pulaski, 2003; Schmid, 2007, 2008, 2009, 2011, 2012

LETS TALK YOGA

WHO IN OUR AUDIENCE PRACTICES YOGA?

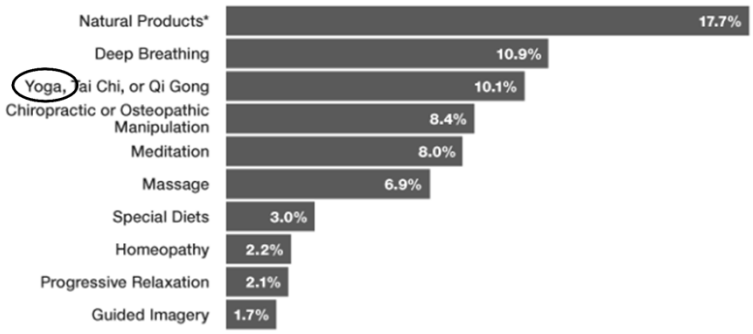
WHY YOGA?

- Balance
- Strength
- Endurance
- Flexibility
- ROM
- Anxiety
- Depression

Complimentary and Integrative Health (CIH)

- Yoga is a type of CIH

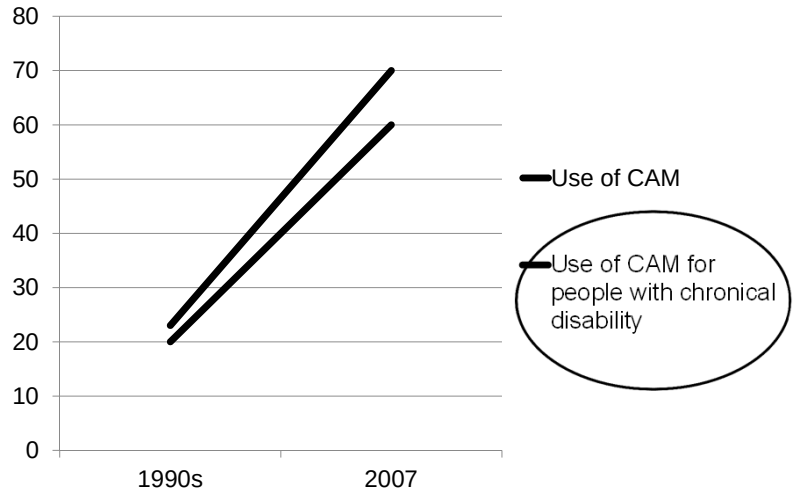
10 most common complementary health approaches among adults—2012



- https://nccih.nih.gov/health/integrative-health

% of adults engaging in CAM

(n=20,000)



(Okoro 2011; Wells 2010)

What is yoga?

- Yoga is an aspect of CIH
- A system of exercises for attaining bodily or mental control and well-being
- Originated from India dating back 5000 years – set of practices to improve connection between mind, body, and spirit
- Introduced to Western culture as a practice for managing stress and improving health

("What is CAM?," 2010, "American Yoga Association," 2006)

Yoga

https://nccih.nih.gov/health/yoga

Share:

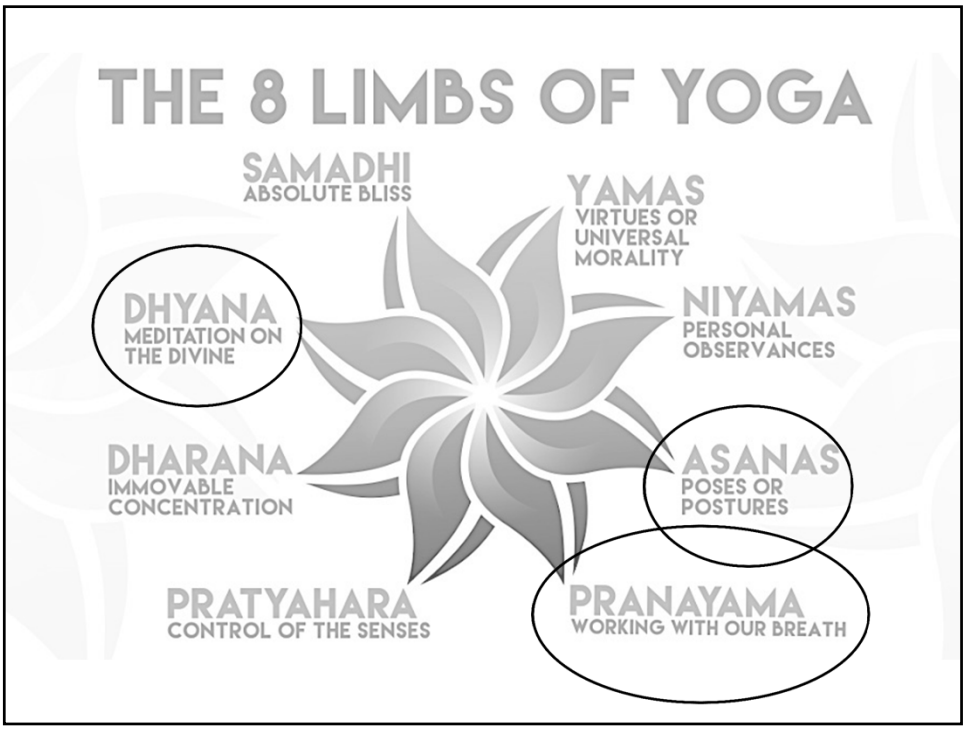
Yoga is a mind and body practice with origins in ancient Indian philosophy. The various styles of yoga typically combine physical postures, breathing techniques, and meditation or relaxation. There are numerous schools of yoga. Hatha yoga, the most commonly practiced in the United States and Europe, emphasizes postures *(asanas)* and breathing exercises *(pranayama)*. Some of the major styles of hatha yoga are Iyengar, Ashtanga, Vini, Kundalini, and Bikram yoga.

The 2007 National Health Interview Survey found that yoga is one of the top 10 complementary and integrative health approaches used among U.S. adults. An estimated 6 percent of adults used yoga for health purposes in the previous 12 months.

FEATURED:
Scientific Results of Yoga for Health and Well-Being Video
RUNTIME: 16min 37sec

NCCIH's unique video that looks at yoga from a scientific perspective.
Yoga for Health

This fact sheet provides a general overview of yoga and suggests sources for more information.



Hatha yoga

- Asanas, pranayama, dhyana
- Increasing attention as complementary technique in the US
- Hatha yoga is gentle
- Demonstrated increases in:
  - ROM (hands, feet)
  - Flexibility
  - Endurance
  - Functional fitness in adults/young older adults

Yoga and OT

Opinion

Yoga is a complete system of occupational regulation, based on complex theories that address occupational risk factors while relating occupation directly to health and wellbeing. Although aspects of yoga have been used in Western occupational therapy settings, some of its underlying theories may have been overlooked. If validated by research, these theories may enrich occupational therapy philosophy. Yogic techniques of potential clinical use include pulse diagnosis, meditation and breath control. These are not described in detail in this opinion piece, but should be the subject of thorough literature reviews and, perhaps, further research.

Yoga: an Ancient Occupational Therapy?

Venthan J Mailoo

WHO IN OUR AUDIENCE USES YOGA AS PART OF OT?

Yoga and OT

- *'Yoga, an ancient occupational therapy?*"
- OT and yoga concerned with the "whole person," integrating body, mind, and spirit in practice, and **holistic** care
- Therapists use yoga as a modality to facilitate relaxation, decrease pain, fatigue, depression
- OTs becoming yoga therapists

(Mailoo 2005; Brachtesende 2005, Oken, et al., 2004, Galantino, et al, 2004, Woolery, Myers, Sternlieb & Zeltzer, 2004, Raub, 2002; http://www.matthewjtaylorinstitute.com/otyoga.pdf)

http://www.mindfulot.com/

We think…

- Mind-body connection makes the difference
- Stroke is complex – but so is yoga!
  - More likely to lead to improvements than simple body strengthening or stretching exercises completed through a single plane of movement
- Yoga programming may be complementary to rehabilitation and be cost-effective
- All clients can engage in at least some aspects of yoga (breath, meditation)

(Kirkwood, Rampes, Tuffrey, Richardson, & Pilkington, 2005)

How yoga <u>may</u> work…

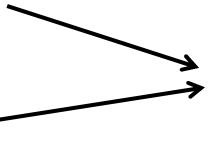
- Connects the mind and body with breath
- Combination of postures and breathing are most beneficial when utilized together & produces different results than exercise
- The mind is encouraged to focus on what is occurring in the body and where the body is in space, increasing both awareness and proprioception.

(Kirkwood, 2005; Bal 2009; Dhaliwal, 2002))

How yoga may work…

Includes stretching and prolonged physical postures which:

- Lengthens major muscle groups
- Activates the stretch receptors in muscles, ligaments, and joints



Leads to improved physical strength and flexibility

(Luskin 2000; Tran 2001)

"Yoga is often recommended as a form of total-solution exercise for older adults, although there is little scientific evidence to support this recommendation."

US Department of Health and Human Services

YOGA AND STROKE

Schmid, et al.

Why? Yoga and Stroke

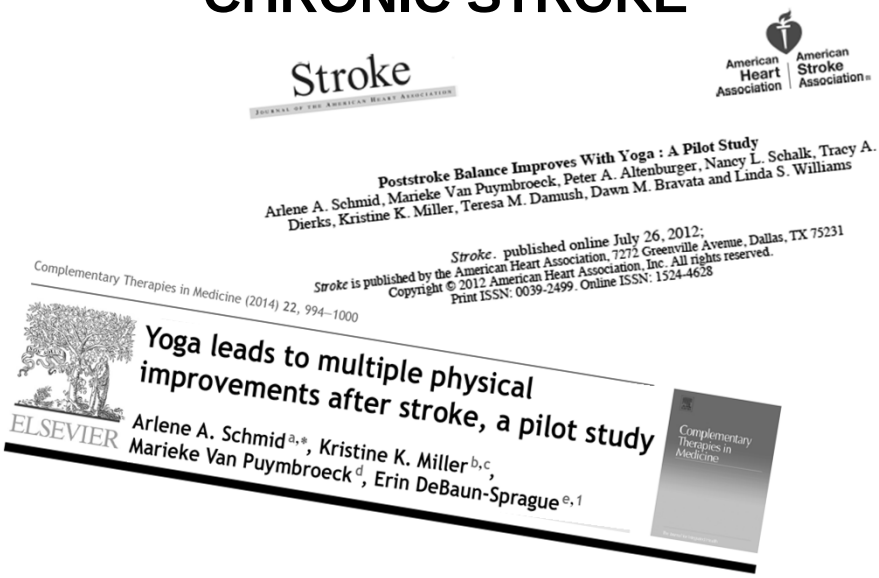
- Qualitative study - mind body disconnect after stroke
- Two case studies exist that examine the benefits of yoga on survivors of stroke:

  1.) Increased dexterity and aphasia scores after a yoga intervention

  2.) Improved scores in the physical, cognitive, emotional, and social participation (SP) domains of the Stroke Impact Scale upon completion of yoga sessions

(Garrett,; Lynton et al., 2007,Bastille & Gill-Body, 2004)

YOGA & ADULTS WITH CHRONIC STROKE



Purpose of this study

- Primary
  - Examine the impact of 8 weeks of yoga on balance and balance self-efficacy scores in people with **chronic stroke**
- Secondary
  - Assess the impact of yoga on activity and participation and QoL (and gait and strength and ROM)

Funded by VA, Schmid, et al. 2012 and Schmid, 2014

METHODS

Design

- 5 waves – all <10 people
- 8 weeks, twice a week, one hour session
- Yoga taught by a certified yoga therapist
- Data collection before and after
  - PT with >20 years experience
  - Non-blinded
- Waitlist control group

Inclusion	Exclusion
• 2x/week x 8 weeks commitment • Chronic stroke (all >6 months) • Adults 18 years • Completed all stroke related rehabilitation • Able to stand with or without a device • Residual disability • Able to speak and understand English • Scored a ≥4 out of 6 on the short 6 MMSE • IRB	•Receiving palliative care •Unable to ensure transportation •Self-reported: •Serious cardiac conditions •Serious chronic obstructive pulmonary disease •Severe weight bearing pain; •History of significant psychiatric illness •Uncontrollable diabetes with recent weight loss •Current enrollment in another research trial

Measures

Variable	Measure
Balance	Berg Balance
Balance self-efficacy	Activities Balance Confidence
Strength and ROM	Strength test and goniometry
Activity and social participation	ICF Measure of Participation and ACTivity (IMPACT)
Quality of life	Stroke Specific Quality of Life
Gait	10MWT & 6 MWT
Plus qualitative data	

Balance - Berg Balance Scale

- Valid and reliable
- Physical performance measure
- 14 items
- Scores ranges from 0-56

- Higher score=better balance
- ≤46 indicates a fall risk
- <36 indicating a 100% fall risk

Berg, 1992, 1995, 1995; Rose, 2002; Mao, 2002; Blum, Korner-Bitensky, 2008; Maeda, 2009

Activities Balance Confidence (ABC)

- Balance self-efficacy
- 16 valid and reliable items
- Valid and reliable in individuals with stroke
- Self-report of balance self-efficacy in

The Activities-specific Balance Confidence (ABC) Scale*

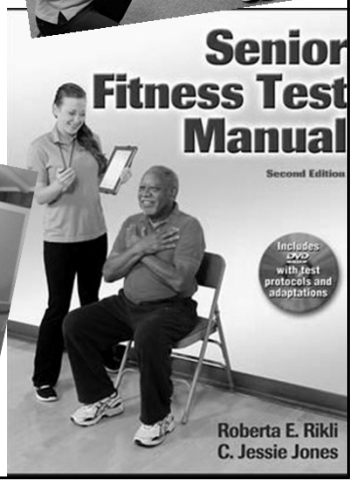
For each of the following activities, please indicate your level of self-confidence by choosing a corresponding number from the following rating scale:

0% 10 20 30 40 50 60 70 80 90 100%
no confidence completely confident

Powell and Myers, 1995; Myers, 1998; Botner, 2005

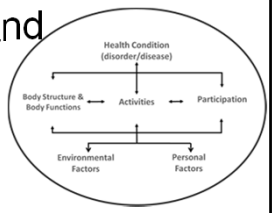
Strength and ROM

- Chair to stand
- Arm curl
- Good old goniometry



WHO IN OUR AUDIENCE KNOWS THE ICF?

Activity and Participation



- ICF Measure of Participation and ACTivities (IMPACT)
- Valid and reliable
- Self-report
- 33 item scale
- Identifies restrictions a person has in the 9 categories of activity and participation
  - Activity (items 1-19), scoring from 19-76
  - Participation (items 20-33), scoring from 14-56
  - Total score 33-132
- **Decreased scoring indicates less limitations**

Post, 2008

Stroke Specific Quality of Life

- 49 items in 12 domains

Energy	Family Roles	Language	Mobility
Mood	Personality	Self-Care	Social Roles
Thinking	Upper Ext. Function	Vision	Work

- Shown to have strong internal consistency
- Shown to have strong validity and reliability

(Williams , Weinberger, Harris, Clark, & Biller, 1999)

Basic gait

- 10 meter walk
  - Reliable & valid measure of walking speed in stroke
  - Instructed to walk as quickly as possible safely
  - Complete 2 walks along a 14 meter walkway
  - Timed during the middle 10 meters
  - 2 times averaged and converted to m/s
  - Can use AD and orthotics as needed
- 6 minute walk
  - Reliable & valid measure of walking distance in stroke
  - Instructed to walk at a comfortable pace making as many trips as possible along a 100 foot (30 meter) walkway in 6 minutes.
  - Distance recorded in feet
  - Can use AD and orthotics as needed

Analysis

- Descriptive statistics to describe the sample
- Paired t-tests/Wilcoxin to assess differences between baseline and 8 week
- T-tests/MannWhitney to compare differences between yoga and control
- SPSS

YOGA INTERVENTION

Intervention

- Focus on hips and ankles
- Biweekly yoga sessions for 8 weeks
  - Led by a Certified Yoga Therapist (Nancy Schalk)
  - Assisted by trained yoga therapy assistants, RAs, and OT students
  - Sessions end with 5 to10 min facilitated meditation and relaxation

PROGRESSION OF YOGA POSTURES

Week 1-2

Entire practice is seated with seated relaxation

Week 3-4

Seated and standing practices with a seated relaxation

Pictures from Yoga Sessions

Pictures from Yoga Sessions

Week 5-8

Seated, standing, and supine on floor poses with on floor relaxation

RESULTS

Demographics

	All N=47	Yoga N=37	Wait-list N=10	P value
Age (42-89)	63.1±8.8	60.2±8.9	63.9±8.7	.44
Race, black, AA	28(60%)	6(60%)	22(59%)	1.00
Gender, male	38(81%)	10(100%)	20(54%)	.172

Baseline stroke characteristics

	All N=47	**Wait-list N=10**	**Yoga N=37**	**P value**
Months since stroke	51±40.4	36.4±23.6	54.9±43.2	.20
Independent (mRs 0-2)	26(55%)	5(50%)	21(57%)	.70

Between groups

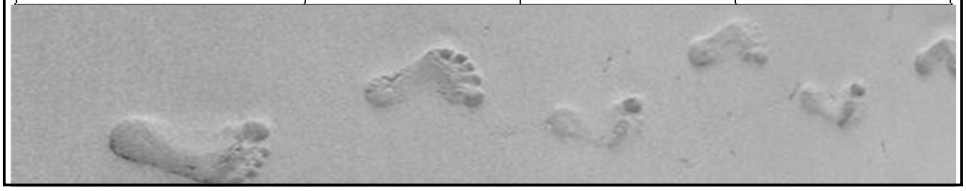
- No significant differences between yoga and control
  - Demographics
  - Baseline variables
  - 8 week variables
- Not powered to see differences between groups - but there are exciting trends!

Yoga only: comparison between baseline & 8 weeks

N=37	Baseline	8-week	P-value
Balance	41.3±11.7	46.3±9.1	**<.001**
Balance efficacy	62.9±22.8	66.8±23.4	.18

Yoga only: comparison between baseline & 8 weeks – physical

N=37	Baseline	8-week	P-value
UE strength	13.70±4.48	15.03±5.20	**.002**
LE strength	6.46±3.93	7.08±4.02	.100
Pain	57.48±14.9	53.26±12.8	**.003**



Yoga only: comparison between baseline & 8 weeks - ROM

N=37	Baseline	8-week	P-value
ive cervical rotation, left	54.72±8.22	63.72±9.22	**<.001**
ive cervical rotation, right	55.52±9.51	64.4±8.81	**<.001**
ive cervical lateral flexion, left	20.48±9.47	27±8.93	**<.001**
ive cervical lateral flexion, right	16.84±8.99	24.72±8.15	**<.001**
mstrings passive ROM, left	-22.56±9.17	-13.2±5.07	**<.001**
mstrings passive ROM, right	-19.92±6.32	-13.68±6.01	**<.001**
flexion AROM, left	106.4±15.08	112.36±8.00	.093

Yoga only: comparison between baseline & 8 weeks – the GOOD OT stuff!

N=37	Baseline	8-week	P-value
Activity	36.77±9.4	34±7.8	**.007**
Participation	20.71±6.5	19.26±6.2	**.016**
Total IMPACT	57.48±14.9	53.26±12.8	**.003**
Quality of life	33.7±9.2	35.8±9.1	**.03**

DOES DOSING MATTER?

Yoga only: increased frequency (<5 sessions vs ~16)

N=37	Baseline	8-week	P-value
Balance	41.3±11.7	46.3±9.1	<.001
Balance efficacy	62.9±22.8	66.8±23.4	.18
N=29	**Baseline**	**8-week**	**P-value**
Balance	40.7±12.1	47±9.6	<.001
Balance efficacy	61.3±21.8	67.2±23.1	.035

Larger increase in balance AND balance self-efficacy significantly improved

- **N=29: attended >5 sessions (1 hospitalized)**
- **Sessions missed due to lack of transportation, weather, illness, &work**

QUALITATIVE DATA

Qualitative feedback

- “My right arm was weak which was my dominant side and now I can do stuff with it like raise my arm and scratch my ear!”
- “Even if you gain one thing, that one thing is very valuable- it has opened up a whole new way of thinking for me.”
- “I cry less…”

Qualitative feedback

- “The doctors told me that what you get back after three months is it…and it scares you…but I just reached my 1 year and [because of the study] I have gotten better still.”
- “Thank you for investing in our lives”
- “The biggest change I have noticed is my increased range of motion of my left arm. I can get it behind my head now.”

Qualitative feedback

- “I am so much less worried about falling”
- “I am so much more comfortable with my body”
- “I can do things I have not tried since my stroke”

And my favorites…

- "This is **better** than all the rehab I received after my stroke"
- "This is the **best** I have done since my stroke"

Can I use yoga in my OT practice?

- Yoga seems to be feasible
- All participants have enjoyed it
- We see change in social activity
- We are seeing change in variables of interest
- Need to choose best OT measures
- Likely to be complementary to ongoing stroke rehabilitation
- Integrate yoga postures into activities – like putting dishes away or reaching for something
- Yoga protocol follows…

A few next steps

- Other populations
  - Acute rehab
  - TBI
  - Chronic pain
- Merging yoga and OT – funded by the AOTF – preliminary data are very exciting!

Description of Yoga Series

Series	Description
Breathing	Slower, deeper, rhythmic breathing, extended exhale
Eye Position	Bilateral eye movements and holding eyes steady
Seated Series	Head and neck movements
	Scapular ROM* and arm movements
	Seated spinal movements: extension, flexion, lateral flexion, and rotation
	Hip Rotation and stretching with ankle, foot, and toes ROM*
	Hand to opposite knee
Standing Series	Hip extension while standing
	Lunges while standing
	Toe/ball of foot, small knee bands with feet flat on floor
Floor Series	Posterior leg stretches
	Supine extensions: bridge lifts
	Supine relaxation: legs outstretched or knees bent and bound together, feet flat on floor

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- Marieke Van Puymbroeck, PhD, CTRS
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- OT students
- Erin Debaun and Amanda Gerwig
- Entire research team
- Our Wonderful participants!

QUESTIONS?

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