The Use of Therapeutic Yoga for the Prevention of Falls in Community Dwelling Older Adults

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[Jessica] Our presenter today is Dr. Kathleen Kelly. Dr. Kelly is an associate professor of Physical Therapy at Quinnipiac University. She has taught in the areas of neurologic rehabilitation, balance, falls and vestibular dysfunction for 24 years. Dr. Kelly received her BS in Physical Therapy from the University of Connecticut, her MS in Neurology from Boston University and her doctorate in education from the University of Sarasota. She is also a board certified neurological clinical specialist. In 2004, Dr. Kelly completed her 200 hours certification in Kripalu Yoga and in 2008, she completed an additional 200 hour training in Anya Sar Yoga. Dr Kelly’s passion for both yoga and preventing falls in older adults, has created many avenues of service. She has presented her work in the areas of yoga for fall prevention and electromyography and yoga asana both locally and nationally. Thank you so much for returning to physicaltherapy.com, Dr. Kelly. At this time, I'm turning the microphone over to you.

[Dr. Kelly] Hello? Am I on? Oh, okay, thank you. Thanks for the intro and thanks to everyone for being here. I appreciate your attendance and I'm going to first read the learning outcomes and then we'll get started. So for today, our learning outcomes are one, to define the practice of yoga, two, identify at least three specific pathologies that would benefit from a yoga based intervention, three, describe at least two benefits of yoga for the prevention of falls in older adults, four, identify at least two lower extremity muscles that when weak are most related to falls in older adults, develop a plan of care incorporating at least four yoga postures that target muscles associated with falls in older adults and develop a plan of care using modified traditional yoga postures for older adults with balance deficits. Thank you for the introduction, Jessica. Yes, I am a professor and also a yoga teacher. I've been teaching yoga for about 14 years now and I've been doing research in the area of yoga for fall prevention and surface EMG during asana for probably about 10 years. So I just want to ask before we get started, are there people in the audience who are practicing yoga right now? You can just give me a

[continued]
hands up. Great, and how about, are there people in the audience who are treating people who are at risk for a fall? Okay, so more people doing fall prevention than doing yoga. So that's great. I'm gonna make the assumption that part of your intent is to kind of add to your bag of tricks for fall prevention. And I'm also going to make the assumption that if you're treating people who are at risk for a fall, you know about falls and falls in the elderly, so I probably won't do any long review on falls, history falls, things like that.

So we'll start with a little bit of background on yoga and I will start this by saying, this is a whirlwind tour of the definition and background of yoga. There's certainly a lot more to it than I would have time to present in even a two hour workshop. But I want to give people a little flavor if you have little or no experience with yoga. So the word yoga, the actual word means to yoke or bring together. I'm having a little trouble with my arrow. It's stuck on the side there. And there are several ways you can think of the term bringing together. One, probably the most common or popular is to bring together the body, mind and spirit. Other little more esoteric definition coming from yoga literature is bringing the individual spirit, also known as self with the universal spirit, also known as Brahman. And I guess the main thing I'm trying to get across here is that yoga is more than just a physical exercise.

And because of that, I think it attracts certain people, certain types of people, both older folks and different kinds of people because it’s more than just exercise, it's more than just going to the gym. There's more to it than that. Yoga, if you have heard things about yoga, yoga is not a religion, it's not a cult, it's a practice. And one thing that is really important if you're thinking about using yoga with any clients really, not just clients who might be at risk for fall, yoga is not exclusionary. We can modify almost any posture to fit the person's needs. And as physical therapists, we're all uniquely qualified to make modifications that will enhance the practice and benefit our patients. So maybe you're not teaching this particular asana and that's okay, but you can teach
many many others and modify them as needed. So again, this is a whirlwind tour of the history of yoga. For those of you who do practice and study yoga, I apologize. For those of you who are new, here's a little, this would be like giving you the history of physical therapy in one or two slides. Yoga is sometimes traced back as far as 3,000 BC. The more, I guess recent or clear tracks of yoga were seen in the vedic age, which was around 500 BC and it's called the Vedanta period, which was a time when we don't find writing because yoga is an oral tradition.

But there are an occasional picture and some historical pictures about people doing asana. At the end of this period, the Vedanta period, the Upanishads and the Bhagavad Gita are some of the first known texts about yoga. And really it wasn't until about 2080 that we see the yoga sutras, which is probably the most well known written discussion of yoga. The definition of a sutra is a thread or a perot. So a sutra is a short description of something and there are sutras describing all aspects of yoga. So the advent of the use of the sutras defines what's called the classical age of yoga, which is the age of dualism. So dualism is a belief that the self, the inner spirit is separate from the universal or the bigger spirit and that's known as the classical age.

So Patanjali, when he wrote the sutras here, he wrote the eight limbs of yoga, The Eightfold Path and what you're probably most familiar with if you practice yoga or even if you've read some articles here and there, you're familiar with the asana. Asana is the physical practice of yoga. If you've taken some public classes, you have probably been exposed to pranayama or what's known as the control of the breath, prana, meaning breath. And then perhaps depending on the teacher, you might have done the dhyana at the end or maybe even at the beginning, which is meditation. So in classes, public classes, any kind of class really, people don't normally teach the yamas and niyamas, it's usually something you study. And then samadhi is often something we're reaching for. So people aren't necessarily teaching about it, we're reaching for it. People often use the example of the Buddha as someone who has reached samadhi. So that's the
eightfold path of Patanjali. That's a thread through all kinds of yoga. Probably later from around 500 AD, is when we see something that's called the Tantric era and tantra, whatever it is you may have heard or may have not heard, the definition of tantra is really that it’s non dualistic, which means we perceive the self and the spirit as one, that we're not separate. And that's all that that definition really means. And Tantra is what modern yoga is based in. So modern Hatha Yoga arose from tantric yoga and Hatha Yoga is really the root foundation of most of the forms of yoga that you'll find here in the United States. So Hatha is a non-dualistic path and it's deeply rooted in the practice of asana. The word hatha literally means force or forceful.

So again, if you've taken a public class, you've tried it once or twice, you've done a video, you've probably done some form of Hatha Yoga. I could have probably four more slides like this, right? So it's just to give you a taste of their many many forms, most of them are based in Hatha, in asana and it's all about how people view the asana, organize the asana and two things I'll point out, one is Kripalu, which is where I did my initial yoga teacher training at the Kripalu Center for Yoga and Health, which is located in western Massachusetts. We also learn quite a bit about the Yamas, the Niyamas. We're taught to have pranayama or breathwork in each class and there's a lot of philosophy. Kundalini is also a kind of practice that uses a lot of breath work, a lot of pranayama and then an extremely well known and very popular in the west form of yoga is iyengar and iyengar yoga often attracts a lot of PTs, OTs, PTs, nurses cause it's very anatomy and alignment based.

So just to give you a sense, no right or wrong, it's really all about what practice feeds you, what do you enjoy and what are you trying to get out of it? So a typical western yoga class, if you take a class at the Y or the gym or even a full length class in a video, it's often organized in this manner. There's a quick centering at the beginning, some people tell stories, some people do meditation, some people do breath work. The intent is to get your mind back into your body and out of your work day, your commute,
your to do list, so a centering. Sometimes there’s pranayama at the beginning, sometimes there's pranayama at the end, sometimes there is no pranayama at all. It really depends on the type of teacher. There's always asana, which is the physical practice, the movement. Sometimes there's meditation and always in a Western class you'll find the last pose of class is savasana. So savasana is really part of the seventh limb, Dyana, but it's actually considered a pose, not part of the eightfold path. So if you've taken yoga, this is probably what it looked like and if you didn't like it, I encourage you to give a different teacher a try, give somebody else a chance. There's a lot of yoga out there nowadays and if you're really interested, you'll find something that you like. So, any questions about yoga, the practice of yoga, the definition of yoga before I move on, everyone needs a pile of props in their house. It's required because the dog likes the props. So no questions? Perfect.

So I'm gonna move on to how I've designed this particular, continuing Ed is, we’ll do a little bit of background literature related to yoga, just to give you a sense that people are studying yoga and there is literature that supports the therapeutic use of yoga for many many different ailments. I've chosen here the most popular, low back pain, anxiety and depression and then one that you all are here for, gait balance and prevention of falling. So there's a lot of literature and yoga and anxiety and depression. Less on low back pain, but I felt it was very applicable to my audience. And then of course you’re here to learn about fall prevention in yoga. So we’ll look at some of that literature. This is by no means an exhaustive examination of the yoga literature. If you go into pub med and just put in the word yoga, you’ll certainly be inundated with hits. So you have to pick your area. These are some areas that I've been interested in, so I like to start here. So yoga and low back pain, in 2004, Mary Galatino did this nice study and just a little background, Mary's also a PT. She teaches at a small private college in Pennsylvania, I believe. So this was a capstone project students did. And how I found that out is I met one of the students at one time who participated in this project. She was taking a workshop with me, so that was very funny. They looked at 22 participants,
two groups, yoga and Control. And what I want you to start noticing is the dose. So one hour, twice a week for six weeks. And their post test didn't reach statistical significance, but they found improvements. And I'd always had a theory that they stopped the study after six weeks cause the students probably had to graduate. So you have to stop so students can write their workup and graduate and that's actually true. My theory was proven true.

So I've always believed if this study went a little bit longer, they probably would have found statistical significance. It just wasn't long enough and that's just my own personal theory about yoga studies, that they need to be at least three months long to show any change. So then we have Williams in 2005, you see a slightly bigger group of people, 44 subjects, a little bit longer class, one and a half hours, but only once a week and a much longer duration, 16 weeks. And what they found is a reduced use of pain medication and improved function. They had probably six or seven measures they used and they found improved function on the PDI, which is the pain disability index and the PPI, which is the present pain index. Interestingly enough, their Oswestry scores were not statistically significant. So just a little FYI. Then there's the Sherman study in 2005, again now we're getting into larger groups of people. Now, they're going one hour and 15 minutes and once a week and they've kind of split the difference. They're only doing 12 weeks. This study at the time when it came out, it got a lot of attention cause someone from the New York Times did a review and this is what they had in the New York Times. Yoga is more effective than self care, which is not exactly what the outcomes were.

But they did find that people who were performing yoga had better outcomes than people who were just reading and doing it on their own. The same group of people, so you see Sherman and 05, Sherman and 11, they repeated their study, only they made it much bigger. They had three groups. They used their same exercise pamphlet, but they added this third group of stretching. They still did the one time a week for 12 weeks
and then what they found was yoga and stretching are reasonable treatments for low back pain and yoga is more effective than a pamphlet, but not superior to stretching. So yoga and stretching were about the same in terms of outcomes. Then I always like to give you guys at least one systematic review. I think they’re really helpful. And also someone else is doing all the work. So this author Cramer, looked at eight articles with a total of about 1,000 subjects. Most individual trials are small which is extremely true. I will tell you it’s very difficult to get a group of people together to do yoga for a consistent four, eight, 10, 12 weeks.

So most trials are small and there’s a lack of heterogeneity in the intervention. So kind of the same problem we have in say, exercise and physical therapy where we don’t know what everyone’s doing, right? Everyone’s doing it a little different. So even though the trials are small and the interventions are different, it appears that yoga is helpful for chronic low back pain. So any questions about yoga for low back pain? Alright, so we’ll move on to yoga for anxiety and depression and I will tell you, this is probably the most brief piece. There is a ton of literature on yoga for depression and then things start to branch off looking at pranayama, breath work for depression, looking at only savasana for depression. There is a ton of work and the overall feeling in the community is yoga helps, right? Yoga helps. So here’s an old study, 2005, 90 minutes, twice a week.

So I think this is my personal opinion that this is a great dose right here. 90 minutes, twice a week, three months. If you wanna make a change, this is what’s going to do it for you, right? 60 to 90 minutes, twice a week, 12 weeks, three months. So this is a personal opinion. I read a lot of literature, I do my own studies and that’s where I’m at right now. If you wanna make a change with someone, you’ve gotta go kind of the distance, they’ve gotta be consistent. These particular authors use the state and trait, which is very common when people are studying anxiety and they also measured salivary cortisol levels, which decrease after yoga. I think the more pertinent question is
do they stay decreased? So on the day you do yoga, your cortisol levels are lower. Are they staying that way? We don't know the answer to that question. So this study showed some improvements. Woolery in 2004, they also found improvements. They also used the state and trait, which is an anxiety measure and then they used the back, which is a very common in the literature measure of depression. One hour, twice a week, very short study and they still found improvement. So I wonder what would happen if they went longer. This Pilkington Meta-Analysis is okay, it’s only five studies, but at the time, 2005, it was the only Meta-Analysis around. They found a trend.

So looking at five studies, there’s a trend towards improvements and we always want to look at the literature with a bit of a grain of salt when we're doing human studies cause oftentimes people aren't randomized. I don't randomize in my studies, most yoga people when they're doing studies don't randomize. So there's always that, a person who volunteered is already interested. So how does that impact the outcome? This 2009 study had two groups and again, they did 90 minutes, twice a week also using the back and state and trait and they found, again, some improvements. So we’re seeing a trend that even small studies find improvements. So we come to...

Really what we’re here for is yoga for the prevention of falling.

And we could go on with the literature, yoga for arthritis, yoga for carpal tunnel. There's tons of literature. I just wanted to give you kind of a taste of what's out there. So why would we as physical therapists who have a large kind of bag of tricks want to use yoga for the prevention of falling? So a whirlwind background on falls and fall prevention, cause I'm assuming that you guys already know this. If you don't, you could tell Jessica or Calista that you want me to do a course on fall prevention and I could do that too, just a shameless plug there. So whirlwind tour, one third of all community dwelling older adults fall. Falls represent the leading cause of deaths by injury in older folks. Risk of falls increases with each subsequent fall. Risk factors for falling are multiple and if you read Mary Tinetti’s work and although it’s old, it’s really
really important cause it's the beginning of studying falls. It's the history of how to look at a fall. So Mary will say to you, if you reduce one risk factor, you can reduce the overall risk, right? So we see people with multiple comorbidities and we think, oh, how are we gonna make an impact? Well, the literature will support us to say, reduce one risk factor, you can reduce overall risk. So how do you reduce risk factors? The number one thing that Mary Tinetti recommends is reducing the number of prescription medications. We’re physical therapists, we don’t have control over that. So let’s move on. Improved strength, balance and gait. Well, this is what we do, this is what we do. So reduce one risk factor, reduce the overall risk of falls. We’re uniquely qualified to improve strength, to improve balance, to improve gait and then compel at risk seniors to participate in group based therapeutic exercise.

There’s a whole separate arm of literature, showing that groups, exercising in groups is more motivating, people are more consistent, so therefore they have better outcomes. Now is it the group itself or is it just the consistency? I would tend towards believing I’m more consistent cause I have a group of friends I wanna see and consistency is key. So reducing risk of falling, three of the top four are things that physical therapists can directly impact. So some specific activities, if you look at the literature on falling and really the biomechanics of falling, we know that falling is a multifactorial problem and it’s not just biomechanics that calls people to fall, but if you boil it down to biomechanics and look at the literature, if you increase the strength of the knee extensors, dorsi flexors and plantar flexors, you reduce the risk of falling.

If you have people train eccentrically, you reduce the risk of falling. If you increase the range of motion of hip extension, you reduce the risk of falling. Very very specific biomechanical things that we as physical therapists can examine and provide intervention for to reduce risk of falling. So why use yoga? Well, you can organize your class in such a way that it hits all the areas. There are asana for every joint, any range of motion. Yoga classes are by nature group based, which often means people are
more likely to be consistent. And yoga is very accessible. Where I live, there's yoga at the Y, there are silver sneakers program that also provides yoga class once a week as part of silver sneakers. The senior center provides yoga at extremely extremely low cost, very low for local seniors. So it's accessible and it's beneficial. So can yoga actually impact the biomechanical variables that we have identified? Can you use yoga to improve strength of dorsi flexors and plantar flexors? Can you use yoga to improve gait? There is not a ton of literature, but the literature that's out there would say yes.

So the DiBenedetto article in 2005, it's one of the more important articles I would encourage you to read. If you get to the end and you look at the work cited and you say, oh, I can't read all this, read this one. They had 19 subjects, they did 90 minutes twice a week for eight weeks. And what's different about this study is they used some motion analysis. They got the people in the lab and they looked at motion analysis and they found that yoga improves hip extension. They didn't find a significant improvement in self selected gait speed and I'm always curious what might've happened if they measured fast gait speed. In my experience, fast gait speed is more amenable to change than self selected gait speed. So that's just my comment on the article is, I wonder what if. So what else about yoga can help reduce the risk of falling? The next few studies are studies that were done at Quinnipiac with my students and they're actually the ones that kind of got me into, I wonder if yoga would be helpful for people who are falling.

At the time I was practicing yoga and teaching yoga and I was treating falls, balance, people with stroke, people with MS. But it never occurred to me to kind of bring it all together. So this was a really small study, it was a capstone study. You see, we only did four weeks, one hour, one time a week. So this dosage to me, I would think would never create a change. We found a statistically significant increase in the Tinetti and that's really what sparked my interest to think, I wonder what else could be going on here? So in 2011, we did a larger study, more people, longer time. Again, it was not
randomized, we used a sample of convenience from a local continuing care retirement community. And we did several measures, so the first thing we do is a mini mental and anyone who doesn't pass the mini mental is excluded cause it's really a protected population. You don’t wanna be doing research on people who are not cognitively intact. Then we use the BERG, the TUG, self selected speed and fast gaits speed and the ABC, if you're familiar, this is a pen and paper test about balance. People report, how are they feeling about their balance. We did yoga twice a week, 90 minutes for eight weeks and if you read the article, you can see that the asana list is there.

So I provide that for the reader cause I think that's really important. What we found was a, sorry, statistically significant increase in the BERG and an increase in fast gait speed, which to me was the most surprising. I thought, how is yoga impacting gait? And I'm sure it has to do with the bio mechanics, improving strength and range of motion. But I was still very very surprised that we had an improvement in fast gait speed. The one thing that I think is really important to do when you're looking at studies though, is to think about, what’s clinically meaningful and what’s statistically significant. So the clinically meaningful change for the BERG is a 5.7. My subjects only increased 3.5, but that ended up being statistically significant. Clinical difference for TUG is 1 to 2.49 seconds. Our subjects showed 0.97 second change.

So, in theory the statistical significance shouldn’t have impacted the people clinically because it wasn’t clinically significant. But if you asked them, which we did at the end, did a little bit of just data collection, qualitative data collection, people felt better. People felt more stable, people felt stronger. So there’s something going on that we’re just not measuring, but it is improving. So, let’s see. The data will suggest that the intervention group did show improvements and yoga is safe and it was just something alternative. Most of these people were doing some type of exercise. It was a continuing care retirement community that provided all kinds of things. So people were walking, people were going on day trips, people were doing other types of exercise and they
were just interested in yoga. So yoga is just an alternative intervention for people to stay exercising and stay involved if nothing else is interesting them. We'd had a small sample size that was a short duration and again, it was non randomized. So in 2014, I had another group who wanted to do a similar study. So we made some significant, important changes. We increased the time, 12 weeks instead of just the eight weeks and that luckily was just from better planning. We had a different location, so we used a senior center. So a comparison would be the continuing care retirement community. People live there. They could walk to class. The senior center is more of an outpatient. People had to be able to drive to get to the senior center.

So I think that inherently, our subject pool was probably a little bit more functional. We dropped the BERG in favor of the mini best. The BERG, if you use it, you'll notice that it has a low ceiling. People that are very functional hit the ceiling quickly. Many of the items are contained on the mini best and then there’s also additional items. And then at the suggestion of a research mentor, we added the dual task TUG. So looking at TUG and dual task TUG. We sure and he'll notice the time to 60 minutes, Much to my chagrin, but I got a lot of complaints from my first round that it was too long. 90 minutes, it’s too long, we're tired, we're busy.

People are busy, right? Active seniors have places to go and things to do. 90 minutes is too long for exercise. So we shortened it to an hour, but we lengthened it to 12 weeks and we use very similar, asana practice, very similar. We had 13 subjects, only one man and he did hold the door for everyone every day. He was fantastic. We had a statistically significant increase in the mini best, the TUG, the dual task TUG, fast gait speed and very surprisingly to me, self-selected gait speed. I was very shocked at that piece of data. Self selected gait speed is very very hard to impact. When you're in clinic and you're measuring and you're looking for change, make sure you measure fast gait speed. So walk as fast as you can, measure both because if you only see someone three or four times, you may not have an impact on self-selected gait speed, but you
might impact fast gait speed. So we had a little weather. I live in the northeast, so we lost four subjects to snow. Got to love mother nature. And I've been questioning returning to the use of a control group, randomizing subjects. It's very difficult because people are volunteering. So if they're volunteering, they often don't wanna be randomized. But those are some suggestions if people are out there and you're wanting to do some studies. So overall, if we look at the research literature on yoga, a group based exercise is a viable way to improve functional outcomes. It can also be extremely cost effective. Even though it's group based, it's still effective in changing variables.

One problem in the yoga area is we sometimes don't know what the asana program is, it's not included in the article or in the appendix or anything, which is really important. We need to know what people are doing so we can evaluate if it's going to be useful for us in clinic. So how does it shake out when you're going to organize a class or maybe you just want to add an asana, one or two asana to your standard physical therapy treatment? Or maybe your patient comes in and says, oh, I'm going to try this yoga class, what do you think? How do things shake out? So what I'm gonna do is go through specific asana and the word asana just means posture or a position. So this position is just on forearms. You can call it bhujangasana or forearm, prone on forearms. So asana just means posture.

So I'm going to go through, how do the postures or the asana shake out in the literature. And not every asana has been studied, so sometimes we don't know. So as I said earlier, a typical yoga class is a centering, pranayama, asana. My training from Kripalu includes extensive warmups. We were taught to always do warmups. Not all trainings include that because I'm doing yoga with seniors., I always include warm ups to get people feeling safe and feeling comfortable and ready to exercise. So some guidelines, if you're organizing a whole class or say you're looking for a class for some of your clients, someone's getting discharged, I wanna try this yoga thing, I always
start in sitting and when I say sitting, I mean sitting in a chair, not sitting on the floor. Although some people don't have a problem getting on the floor, a lot of people don't like to be on the floor. So we start in a chair, we do with centering. Everyone has the chair for later as a prop. We always have blocks and then, if you're organizing classes or looking for classes or recommending classes, one thing to think about is, a class for people who can get on the floor and a separate class for people who can't or won't get on the floor. So that's really important, that's one thing that might cause people to shy away from yoga is, well, I can't get on the floor so I can't do yoga. So looking for classes that don't ask people to get on the floor. So I always do a centering and breath work in a chair. I usually do a diaphragm training because who can't benefit from diaphragm training and asking people about injuries or concerns.

Obviously if I'm doing a study, I already know that, but if it's a public class, I'll ask. And then this is a list of options, things you can do to warm up. Some things that I do, every single class are standing toe and heel raises as part of the warmup and I will tell you why in a minute, but here are some options if you're sitting in the chair and then you finish your last stretch sitting, which would be a piriformis stretch and then they stand up and finish their warmups. So heel and toe raises, why include that in a yoga class? Probably the best work that was done was done at University of Connecticut by Whipple and his group. And what they did was take people who were known to have fallen, compared them to people who were known to have not fallen, age and sex matched. And what they found is people who fall have decreased strength in dorsiflexion and plantar flexion.

Very simple design, no intervention, just looking at what is descriptive work. So people who fall have weakness, dorsiflexion and plantar flexion. There was another review done by someone from the same group, Wolfson. He found a strong relationship between balance, strength, and gait, especially strength of the anterior tibialis. So overall, if we look at the literature, there's a good correlation between decreased
muscle strength and increased risk of falling. So when I do a class, I do warm ups in a chair and then I finish with warm ups standing and the last warm up is done in standing. So the beginning of the practice is done in standing. So we don’t get up and down a lot, we sit in a chair, we stand up, we do our asana standing. If we’re gonna get on the ground, we get on the ground, we stand the ground and finish or people can finish in the chair. So if I do have older folks get on the ground, it’s only one time. So a more typical class, you might be going up and down, up and down doing a vinyasa. That’s not how I would teach a class to people who are at risk for falling.

So baseline pose is tadasana and we would end a class doing some warmups standing using the chair for balance, heel raises and toe raises and then we would start the class in tadasana. Tadasana is the foundation for all your standing practice and you can use this as much or as little as you like. You can talk about alignment in tadasana, you can talk about engaging the feet, you could give it to people for home program. When we do EMG studies, we use it as our baseline, right? So assuming there’s actually a minimum amount of muscle output in tadasana cause it’s really just basic standing. And then a standing series that you have probably experienced if you practice yoga and a standing series, that’s pretty common. Chair pose, Warrior I, Warrior II, extended side angle and triangle.

So before we looked too much at the asana, we’re just gonna look at again, the Whipple article, they also looked at strength of the quads, right? So fallers have weakness in anterior tib gastroc and also knee flexion and knee extension. Anterior tib gastroc, knee flexion and knee extension. And then, more recent work by Carville and Perry, again, looking at people who have been known to fall, fallers do not have a good eccentric quadricep contraction. So the eccentric ability of the quadriceps can be used to distinguish fallers from non fallers in a laboratory setting. So we come to utkatasana, which is really just standing squat. The asana’s called utkatasana, but you can also read squatting literature. And when we go on the lab, what do we see? So this is a
subject who’s being studied. There’s surface EMG on our quads, her hamstrings, you
can't see the right leg, anterior tib and gastroc. We're fancy now, we're wireless. This
picture is a little bit old and you could see the wire here, but we’re very fancy now,
we're wireless. And what we find is utkatasana, also known as standing squat, ooh, my
apologies, is a great way to activate the quads, it’s a great way to activate the quads.
And we’ve done it many, many times in the lab. There’s three separate studies that
have actually been published, there’s not a large amount of EMG in other muscles and
one of our bio mechanists, Quinnipiac came by a poster of mine one time and said,
well, what about the glut medius? Cause you know, those kidneys people.

So we did a specific study in 2017 on the glut medius and guess what? It doesn’t fire
as much as you think in a standing squat, in a standing squat, but the quadriceps do.
This is called Warrior I, virabhadrasana I. And if you read the yoga texts, Warrior I
strengthens the quads, the gluts and improves balance. So this is a text on yoga. If we
take Warrior I into the lab and study it, really the quadriceps are working only about half
as much as they worked in utkatasan. Hamstrings are only working around 30%. In this
particular study, we didn't have surface EMG and gastroc soleus, so I don't really
know. And because we weren't getting great data, I don't study this posture anymore.
This is virabhadrasana II, Warrior II, very common yoga pose. And what we see in
Warrior II according to the yoga text is that everything’s working, quads, gluts and
hamstrings. What we see is really not as much lower activity. And I would say that my
opinion of that is cause it’s more distributed.

The work is being distributed if you look at the pose. Oh, sorry about that. If you look at
the pose here, you got both legs on the ground, both feet on the ground, you’ve got a
good quad contraction here, so you've got distributed work. So you don't get that
directed work in the quadriceps like you would get in utkatasana. One thing that I think
that’s important to note is the DiBenedetto article, they use vira II and a couple other
asana because they were trying to open up the hips, improve hip extension. So that is
one of the postures that they used. Trikonasana or triangle pose is another standing asana you might see in a yoga class, also known as a hip opener. I haven't done any studies of trikonasana, so we don't have any EMG data on that, but it is known as a hip opener. So if you are looking to increase range of motion of the hips, that might be one of your choices. So vrikshasana or tree pose is a pose that we study all the time in the lab and you can see it's a variation of unilateral stance. So the person's leg is up, the person's foot is up against their leg and you can see the surface EMG on this leg and then we would have her switch and collect data from the other leg. So it was a variation of what you might do in a clinic when you're doing a unilateral stance test in vrikshasana.

And what we find in the unilateral poses is a lot of work in the gastrocns and hamstrings. So in yoga, we use balancing poses to teach us humility, but in PT we use balancing poses for strengthening. And one thing that we will find in the literature is some different studies on unilateral stance. So the position of the arms, the position of the free leg is often different. So if you wanna get an overview, this is probably the best study. The Michikawa, 2009, they looked at 23 studies and what they concluded really is that one legged stance can help you predict injurious falls or predict frailty, but it doesn't predict all falls. So just because someone can't do unilateral stance, it doesn't necessarily mean they're definitely going to fall. Wang looked at the unilateral stance in terms of the BERG and felt that you could use the unilateral stance in tandem standing alone to discriminate between fallers and non fallers.

What we find is large amounts of EMG data. Anterior tib and gastroc in unilateral stance. We found more output in females than males and no difference with experienced practitioners versus non-experienced practitioners. But the big thing is, if people are falling and they're weak, they're probably weak in anterior tib, gastrocns, quads, maybe hamstrings. The EMG literature, the data would suggest that unilateral stance helps activate anterior tib and gastroc. So it's really a win win, right? It's a yoga
posture, you’re doing yoga, but you also know you’re strengthening muscles particular to fall prevention. So if you’ve ever taken yoga, I’m sure you have been subjected to downward facing dog. You can see she’s hooked up here. So we have done a few studies on downward dog. Not a lot, because if you notice, the weight’s pretty evenly distributed. So that’s what the output is for the EMG, a little bit of everything. So perhaps not the best posture for fall prevention, but it’s a common posture. If someone’s gonna go to a public class, they’re gonna have to do downward dog, so they might want you to work on it with them in therapy. It’s known as an inversion, which is often part of...

A typical yoga class would be an inversion. It is an opportunity to weight bear on the upper extremities which we don’t have a lot of activities that afford that. And it’s a cornerstone pose in a public yoga class. So if you have a client who’s considering trying yoga or going to yoga or they’re interested in yoga, there’s probably no way they’re going to get out of it. So it’s good to know what’s there and what it can do for you. And you can see just the general distribution of output during downward dog. So it’s just a good general pose, a lot of older folks don’t like to do it cause they don’t like to get on the floor, they don’t like to wait for on their hands, they have pain in their hands. So towards the end, I’m going to give you some ideas for modification. And then shalabasana, locust pose, it’s not the most common pose in the bag of tricks of a yoga teacher. I haven’t done any studies on it myself, but I thought it was really important to bring up this study.

The Iki et al study cause what they did was weight, they put a weight on top of the trunk right here and they found improvements in bone mineral density. So I think that’s really important. If you’re going to design a class, soup to nuts and people are willing to get on the floor, why not do shalabasana? It’s only one study, but I think it’s an important outcome. This called basakonasana, bound angle, it’s known as a hip opener. I don’t really study motion so much as I study surface EMG. So I haven’t done
any studies with badakonasana, other people have, but it’s a good hip opener and it’s
good for posture. And navasana or upward boat, depending on the style of yoga,
certain styles really emphasize core and working on the core. At Kripalu, we would
include both just as part of an overall class, but we don’t really focus on the core that
much. You can modify it. It is more accessible than it appears because what you might
have someone do is bend their knees or put their arms down and you can really modify
it for anyone who’s willing to get on the floor. This has to be a class of people who will
go on the floor. Ukatas, oh, sorry, setu bandhasana, also known as bridge pose.

So you can see, it’s the same as a traditional bridge that you might do in the clinic. This
picture is with the arms, the hands class, but you can do it with the arms flat or
crossed, whatever modification works for your clients. It’s also known as a slight
inversion and it’s very good lower extremity strengthener. And again, if you have people
who are willing to get on the floor, it’s a good a strengthener. I have a couple of
stretches here, pavanamuktasana, which is also known as wind relieving pose, really is
just a single knee to chest. You can see that there. Single knee to chest, more for
stretching and relaxation. Really only for people who are gonna get on the floor. In
yoga, poses like that purport to massage the abdominal organs.

I always tell my yoga classes, my public classes, I don’t have any data to support that.
A claim made by the yoga people for some reason no one is willing to have an
electrode stuck in their abdominal organs and be studied. So we don’t have a lot of
data on the what it really does do, but it is definitely a good activity for someone who’s
willing to get on the floor. And then you see the... You got the contra indications here.
And then shavasana, for those of you who have done yoga classes, most classes in the
west and with shavasana. So shavasana is also known as the pose of shivah. The rest
pose, Mr. Iyengar will call this the hardest pose and it’s put at the end so that you can
integrate your practice and relax. There is this one great study, it’s old. It’s the only one
I’ve ever found. They only looked at shavasana. So they had people just come in and
do shavasana and they measured pre and post and they found improvements in symptoms of depression just from doing shavasana. I would say, we probably need some more data to support that, but if you have been in a yoga class, you probably will admit to shavasana being your favorite pose. So one thing about yoga is we definitely need more data. From what we can see right now, yoga can probably reduce the risk of falling. It appears to improve lower extremity strength, it definitely reduces symptoms of anxiety, especially if you use a state and trait to measure. It improves symptoms of depression as measured by the back depression inventory...

Back depression inventory, sorry. And there’s many, many things about a yoga practice that haven’t been measured, right? We just don’t know everything that goes on, what makes someone come to yoga, what makes someone stay, what makes someone like it, we don’t know. Any questions, any comments? Alright, so the... What I have for the rest of the presentation is how can you modify yoga? How can you use asana either in a class format. So say you’re a yoga teacher and you’re creating a class or possibly in a clinical setting. So either you’re trying to teach someone or someone's come to you and said, I really want to go to this yoga class but I’m nervous or I went this yoga class with my friend and I was afraid or I didn’t feel like I was doing it correctly. What can we do to help alter or modify to make yoga more accessible to more people?

So there are a lot of pictures for you to use when you’re designing your own treatments, your own practice and there’s a lot more out there. I only have an hour, so it’s certainly not an exhaustive, discussion of how we can modify. So if you’re either teaching a class or providing a sequence to someone who won’t or can’t get on the floor, we can use the chair as a prop to modify things. So you can do all of these warmups seated in a chair. I usually use a chair without arms, so there’s a little bit of room, but if you have people who feel more unstable, you can make it work with the chair that also has arms. And then we have lots of shoulder stretches. We can do arms overhead, hands behind the head, towel stretches. I have some pictures of the last two
there, garudasana and anjali mudra, I have some pictures to show you. So lots of seated stretches. So clasping hands behind the head, obviously people with shoulder pain, shortened pex, this can be hard. But it's a stretch that can be done seated and then I just want you to notice that this chair doesn't have any arms, right? So if's someone who doesn't get on the floor, but they're stable enough to sit in a chair without any arms. So they have good sitting balance, you can use a towel stretch. A towel, sorry, or a belt. So I would put a towel in my hands right here or a belt or people are always saying use old neckties, I don't know. Anytime someone I know has a neck tie that gets old, they just throw it away.

So I don't know of people with old neck ties. I like to use a yoga belt and again, that's a big shoulder opener for someone who is stable, sitting and stable. This is called garudasana or eagle arms. You can see that close up here. A little more of a shoulder opener, a little more complicated, have to have some good sitting balance cause I don’t have any arms there on my chair. And then, I always include some breath work. My main training is in neurology, neurologic physical therapy, but I have had to... I have been compelled to teach cardiopath. So I always include some breath work, pranayama, before, during, after, all through their practice cause it's really important. So breath work with upper extremities. Anyone know what this is right here? I mean, any of my former students in the audience, what is this?

Oh my goodness. Nobody knows PNF anymore, alright. So she’s doing upper extremity D2 PNF. She’s gonna take a breath in on the way up and a breath out on the way down. It's really good shoulder stretching, really good work for the diaphragm and she’s actually getting the job done even with arms. The chair here, you see the low arms here. So this is a great activity for even a yoga class where people are getting on the floor as a warmup. So some asanas that you would traditionally do in standing, how would you do them in a chair? So tadasana, you see here, we can either have the arms up or she used to have, you can almost even see a little pain in this right
shoulder. So she would keep her arms down. And we, again, we’re in the senior center, so we’ve got the chairs with the arms here. So tadasana modified for a chair class is very simple. You do the whole pose seated. Ardha chandrasana or half moon, I didn’t show you a standing, standing picture of that, but you can do this seated, it’s a little harder if the chairs have arms, it’s four stretching the size of the trunk here and again, a person has to have really good sitting balance. They don’t have to have good standing balance, they just have to have really good sitting balance. So for those of you who have taken public classes, a lot of public classes, people rely heavily on a vinyasa or sun salutations.

So it’s used for heating up the body, for warming up the body, heating up the legs and sitting, we can use it to also warm up the body and to increase respiration and we'll get people moving even though they’re gonna stay sitting, right? So the assumption of the chair yoga class is people are mostly seated and then maybe they’ll stand up and use the chair for balance. So you can still do a sun salutation in sitting. So utkatasana or chair pose, we do in standing and in standing, obviously we get a lot of output from the quads. Seated, it’s not gonna be as good of a strengthener, obviously you’re not standing up, but it’s much easier on the knees. And what I work on with seated utkatasana is trunk, right? Hinging the trunk, drawing the abdominals in, holding the posture to strengthen the trunk and then I often cue people to press down into the floor so that they’re engaging their legs, right?

So not as much as a standing utkatasana, but still keeping active. Still keeping people active. And then you can also lift the arms up, which makes it harder. Cueing more posture and as long as people don’t have pain in their shoulders, it’s a really good activity. So virabhadrasana I, I showed you at the beginning, without the chair and the normal virabhadrasana I, you have some nice even output of all the muscles, front and back. With the chair, you prop the chair under the front leg, so there’s a lot less weight bearing through the lower extremities. You don’t need as much balance, if the person is
having any kind of problems, any trouble, what you have them do is bring the arms down and just hold one arm onto the back of the chair and in all these pictures, I have the chair just on the floor, but you can put the sticky mat under, right? So then the feet won't slide at all. This is a little tricky to do. Oftentimes in the senior centers, they have our rug down, so it can be a little bit tricky if it's slippery at all. And then virabhadrasana II, a similar position of the chair right underneath the front leg, but a little bit more stable cause now I'm gonna be facing forward, right? And if you can see here, the back foot can be all the way down as opposed to in virabhadrasana I, the back foot is usually gonna be up.

Especially if it's like the first class, first two or three classes, sometimes I just skip vira I completely and just do virabhadrasana II. It gets people comfortable with using the chair for support, using the chair to rely on and still engaging their muscles. So that's a way to modify vira I and vira II. Side angle, I also didn't do this in standing, sorry about that. It's similar to virabhadrasana II, so you can see the same position of the legs and the chair. And then what we do in side angle is just add a little bit of a stretch, right? So you put the forearm down. So the person has to feel safe and stable on the chair before they're gonna stretch. And this is a really good time to do some breath work. So as they're holding the asana, I have them take a deep breath into the side. They only would switch sides and you can get a lot of really good breath work.

So in yoga we do twists both sitting on the floor and also sue pie, laying on the floor. And twists, there's a lot of yoga literature about twists, but not a lot of studies. The yoga people believe twists are way to kind of ring out the organs, bring blood and lymph to the organs. Again, I can't offer you any studies on that, but I do know that twists are usually an integral part of well designed yoga class. So for people who can't get on the floor or lay down flat or sit on the floor, you can do a lot of twists seated in the chair. The problem is if you do have a large armrest, right? So this chair has no armrest. So we just do a very simple twist to one side and then the other really easy to
do in the chair. Then we do a little more complicated twist, it's called ardha matsynendrasana, but it's in the chair. So you see one leg is crossed over and you twist towards that side. We're gonna hold the back of the chair. You can actually make this work with a chair with an armrest. You have the person use this hand on that armrest. Just has to be a little bit of wider chair. So always interesting, trying to make do with what's around, right? What kind of chairs are available, what does the facility have? Just make sure none of the chairs have wheels. And then a much deeper twist, this is your same person who has really good sitting balance. And they twist over to one side and then they get a little bit of forward flexion. It's a modification of parivrtta utkatasana.

So several ways to modify seated twists using a chair to make sure that you can include those in your classes. So succirandrasana, you know it as a PT as figure four or maybe eye of the needle. We usually in the PT clinic do it laying down, supine. If you either have a chair without arms or if you feel comfortable having people scoot forward, it's really easy to do in sitting. We make sure the foot is flat, foot is flat, top ankle is in dorsiflexion and really good for opening the hips. So just remember if we improve the range of motion of the hips, we'll often see improvements in gait and when you improve gait, you reduce falls, when you improve gait, you reduce falls. So doing some hip openers in the chair is still very valuable. And then the seated piriformis stretch, most of you guys, again, you probably do this laying down.

Person is supine, on a high plan or a mat. We do it in a chair. Just have the person cross the leg over. And honestly, this is usually the hardest part for older folks, getting the leg crossed over and the twisting is optional. The twisting is optional. So, usually I just work with them on getting their leg in a position that's comfortable, that feels like a stretch. So then you have opening of the hips in both directions. You have succirandrasana and you have piriformis stretch. You have a nice hip opening seated in a chair And then runner's stretch, probably not something you think about doing with
people who are older, but it’s really nice in the chair as long as they’re stable and most of the time I would have the chair on a mat to make sure that it doesn’t slip. And then we do a lot of queueing and work with the back, the posture, hinging from the hips and using some breath work. Anytime you can get some hamstring stretching, it can be really beneficial to people who are having trouble walking. So we did in the warm ups, we did heel raises and toe raises. So you’re doing some strengthening, then maybe some chair pose, then doing some stretching, hip opening both sides and then hamstrings. This is never a favorite with my classes with older folks.

A lot of people can’t do it. It is a deep stretch even though you’re sitting in a chair, it doesn’t have a yoga name, it’s just a quad stretch. But I couldn’t show you a hamstring stretch and not a quad stretch. So you might choose not to teach this, you might choose to skip it. We sometimes put a block right here, under the knee, put a block and then it’s a little more stable. And this one’s really impossible to do if the chair has arms cause there’s no place for the leg to go. So garudasana, I showed you earlier with the arms. Garudasana is actually a standing balance pose, eagle pose. You stand up on one leg, then you cross the opposite leg over like so and then you cross the arms. So this is modification in sitting. So the only problem with doing it and sitting is you’re not getting all the benefits of standing on one leg, you’re not getting all that EMG output of gastroc and anterior tib, you’re not working on balance, but what you are working on is a lot of range of motion, upper extremity and lower extremity range of motion.

And then I usually cue people to squeeze the legs together, so you activate the adductors and to dorsi flex the top foot, so you activate the anterior tib. So you get some work in, you get some activation of muscles even though you’re not actually standing on that one foot. And then pavanamuktasana, I showed you earlier in a class where a person can lie down and here it is seated. So it’s really just single knee to chest. You exhale as you draw the knee in and then you switch sides. So this is
something you might do at the end for relaxation before you’re finishing and if you’ve taken yoga shavasana, we normally lay down on the ground floor, but for people who aren’t getting on the ground, we just do some shavasana seated in the chair. Sorry, did you guys just hear my dog barking? It’s thundering here. Alright, so some forward fold in the chair, it’s a little bit tricky. Paschimotanasana you would normally do seated on the ground and then hinge from the hips and fold forward. So the first thing I tell my people is, if this makes you dizzy, you don’t have to do it or if you get dizzy while you’re doing it, just come straight up. Forward folds are deep, deep stretches, bilateral hamstrings.

And then you might also get the low back. Sometimes people do get lightheaded, so I have them come up slow and then we do a lot of breathing, breathing at the top. So that’s a seated forward fold. This one’s really easy to do even if you have arm rests on the chair cause they’re not in the way and people can use armrests to push themselves back up. So that’s paschimotanasana, seated forward fold. So this piece was really about a class or activities you would do for people who are only gonna be in the chair. So do people have any comments or questions about doing yoga in the chair? I’m sure you have communities around you that offer chair yoga. So this would be some examples of things that are going on in those classes in chair yoga.

Okay, so the other way, I’m not getting any questions, so I’m gonna keep going. The other thing you can do is you use the chair as a prop. So you’ve probably been in classes where you have blocks, maybe you have blankets. This is using the chair to make the class as a whole safer and more accessible for people. So when I do my studies, everyone has a chair and we always start in a chair and then we move to standing. Get him our of here. And then we may use the chair as a prop or not and it’s really just optional for people. They can use the chair as a prop or they can put it to the side, but we make sure that everyone in the class has a chair. So it’s available and it’s not any big deal for someone to say, oh, I need a chair. Oh, sorry, thank you, I
apologize for that. I usually lock him out of here, but he was being so quiet and now it’s thundering so he’s not quiet anymore. Alright, so utkatasana, this is probably the third version I have shown you. So that tells you how important I think utkatasana is in the grand scheme of the practice because we see such good EMG output of the quads in utkatasana and because eccentric work in the quads is really important for gait and fall prevention. I really like to have people try this pose. So you can see that the knee flexion that you would normally get with a squad is not as deep. The chair is there for balance. Again, you could have the chair... You could have the chair on a mat here and we’ll do two or three and always encouraging people to go deeper. One thing you can do to protect people’s needs if people are complaining of knee pain or strain, you put a block in between, right?

So they squeeze the block, it holds their femurs in a good position and they still get the work on the quads that they need. So this is a really great, I think modification for people who are capable, but maybe just a little nervous. I’m very spoiled because when I teach yoga to older folks, to people who might be at risk for falls, I normally have two physical therapy students in the room with me. So I’m never worried if anyone’s going to fall or get hurt cause I always have my students with me. If your clients go to public class, obviously that’s not gonna be the case. So you could show them ways to use the chair to keep themselves safe and still go to the class. Here’s another modification with a different kind of chair and then she was really unsteady, more nervous than unsteady.

So we do it over the low mat to give her that sense of there’s really no place for you to fall, right? The chair is here, the mat’s here, I’m over here, it's all good. And you know, eventually she moved away from the mat and started just using a wall at her house. But at the beginning, it’s important for people to feel safe. So there’s a question here, so for the seated poses with legs crossed, what do you suggest for people with knee replacements who have been told not to cross their legs? The seated poses with legs
crossed, the purpose of that is to open the hips. So if you can get them to cross their legs, but the position of the femur to tibiae is still nice and neutral, then it's really no strain on the knee. Now if they've had hip replacements, that's different. I normally tell them to just stay in the small range of motion if they've had hip replacement, but if it's knee replacement, you want the stretch in the hip. So really if you're mindful of the position of femur to tibiae, you can still open the hips. So I hope that answered your question. Alright, so we have several ways to modify utkatasana, right? We have seated, we have standing, we have standing in front of the mat. I think that's it, yep. So these next few are ways to modify downward dog. So one, I would call it a concern, not a complaint.

When I teach yoga with older people, is my hands hurt or I don't wanna put weight on my hands or I'm afraid to put weight on my hands. So downward dog, if you remember, hands and feet are on the floor. The easiest or you know, least amount of weight bearing through the hands is to put the hands not on a chair like here, but on the wall, right? So she would just be hands on the wall, it's almost like doing a pushup on the wall. That's where I start with my people who have the most tender joints in their wrists and hands. And then if they're willing, if they're willing, I'll start to work down first to the seat of the chair. And if this is uncomfortable, you can put a mat in the seat. And it doesn't matter if the chair has arms or not because the arms won't be in the way. And we're getting a little bit of weight bearing, but she has a ton of control about how much weight she puts in, right? It's all up to her and if it bothers her, she comes right off.

So we start in the seat of the chair with a downward dog. You can use the back of the chair, but then there's really no weight bearing on the arms, it's more for the position. So I like to start at the seat, unless they're really, really nervous. Then what we did is I happened to have a stool. In this clinic, we had a stool, so I brought her down to a stool. One of her concerns was, oh, I don't... There's no way I have the range of motion, I'm too stiff, I couldn't possibly bend that far. So I showed her, sure you can,
right? We started in the seat, she practiced that at home. Then we went to bench. One time I was doing a study and they had those freely old fashion... I’m just gonna date myself so badly, gymnastics mats that you fold into thirds, if any of you are even old enough to remember that. So I use that, I folded it into thirds and every week I would unfold it and she ended up eventually downward dog on the floor at 84 years old after eight weeks. We use the block here to modify and I think I have one more here, modification. Nope, no more modifications. If the person is not in pain, it’s more fearful or I can’t bend that far, you can find ways to modify it. And at the beginning, I think I had it on a slide previously.

Contra indications to downward dog would be uncontrolled hypertension, detached retina, increased intracranial pressure, all things that are probably not going on with a person who’s coming to a public yoga class and things that would be in their chart if you’re seeing them in the clinic. So, definitely talking to people about their medical background just to make sure. So those are some ways to modify downward dog and then triangle pose with the chair. People actually really like this pose, right? A full triangle pose would be with this hand on the floor. It's with more at the beginning of the slideshow. And when you show that to someone who’s older or even someone who feels really tight, they look at you like you’ve just told them they have to learn how to speak a new language in five minutes.

Then you pull up the chair and people are much more open minded, they’re much more willing to try. You can see in this picture we have the mat underneath, so her feet are not slipping. The chair is not slipping and the purpose of triangle pose is a stretch on the hamstrings and it’s a little bit of a twist here. So you’re still getting the benefits of the pose, but the person is nice and safe. And just a little disclaimer, this is my mom, she wasn't in any of the studies, but I needed some pictures with someone who looks like she could have been in a study. So thanks mom for paying for undergrad and being a good subject. So tree pose, we try and do during the study and when I teach a public
class, I try and do at least one balancing pose, unilateral stance. It’s my preference that we do two in each class. So if you have a one hour class, you organize it so the hard poses come right about in the middle. So I do tree pose every class with everybody regardless of their age or their ability because I’m really, really passionate about strengthening hamstrings and gastroc. I’ve read all the literature, I know all about fall prevention and my own opinion is strengthening gastrocs, strengthening anterior tib is the most important thing. So here she is doing tree pose with no prop and you see her foot is below her knee. Another way to modify that would be to put the foot on the floor, right? Foot on the floor. And then everyone has a chair. So it’s not... They’re not embarrassed to just hold onto the chair cause everyone has one and it’s right there. So we just turn the chair to one side, we do vrksasana on one side, turn around, do vrksasana on the other side.

I think it’s really important and people get a lot of confidence when they start to practice balancing poses with you. I have a question here, do you recommend using an Eric’s balance pad? I wouldn’t recommend it during the yoga class for standing, you might be able to use it in the seat of the chair, like to modify for downward dog or something. But I wouldn’t have people stand on it. My intention with yoga is to get them comfortable with yoga so that they might take a public class or go to silver sneakers and try and feel comfortable. You know the Eric’s standing on an uneven surface, that’s a whole different intention, it’s a whole different intention. Alright, let’s see. So I got done a little bit early, I apologize for that.

So I’m gonna take questions and then if there aren’t any questions, we can go. Oh, so Jessica’s asking me for a case study. We could do a case study if there aren’t any questions. Alright, let me hit the questions here and then we'll see where we are for time. So question one, as a modification for weight bearing, oops, weight bearing on hands. Oops. As a modification for weightbearing on hands on the chair. Yeah, oh, thank you. I was having trouble opening the question. Yeah, you could use the the
Eric's pad for modifying for weight bearing on the hands. You just have to be careful, sometimes Eric's pads make people dizzy, right? The uneven surface makes people dizzy. So I have, how long should older people hold the positions? So in yoga, you're taught anywhere from 30 seconds to two minutes. If you've ever held a yoga pose for two minutes, you know that that's excessive. So, I try for 15 or 20 seconds and I do most things twice and then we work up to 30 seconds two times.

And at the beginning, we do a lot of education about managing your breath, managing your energy, taking a break if you need it. Like a public yoga class, people are usually good about if they need a break, they take it, but sometimes, if you're in like a senior center, people feel funny, they don't wanna relax, they don't wanna take a break. So we just do a lot of education, but we work up to 30 seconds and try to do each one twice. The other thing is you have to keep your eyes peeled for people who are holding their breath, we don't want them holding their breath. Let's see, I have a preteen girl that I can't get to a class, is there a DVD that you favor that we could use in the home to get started? So I would recommend and not just for preteen girl, but really for anyone if you're trying to get started. Here are a couple of options.

Number one is called Yogaglo, Y-O-G-A-G-L-O, Yogaglo. You buy a subscription and you could cancel it at any time. They have lots and lots of classes on there, anywhere from 30 minutes to an hour and a half, beginner, intermediate, advanced. It's an online format for taking yoga. International Journal of Yoga, no, it's called Yoga International, Yoga International. They have a similar format as Yogaglo where you sign up, you do for a month, you see how you like it. As far as DVDs, oh my goodness, there's millions, I wouldn't even know where to begin. Honestly, I would start with a subscription service and find somebody you like. Also Giaim, G-I-A-I-M, Giaim. It's a little bit cheaper, the classes are shorter, but it's a similar, it's an online, it's a streaming kind of thing. And then there's always YouTube, right? To get started, not for really learning a lot, but to try to get started. What are your favorite yoga positions? I really like
inversions, handstands, form stands, I like to go upside down and of course everyone's favorite is shavasana. And I do like to do partner yoga, so this one's fun. Alright, so I don't have any other questions here so I'm going to actually talk to you about one...

She was one of the participants in a very, very early study that we did. So it was a single case design, she was probably in her mid 50s. She had MS and she was independently ambulatory with rolling walker, which she despised and with a cane, but she was fearful, she was fearful of using the cane.

And she was independent around the house, she could drive, just everything was slow, everything was exhausting to her and she was fearful a lot, but she didn't want to... She didn't wanna change her lifestyle based on fear. So we did a yoga intervention. We did once a week for eight weeks and then she would do at home, which you know, what she could, what she wasn't fearful of. So if you look up any of my articles which...

Let me show you this. You have all the references, you actually have more references than what I included today just because I figured if you're interested, it's here. I'll save you some work. So I did not cover all of these articles today. Everything I did cover should be on here and then there's just more cause there's so much. So if you look up either of my articles on falls, so let's see. Yeah, Dana's article, this one here, 2014 and then this was before I got divorced, 2011 here.

Those two studies have the asana practice just outlined, not explained cause the publishers will never let you explain it, just outlined. So I use a very similar outline with this particular study participant. So we would start seated in a chair, we would stand and she would use the chair as a prop and I would work on getting her away from the chair. So it's really a PT intervention, but I'm using yoga as my exercise, right? So I'm being a PT. The person has balance deficits in MS, but I'm using yoga as a PT and you have to understand it was a study, so I was paying her, right? So we don't have that whole, what about insurance? Is insurance gonna pay for this? No, insurance is not gonna pay for this, but I was paying her cause it was a study. So we work on standing
and working on heel raises, toe raises, stretching, things like that. Balance, right feet apart, feet together, balance. And then a lot of the poses that I have pictures of using the chair as a prop. So downward dog with hands in the... Hands on the seat of a chair, Virabhadrasana II, with the chair underneath. We worked a lot on udkatsana standing squat without any props. So she started holding onto the chair, but I really kind of nagged her a lot about letting go to work on her strength of her quads, but also her balance. And the thing that you have to kind of think about is when you're helping someone work on their balance, you're also improving their confidence, right? Cause they're seeing, I can do this, I can do this, right? And then she would get on the floor because she knew that I was gonna help her up. So we do things on the floor and always a shavasana.

Of course she had some spasticity, so I was really trying to teach her some pranayama, breath work with the diaphragm and shavasana to help manage the spasticity. And at the end, so we did only eight weeks, once a week for eight weeks. She had improved gait, so faster gait speed. She had an improved ability to ascend and descend stairs and I only use training stairs. So we just tested her on training stairs. She had some kind of maybe two steps to enter her house like that, so we worked on that. And then we looked at her postural sway in the lab. So improvements in postural sway and there is a little bit of literature on postural sway and falls and I wouldn't... I don't put a lot of, I don't know. I don't put a lot behind that because we don't really know what the relationship is between postural sway and falls.

There's some studies, there are some literature, but there's no kind of clear cut. Yes, people with decreased postural sway also fall down, we don't know that. So she had some improvements, but I was more interested in the gait and then really I was most interested in what she said, which was I feel more confident, I feel safer. And that's the thing that when you read the studies, that's the thing we're not able to measure or we aren't measuring. I don't know if we're not able, but we're not measuring. How does
someone feel when they do a practice that's well rounded? So it includes some pranayama, some meditation, shavasana at the end and they do it for a length of time, say two or three months and they do it in a group of people that they start to get to know. My last study at the end, when we had to end, they were upset. They wanted to keep going, they wanted to stay together. We tried to work with the... It was at a senior center, so we tried to work with the senior center to make that happen and it just didn't work out and they were upset, they wanted to stay together. They were really happy, they had met people.

So how do people feel when it's all done? We don't know. No one’s really measuring it. So I think although as a physical therapist, you have a lot of tools in your bag, yoga gives you something different, right? It gives you something that we don't think about a lot, making someone feel more relaxed, teaching someone how to use breath work to calm their mind, teaching someone a centering. So when they get to a yoga class, you do a centering and you kind of leave the commute and the to do list behind. Yoga gives you something a little bit different. So not saying yoga is better or worse than or just saying it gives you a little something different to add to your bag because I'm assuming you guys all know about falls and falls are multifactorial.

We don’t always know why someone falls. I’ve got a couple of comments here. I work at a senior living facility and they went from two days a week to three and they love it. It’s really great, I think it’s really great to bring people together and people are afraid to just walk into a public class and try yoga, right? It doesn't matter what their age is, people are afraid. So to make it accessible to someone who might be at risk for falling or might not be exercising regularly, I think is really important. Yoga three days a week and they all show up, good, do a study, do some pretest and post testing. Just test everybody’s gait speed, fast gait speed. Alright, so I think that's the end of the question. So I've got everything wrapped up in here. Anything else from anybody else? It stopped thundering here. Alright, well I think I'm done.
- [Jessica] Okay, thank you so much Dr. Kelly, we appreciate you sharing your expertise with us and the stories and the practice with everything and ideas on how to use it. We appreciate your time. Thank you to everybody from joining us. This does conclude today's course. Please join us again for future courses on physicaltherapy.com. Make sure you like our Facebook page and follow us on Twitter for our latest courses. You can also see a list of upcoming live courses on the physicaltherapy.com website. Enjoy the rest of your day everyone.