Welcome to the Mindfulness for Chronic Pain session with Dr. Kathleen McChesney. I have just a couple of housekeeping items for you and first the session is being recorded. Also, if you have not already done so, please mute your microphone until the Q&A portion of the workshop. We have recorded the plenary sessions and posted them on the Pain Skills Training website along with the sign-in sheet and questions that must be completed and returned to receive CME. The agenda and presentation along with the CME sign-in sheet for this workshop is located in the "Files" pod and please remember to download and sign and return the sign-in sheet no later than September 9. I have added the emails to return the sign-in sheet in the chat pod. In addition, screenshots of your name will be taken throughout the workshop to confirm your attendance for documentation for CME. For the Q&A portion, your microphone and your WebCam will be enabled, and this may take a moment or two and we appreciate your patience. During the Q&A, please feel free to place any questions or comments in the chat box. The week following the training you will receive an email survey evaluation your answers are invaluable to the future funding and planning of the Pain Care Skills Training. In addition to the training evaluation, there will be a CME survey to complete within the Navy CME website. The survey from our program and the survey from CME are two completely different items. For CME/CNE, it can take anywhere from three to four weeks to receive your credit and once credits have been assigned you will receive an email from the system to complete the CME survey. Will need to complete the survey and Navy CME in order to retrieve your certificate. Please make sure you do this.

If at any time you're having trouble viewing the slide presentation, please exit out and come back in. Sometimes that is all it takes. The worst-case scenario, please download the presentation located in the files pod and follow along. Now I would like to turn it over to Dr. Kathleen McChesney.

Thank you, Linda and everyone in the background and things to those of you who have chosen to dedicate the next several hours to learning more about mindfulness and I always find this workshop a fun one to teach and especially considering what we are going through with the COVID restrictions as well as the pandemic and changes in our home life and changes in our work life in the upcoming election with the political tensions in the air. Likewise, there is so much happening now more than ever I believe we need to practice taking care of our self and what better way than to participate today and maybe learn a little about the engaging mindfulness practices.

Let's go ahead and move on to the first slide.

While she is setting up everything and moving along to the next flight them I want to let you know the views expressed in my talk today or not at all motivated by the Department of Navy or Army or Air Force nor am I influenced by the Department of Defense nor am I having any collateral incentive motivations or financial conflicts during this talk. Today we will be focusing on how to nurture mindfulness in people with chronic pain and it is such a big trend these days and I want to mention to everyone here the whole function of my talk is really to try and offer the philosophy in the history in the background of why we use these

practices in an effort to really emphasize this is not just their essay a new [Indiscernible] or hippie dippy process these practices have not only been in these for thousands of years, there is also a plethora of scientific evidence to support the impact of certain practices that they have on the brain on a cellular level and in terms of regulating how we respond to stress as well as the presumption of chronic disease and illness so on the next slide --

Again to break it down my goal today is to talk about the origins and philosophy of this westernized label called mindfulness and to inform you of the history of the practice and so you feel more justified and may be able to talk to your colleagues and have that conversation with your patience in order to gain their trust and reliability in your recommendations and to learn about the neuroscience and the functions of the practice and particularly the clinical utility in the appropriateness of how and when to use it for your treatments with patients who have chronic pain and then also if we have time we will show you a standard course I have used in the past for my functional restoration intensive outpatient program and you will have a better idea of what classes we start with and how we introduce people to the use and then advanced or more complicated practices of mindfulness.

Just so you know, some of the therapeutic functions, and I will go into detail further down the road but some of the functions include helping patients who have difficulty disconnecting from the present whether they are struggling with worries about the past that are likely putting them at risk for depression or if they are fixated on the what if's about things in the future, the practices actually really do great work with grounding and there is imaging evidence to support what happens in the prefrontal cortex and we also know it can help with impulse control and we now know it can improve cognitive processing and improving and sharpening concentration and memory and can also help teach people [Indiscernible] taking one of the primary steps in building empathy and connection with others which is often lacking in our patients who struggle with depression and anxiety and of course the physical health benefit of reducing tension which is a transient of the pain experience as well as preventing other certain cardiovascular and chronic illnesses and diseases.

Let's go on to the next slide. I know in the background Linda will be clicking a lot of bullets for me so bear with us and this class is intended to be taught live and so she will be clicking and clicking to get everything we need on the slide.

By definition, the word mindfulness is defined as the ability to observe the experience of the present moment with openness, curiosity, and without judgment. Whatever the experience may be. It uses meditative practices from Eastern traditions, while omitting original religious, ideological and cultural constructs. Again the definition of mindfulness has been a westernized description of the practice of paying attention on purpose in a particular way without applying opinions or judgment, criticisms, and what we pay attention to is not necessarily in the service of reaching relaxation, I think that is a common misunderstanding and as noted before the ability to observe the

experience is based on whatever the experience is whether of noxious or positive or a neutral experience and in so doing by definition the practice cultivates a relationship to our own awareness of what is happening around us, in the present moment but more importantly it helps pay attention on purpose to what is happening internally and a process that many folks actually struggle with or have done a lot to avoid or escape particularly if the internal experience underneath the skin is noshes or unwanted.

Next slide please.

I will start with the origins and I find it really fantastic because so much of this has to do with political history and there is a fantastic convergence as we have advanced technology and international relations over the past if the up to 75 years, we recognize historically some of the origins stem from contemplative disciplines originating from Southeast Asia and some of these traditions are up to 5000 years old and so something must be working if it is a practice that has not been extinguished or otherwise died out. There is also the fascination in Western society about the ability for us to apply the science and scientific method in order to collect evidence to support why this practice or such practices are worthwhile and worth investing in and how they can actually improve people's lives. There's also the wonderful marriage of the history of the traditions as well as scientific research and Western medicine what we've done with healthcare settings in clinical trials in research and academic institutions.

Next slide please.

Case in point, I pulled out some key people, historically, have made a difference in one of the things I really want to do is try to not bore you with talking the whole time but I really want to encourage interactive dialogue and I am putting a plug in for the chat box if during the conference call you have questions or comments, any curiosities, please type those in the chat box and to begin with, I also want to introduce everyone if you are on your computer terminal you may see the little man at the top of your toolbar who is doing this, his raising his hand, so I may ask for the course of this lecture by show of hands, show many how many of you have heard of some of these people before so let's try that out right now. Out of the list but I have provided for you, by a show of hands how many of you recognize some of the names of these people who have been movers and shakers in the introduction of Eastern methods to Western society?

Excellent, yes. We know about them and the names make sense and some of you may more or less have information about what you know of them and what is interesting about this is starting with what was happening in the 1950s and 1960s, it set the stage for the ability for information to travel. Again chat box question, what was going on around the world and in particularly in parts of southeast Asia and the Far East between the 1950s and 1960s, any guesses and you can type those in the chat box.

Anyone? I love it seeing people typing.

There was a lot of international conflict is a clue. We had the Korean War, absolutely. There was also conflict in Vietnam in particular. Members of the French military were in the process of kind of breaking down formal colonization of those areas and also between the political divide of communism versus democracy in these nations, there was a lot of movement of people and in particular as the French were drying back, the American military decided to push forward and try to resolve some of the conflict in these parts of the world and Chinese Civil War, you got it, a lot of conflict between belief systems and political motives and whether or not certain spiritual and religious practices were legal or deemed illegal, and so during that period of time in the 50s and 60s, there was a huge of people of, Utah people of many [Indiscernible] and speaking solace in other parts of the words an many immigrated to the parts of modern Europe and North America and so forth and so also during this time if we think about what was happening in America with pop culture and the movement toward understanding international conflicts, we had an uprising in thinking and alternate thinking and there was an uprising particularly in the 60s that was strongly influenced, not only by the media, but popular culture from role models such as believe it or not, the Beatles, the Beach Boys and other stars that were internationally known for their message of trying to inspire their creativity and consider human relationships in a different way and so the Maharishi Mahesh Yogi was very popular during this time and it was through the troubles of the Beatles who popularized his name and I will give you information on each of these movers and shakers.

The 1950s the Rishi Margie Yogi was a Hindu Yogi from [Indiscernbile] and disseminated internationally for religious and non-religious purposes. During that time he is reported to have attracted well over 40,000 students and teachers and in so doing was able to establish teaching programs of meditation at certain universities internationally answer not just in India but also in Canada and the United States and the United Kingdom and Switzerland and let's move on to take not pond he is a very known publisher here and Western North America and Western Europe and at the age of technology on he was actually raised in Vietnam and entered the monastery at this age and during that age because of the international conflict he was actually exiled from his original region where he studied traditional Vietnamese Buddhism. And so, and so moving throughout different areas he sought solace in primarily in the country of France. That was not before he finished and became ordained as a monk in 1949. And upon his migration to France he introduced methods of meditation and mindfulness to those in the West. His efforts were also in conservative trying to reduce conflict and reduce human violence and increase efforts in order to find piece in resolution and human compassion.

Again, taught by a master his training was in the Vietnamese tradition of [Indiscernible] beauty is him, Buddhism. In 1960 Thick Nat Han went to the on state to teach to comparative religion at Princeton University in consequently appointed as a lecturer and Buddhism and by then he gained fluency multiple languages and was able to teach in the languages. And in so doing he has accomplished in French and Japanese and English and [Indiscernible] which I think is what has resulted in his plethora of publications that you can receive and read by him and he is very well

read. In 1963 he actually took a chance and went back to his home in Vietnam to aid fellow monks and their nonviolent piece efforts and so moving on to Jack Kornfield for those of you who are more involved in Western Buddhist psychology or more westernized methods of using mindfulness and Buddhist practices in your clinical work. Jack Kornfield was another one of the movers and shakers in the 60s who kind of was a part of the whole movement to broaden the minds and step outside of Western scientific traditions in order to learn more about the contemplative practices.

First and foremost he was trained as a PhD in clinical psychology and ironically he decided to relocate through the Peace Corps in the late 1960s and trained in the American [Indiscernible] Buddhism but he joined monasteries in Thailand and [Indiscernible] and India. First as a student of the type or semester of John Shaw and [Indiscernible] of Burma. He has been teaching meditation worldwide since 1974 and one of the key teachers that introduces Buddhist mindfulness practices to the west and he is a fantastic way of translating things in the clinical terminology for folks like us that are providing clinical care. He originally founded or cofounded the insight meditation society and bar Massachusetts in 1975 and in 1987 he has since also created the Spirit Rock Meditation Center in Whitaker, California to the state they are still offering classes in traditions including practices of mindfulness and meditation and Buddhist studies.

Let's look at Pema Chodron break I was introduced to her in my graduate studies and what is interesting, and about 1974 maybe before many of you were born she became a novelist Buddhist nine under the regime [Indiscernible] the 16th [Indiscernible] and I apologize if I'm wrecking the language. In Hong Kong in 1981, she became the first American woman in the [Indiscernible] tradition to become a fully ordained Buddhist monk and she is still alive today as is Jack Kornfield and I believe Thick Nat Han is as well. She is very famous for studying under the llama [Indiscernible] during frequent trips to London from the east coast of North America and while in the U.S. she did study under [Indiscernible] in San Francisco, California and she was appointed director of the Boulder Colorado [Indiscernible] Mountain Center in the early 1980s which is still in practice today and she moved to [Indiscernible] what I believe to be Nova Scotia in 1984 where she currently resides. It was established at the first Tibetan Buddhist monastery in North America for Western men and women she was the first director in 1986 and my mother talking to you about these folks?

Again prior to the conflicts in southeast Asia in the far east, there was more of a sequestration or segregation of knowledge and through the international crossings and travel and all of this we started to get more information about the movements and with the help of media and entertainment and popular culture where not having access to alternative methods of trying to create calm and trying to create or connect to a deeper area of understanding of ourselves and our world and how to take care so let's go on to the next slide please.

So, let's talk about the science. Here we are in North America, the western part of the world if you will and through our strong efforts in

the additional revolutionary it was just a huge emphasis on the scientific method of being able to prove and rigorous and randomized studies and clinical trials that there is something going on here that we want to capture and how do we capture it and some of the works actually go back all the way to the 1940s and this is like post-World War II up through the 1960s and one of the very first primary movers and shakers in the Western world was HD Kimmel, Neil Miller and David Shapiro and they were the first to actually coin the term biofeedback and in so doing, the concept evolved out of the early repertory, laboratory research where they wanted to look at various applications of biological feedback and mechanisms and how the mechanisms of feedback modified physiological functions in animals and humans. They were the first to implement some of the Skinner concepts regarding [Indiscernible] and classical conditioning and under this stimulus it charges the body to physiologically respond and after this stimulus or within this context how does the body naturally respond? It was in the late 1960s this term biofeedback was first used to describe this particular type of learning. Contemporary commissions and researchers today now view successful biofeedback treatment as contingent largely on the skilled acquisition and mastery and focus of research that has shifted increasingly from demonstrating efficacy to refining and improving the training and skilled procedures and we still use it today and by a show of hands, how many of you know of a clinician or a psychologist who still teaches your patients biofeedback? I think it is even taught in the seminar which is fantastic.

Awesome and thank you for sharing. I love it. That way I am not talking to my wall. Thank you. Let's move on. Herbert Benson. For those of you who are familiar with mind and body medicine movement that is happening in a lot of medical treatment facilities thanks to my Khalid [Indiscernible] Milligan, he was able to get information originally collected in the 1960s at Harvard Medical School's and it was during that time he was able to coin what we now call relaxation response and how that relaxation response can be used to oppose the fight or flight process. He spent a lot of his efforts focusing on stress and relaxation response and medical settings and actually noticed as even more of a nice catchy technical term, an alternative from the word meditation. For many of you who are familiar with some of the stereotypes or some of the negative stigma associated with meditation, there has been an understandable concern about whether or not the practices may be an effort to convert someone from one faith or religion to another and so Herbert Benson was actually brilliant and interested in making sure the core processes involved in activating the relaxation response there was something that you could apply and if we just change the terminology, perhaps it would be better by in an understanding it does not require having a spiritual faith or ascribing to a particular religion in order to gain the benefit.

With Robert Keith Wallace, Herbert Benson [Indiscernible] reduce metabolism and reduced rates of breathing and reduced heart rates and brain activity. He is still, I believe, operating today and he is still currently running his programmatic on the East Coast. John Kabat Zinn is one of our more popular contemporaries and has been around a while and ironically, John Cabot Zinn got his PhD, not in religious practices, not in psychotherapy or clinical psychology not even in neuroscience, note

John Kabat Zinn actually obtained his PhD in molecular biology. So why is he involved in this movement for mindfulness-based reduction? What is going on here? What I can tell you is, he was very curious about the relationship between mind and body and connecting very much with a lot of the Herbert Benson and he was very interested in how these interactions can create healing and he really wanted to know whether not clinical application of mindfulness and meditation training for people with particular health conditions like chronic pain and stress related disorders could shift and he was looking at the subway back in 1979. He was well known for establishing mindfulness-based cognitive therapy and through this particular program, the use of thought and behavioral changes and ability to slow down and integrate physical movement as part of the slowing down, could improve chronic pain and stress related disorders.

All right. Depak Chopra, we were so fortunate to have him come to San Diego about two years ago to give a seminar and we all really know a lot about him thanks to Oprah and things to a lot of media and publicity but let's get an idea of his background. He studied medicine in India before immigrating to the United States in 1970 where he completed residency in internal medicine and endocrinology. As a licensed physician, he became chief of staff at New England Memorial Hospital in 1980 and it was there that he met the [Indiscernible] in 1985 and became involved with the movement three or through the Maharishi. He resigned shortly after and not because of interpersonal conflict but one of the reasons why he resigned from the medical center and I quote, he was concerned about the growing use of pills and medication to soothe and comfort and alter metabolism and health related problems and diseases and injuries. And I quote when all you do is prescribe medication you start to feel like a legalized drug pusher and that does not mean all prescriptions are useless but it is true 80% of all drugs prescribed today are of optional or marginal benefit. I have references if you're curious about that. So shortly after splitting from the biomedical tradition of the center he was working at, he became the founding president of the American Association of Higher Vedic Medicine and one of the founders of the Maharishi products international and the medical director of the Maharishi Health Center in Lancaster, Massachusetts.

Any questions while I pause and look at my notes, please type those in the chat box.

Okay as a final capstone on the current experience, he has become the executive director at one point of [Indiscernible] Center for Mind-Body Medicine and in 1996 he cofounded the scent of her well-being which is located outside San Diego here in California.

All right for those of you and the clinicians out there, social workers, master level therapist, clinical psychologist, psychiatrist, case managers, psychiatric nurse practitioners, I know you are out there even the corpsmen out there, Marsha Linehan, Edna Foa and Steven Hayes are most well-known for their practices of clinical psychotherapy methods and yet I'm including them here in this talk because they too have studied the contemplative traditions and utilized and studied them in their own randomized clinical trials of treating conditions we see today in our

patient population. Marsha Linehan actually took several years and dare I say dropped out from her academic work for quite some time in order to truly integrate and learn more about the practice of meditation and mindfulness. Through her knowledge which I believe was a sabbatical I should say that the more appropriate word to say, she has used mindfulness-based techniques and so by a show of hands, how many of you are familiar with the work of Marsha Linehan in treating borderline personality disorder?

Anyone?

Okay, there is a huge aspect of her treatment methods that really talk about why the mind in comparison to the emotional mind and logical mind and practices of being here now, being present and using mindfulness-based present focus skills to calm the emotional mind and to help regulate the dysregulation often seen in patients with borderline personality disorder. EDNA Tran5 and those familiar with her and if you're not you need to be familiar with her because she made it on the cover of time, I want to say, time magazine as one of the most influential persons because of her successful clinical trials that look at the treatment of posttraumatic stress disorder using prolonged exposure. She too has woven in the imaginal practices in the service of helping patients have hyperarousal and the cardiovascular [Indiscernible] that is involved in the experiences that patients often struggle with when they are going through panic and reexperiencing or other high anxiety, and she has taught again breathing techniques in order to elevate and help patients BNA great of the sea, be in a great of efficacy and once again if you were in on my talk yesterday, Steven Hayes and his movement and acceptance space treatment regulate uses mindfulness-based techniques in order to treat the stress tolerance and concepts about disconnecting and giving us some distance from certain unbalanced thinking so we do not become impulsive or reactive to certain urges and to calm the system and activate the upper parts of the cortex so we execute more meaningful behavior in the service of our values.

Ohno I know I am spending a lot of time, I have one last final person and people interested in physiology and any physical therapist out there or neuroscientists out there, it is so pertinent to recognize in today's age the value of what we are now harnessing with the studies of the brain in terms of the thing we called neural plasticity so BS from a Tron drawn as well as [Indiscernible]and Norman Doidge are individuals on the cutting edge and how surgeon practices of using the mind and using the ability to harness certain aspects of present focused attention on purpose even if it is with stimuli can alter the brain on a cellular level and help rewire the network of how we are processing information and actually improve our functioning whether that functioning is living with chronic pain or living with [Indiscernible] phantom limb pain or living with understanding and the difference between tissue injury or chronic hyper-arousal and hypersensitivity of the brain these folks on the cutting edge of neural plasticity and current randomized clinical trials of using mindfulness-based methods to help alter the physiology and networking of the brain.

Okay next slide.

So, why am I going through all of this? Why is this important for this workshop? I do believe it's important we have this historical knowledge base and one of the things that came into my head in graduate school is if you're going to execute a therapeutic school you better be able to rationalize why you're not doing it because you want to be their friend you're not doing it in order to pass time, what is the function, what is the justification and some of this now comes with history of the movers and shakers but more importantly a very powerful study that happened between 1997 and 1999 and by a show of hands everyone, how many of you are familiar with the adverse childhood experiences study that happened through UC San Diego and Kaiser Permanente? It is also known as the ASIS study, anyone familiar, show of hands.

Okay, I appreciate the honesty. Here we go. I have one person, thanks, Lori, I am glad you are out there, and you know this. All right.

During these years, the preliminary data that was collected by the Americans Health Maintenance Organization Kaiser Permanente and the Centers for Disease Control and Prevention in San Diego in the 1980s. During this time they went on to survey childhood trauma experiences of over 17,000 Kaiser Permanente patient volunteers and participants were recruited to the study in between 1995 and 1997 and they were studied longitudinally and so this was a longitudinal study and in order to look at them throughout the years and to follow up to determine their health outcome, in a nutshell, this longitudinal study was looking at the effects of life stressors on late life health and immune functions over time. And so here are the interesting key points to take away. In terms of demographics, about half of the participants were female and 74point8% or about 75% were white and the average age of a participant was 57 years old and about 75% had attended college and all had jobs and good healthcare because they were part of the Kaiser system. Already just demographically speaking we are looking at a relatively privileged cohort to look at. Here's the interesting thing. Participants were asked about 10 types of childhood experiences that were thrown into a category as being adverse. They had been coined childhood experiences based on the identification and earlier research they were using evidence from prior research to save these experiences are considered to be traumatic experiences when they happened during childhood and here, they are. Physical abuse, sexual abuse, emotional abuse, physical neglect, emotional neglect, the mother was treated violently, there was household substance abuse, household mental illness, parental separation or divorce, interestingly enough because we now know there is over 45% risk rate for divorce and lastly a household member had been incarcerated. Went us sit, let us sit for a moment mindfully and think about these particular events.

Ask yourself who is a part of our patient population when you look at many of our servicemembers, many of our servicemembers are individuals who have chosen a career because they have come from communities of hardship or background of challenge, and if you look at the list that I have given out to you, it is pretty striking when you think about how many of the folks we treat have had at least one of these events happen

in the course of their life. What were the findings when they queried these individuals over time, and again we are looking at long-term health outcomes as a result of living through these experiences? Here's what they found out. Adverse childhood experiences are common, 28% of participants reported physical abuse and 21% reported sexual abuse. Many also reported experiencing divorce or parental separation or a parent with a substance abuse disorder. Adverse childhood experiences occur together and almost 40% of the sample reported to the more ASIS and 2.5% experienced for more and many subsequent studies since then have now examined the accumulative effect of having lived through more than one. And here's a good take a way, there seems to be a dose-response relationship with many health problems as researchers followed participants over time they discovered a person cumulative adverse childhood experiences number has a strong graded relationship to numerous health, social and behavioral problems throughout their lifespan including substance use disorders. Furthermore many problems related to ASIS tend to be comorbid or co-occurring the number of ASIS were strongly associated with adulthood, high risk health behaviors such as smoking, alcohol and drug use, security, severe obesity, and correlated with ill health including heart disease, cancer, chronic lung disease and a shortened life span. So, interesting findings, yes. Each adverse childhood event increased the likelihood of early initiation into illicit drug use, by 2 to 4 fold including a 2003 childhood study on how cell dysfunction.

On a behavioral note, experience of living through adverse childhood events increases risk for suicide attempts and ASIS and a category increase the risk for attempted suicide by 2 to 5 fold throughout a person's lifespan and that was from 2001 study. I cannot emphasize enough how patients who have chronic pain alone are not only at higher risk for having a comorbid diagnosis of depression but at greater risk for suicidality and thoughts and efforts to attempt suicide.

It may increase the risk of experiencing depressive disorders well into adulthood and sometimes decades after exposure to an adverse childhood event. There is also an awareness of sleep disturbances and people with a history of exposure to an adverse childhood and there is a higher likelihood experiencing a self-reported sleep disorder and it was according to a 2011 study. And last, women who had a history of exposure to adverse childhood event is reported risky sexual behavior including early intercourse and having had 30 or more sexual partners and perceiving themselves to possibly be at risk for a [Indiscernible] like HIV or AIDS. I will pause for more questions and curiosities and at this point, the ASIS longitudinal study has created such a large database of information and current studies of continuing to occur I strongly encourage, you can Google on Google scholar ASIS and you may be surprised how much literature is out there. Especially if you work in a particular patient population.

What does this all mean and why am I throwing out this really scary information? Let's say we have a question with risk factors for ASIS like physical abuse does this have to be long-term abuse or abuse that happens for a short term? Great question and I am going to fall back on the implication of the early outcome which was decades could pass,

decades can pass of no event occurring and yet the individual may still manifest certain health-related problems in living. At the same time or token, I think I will go back to the dose-related relationship and to let me see if I can get back to that citation.

Adverse childhood experiences had a dose-response relationship with many health problems and researchers discovered a person's cumulative score has a strong graded relationship to numerous health problems and I think it would be fair to say, if it was a one-time ordeal, it may not be, it may not imply as great of a risk than if there was frequent continued long-term exposure. I am actually going to go into why and I think we may have some understandings of why but again I would strongly encourage you if you want to know more about the studies to go into Google scholar in the original researcher, if you want the name I can plug that name in. I want to say I will put it in the chat box. Selitti He is the author of the original ACES work and there are so many academics using the data as well.

So the take away here, why am I talking about the next slide.

I think it is fair to say, and we can maybe extrapolate some of the information. When we work with patients who have chronic pain, pain itself is a symptom, not a disease. It can reflect a symptom of a disease, and in many circles, we are conceptualizing persistent chronic pain as if it was a disease and based on what we are now learning about what is happening in the brain neurologically and however the experience of pain itself is a symptom what is it a symptom of. We treat so many different conditions and I think in the active duty population we have many people with low back pain and we get a lot of ACL and a lot of bulging disc and in fact we have shoulder or tears and it makes sense. But if we look under the hood a little bit more and we try to understand after the tissue has healed what is happening and I want to draw a connection about what might be happening if we think about early youth who may be living and dysfunctional household settings or settings that are limited or underserved or underprivileged and when they are exposed to chronically stressful events neurodevelopment or the development of the childhood brain can be disruptive and as a result cognitive functioning or the ability to cope may be impaired in the use may adopt or the youth may adopt negative unhappy coping mechanisms we do the best we can with what we have and we have to make decisions.

And so often times youth will turn to the closest simplest easiest thing they can access. We do the best we can with what is available to us and sometimes it could be substances and sometimes it may be intimacy with people we think we trust and maybe we don't trust and we may be vulnerable if there is not a supervisory caregiver around and all sorts of things like that and so if we think about the folks who choose to enlist in the military, I think anecdotally, and I don't have research to back this up but I reckon out of the people I work with we have a significant number of people who have chosen a career in the military because they were struggling for a variety of different reasons whether it is financially or socially or physically and from the homes they grew up in and eventually what we may see are people who are presenting to us very interested in getting better and very much wanting to feel better

however they don't necessarily have the best coping mechanism. The coping mechanism they may have fallen back on can contribute to disease and disability in social problems as well as premature mortality.

Next slide please.

Another way to look about this or look at this is to actually say to ourselves unhealthy experiences influence the body's immune system as well as the neurological development of the brain and sometimes harmful or unhealthy neurological relationships form. So the function of unhealthy coping mechanisms, a cognitive effect have been studied and I will show you a list of certain studies that have come up that are looking at what are the neurological effects of this. Catastrophizing, which and otherwise is the magnification of pain related symptoms, illumination about pain or hopelessness, pessimism about the pain related conditions and catastrophizing independent of a clinical form of depression is associated with increased activity in the brain and the brain areas related to the anticipation of pain and attention to pain, emotional aspects of pain and motor control.

So how many of you are familiar with the medication Cymbalta, show of hands? It is a popular one and we use it frequently with chronic pain patients. This study, I think, it backs up why at first, yeah, Cymbalta was FDA approved for the treatment of clinical depression and it was only within the past few years the FDA finally said you know what it can be clinically approved for the treatment of chronic pain so when the brain experiences pain it is not just a sensory issue and acknowledges the experience both in emotional and physical experience in let's keep that in mind? The next study in patients with chronic pain sensory input plays a diminished role whereas affective and cognitive pathways play a more prominent role in the creation of painful [Indiscernible] and many have been coming to conferences and I don't necessarily want to repeat and go on the merry-go-round with you, we recognize the brain is a complex organ and if in fact from the studies of tissues and petri dishes. If we are able to say with relative confidence tissues will mend and scars will form and certain things will be reabsorbed by the body I believe we have relative confidence and kind of scratching your head and say you had this discomfort for a year for a year or two years and it can't just be about the tissue of the body I have to relate too much and certainly we have to rule out irreversible nerve damage and absolutely and we need to roll out whether or not scarring may be causing discomfort. Right and I get that and at the same time when the brain is anticipating and processing and perceiving a sensation and has an active response to that.

The longer the person suffered from the pain, the higher the activity, that part of the brain described as a cumulative additive memory, that builds the story, the story that you as clinicians are trying to garner from your patient in order to understand the history of what led to this injury, the background, the context as well as was there a particular event that led to this incident. I want to put a plug into my PT. Two of my PT's, Jennifer and Wade, who have actually introduced me to the central sensitization index, also known as CSI. By issue of hands, how many of you are familiar with the CSI? Any PTs? Any PM in our docs? I see

Heidi is typing. Awesome. Yes. Some other people may be typing. This central sensitization index is a new self-report form. I am really curious about it and I am hoping we can do some studies on this down the road. Basically, it asks somatic questions and mood related and cognitive related questions to a patient who presents with chronic pain. In a nutshell, the higher the score, the more likely we can conclude that the pain is no longer just a tissue issue, but it is likely more greatly influenced by the central nervous system. In other words, this. Okay?

Next slide please.

So, to summarize this approach and this background, exposure to acute and chronic stress on human physiology, behavior, and the development of disease is significant. Unhealthy negative coping styles often are learned in psychosocial context. And they can result in the chronic development of illness, disease, and comorbid psychiatric problems. We are also aware that it puts one at greater risk for premature death. Lord knows we do not want this, so when our patient walks into the room, we recognize that even though they were referred to as the cause of pain, the probability that they have additional comorbidities is very high. We have to take these into consideration when we treat the whole person and if we recognize that some of these issues are stemming from what is happening neurologically, let's figure out how we can do the work neurologically.

Next slide please. I want to pause here. Checking with the group, maybe take a question, do we need to pause, do we have questions? I am going to defer with that, if you do not mind. Do we need to pause, or shall we keep going? Bear with me one second. Let's take a quick poll.

At your fingers ready on your keyboard. You can type your answer. I like it. I feel like we are at the polls here. Kind of close.

I have an idea. I have a really good idea. Rather than walking away, why don't we do is stand up mindfulness stretch. This is a mindfulness class. So, let's do that. While you are in your home, I know we are sitting in front of these computers, so I will stand up, and you might not see all of me. We will see how this goes. Let's just stretch. However, you need to pick just a couple more days and then we have a long weekend coming up. So if you need to move your head, I think that is so important. Let's look to the right, the left. Role that Mac. Sitting at our desks, let's roll our shoulders up to our ears. Around and back. Up to our ears. Around and back. I always like to say, we have pockets in our back, so we are rolling those shoulders back and we will tuck them in our pocket. Let's clasp your hands behind your back and try and stretch your elbows for to you feel a little bit of opening in your chest. This is a good stretch, and you think you can go further, try and think your palms touch while your hands are still crossed. Straighten those elbows. You may feel a wonderful stretching your shoulder blades as well. It looks like and taking flight with the light above my head. One hand over the head here. Stretching out the arm and the elbow. Right. You feel that on your triceps? Then switch. I am not a yoga instructor, so be kind, do not overdo this. Okay, and then we will take our right arm and pulled it over

and try to stretch it this way. So, hugging and feeling a gentle pole in that right shoulder blade. Ever so gentle.

Pop quiz question, you do not have to type your answer because you are stretching right now, but ask yourselves, to the left arm over and across and then close our right arm so you get a nice pole in the shoulder. How long do we hold the stretch for? What is the recommended time to hold a stretch? You can put your guess there. 25-30 seconds is what I am told. The longer the better. If you had 25 or higher, you win a thumbs up in the Pain Skills workshop here today. Lastly, okay, what I like to do is the chair stretching. So, I usually have arms above the head. I am going to put one arm in front and one arm behind my seat and I will look over my right shoulder. So, I get a little bit of a stretch in my upper torso. Just take a couple of breaths. Up again. Right arm in front, left arm behind. Look over your left shoulder. Take a deep breath. So just enough to wake us up and then we will keep going. We will have a time for a longer break so I don't want you to feel like that is it.

Let's go to the next slide.

Okay. By a show of hands, everybody, how many of you who studied development or studied child stuff, or even studied the history of psychology at and appoint, how many of you are familiar with Jean Piaget? I see a couple. This is what blows my mind away also. Now, and only now does there seem to be such a strong push for functional restoration. Right? And practicing what we preach, and interactive learning. All of these things. Jean Piaget was around in the 1950s and 1960s, and he was very well known in certain European circles because he strongly believed that the interaction and the ability to ask upon your environment influences the development of the brain, thinking, and how we process and learn vocabulary and move through the world. I feel like he was sold short, to be honest because only now with our studies in neural plasticity and all these scientific ways of imaging in the plan are we like you know what, acting on my world is altering my brain. Who knew? Piaget was onto something back then. He was a Swiss developmental psychologist, and he practiced and taught at the University of Geneva all those years ago.

So what is really important here is that to influence and ideally prevent or repair the disease process, it is so important that we teach our patients who are more likely to be at risk for engaging in unhealthy coping to teach them healthy coping. And we can do that by teaching them mindfulness, practices that do not involve needles, necessarily if not indicated. Do not necessarily have to involve pills if they are not indicated, or surgical procedures if they are not indicated. Through the manipulation of neural plastic opportunity and through self-initiated action, and psychological support, behavioral reinforcement, whether it is through their physical therapist, a yoga instructor, aqua therapy, and support from the culture that they are in. I think many folks in middle management these days of leadership get it. They actually get this once we start to disseminate and try and inform them about the values here.

Let's get into the weeds about neural plasticity. You might notice that funky looking animated guy, he is what we call a homunculus there is not

a quiz on it. Everybody, while you are at home, do me a favor and don't worry because you are not on camera, but I want you to put your fist together like this so your knuckles are line. What I want you to pay attention to is where your middle finger begins on your right hand, so you will follow that middle knuckle and you will trace that middle finger all the way to your left knuckle and your left wrist. That strip is what is highlighted in the two hemispheres. The left of that illustration. That is what we call the sensorimotor cortex. What we have learned about the way the brain maps your body parts is crucial and key as we are trying to encourage our patients to get back in the game and overcome their pain sensations because we really need to help the brain learn through doing, as Piaget said that the sensations do not necessarily mean tissue damage. Case in point, our funny little homunculus, he is a direct ratio animation of the service area and number of neurological data points, sells, if you will, neurons. How sensitive and had been sleep onset of their neurons are based on the body parts and how it is mapped in the brain.

So, for example, you see how big his lips are. If you look at the strip of the sensorimotor cortex, you will see that our lives have a lot of sensation. Dense population of neurons, and that takes up surface area on the cortex. Why is this important? We believe that when an injury happens, and someone actually stops using that body part because it hurts or because the tissues need to heal, the absence of use can alter the way the nerve endings are mapping and the connectivity that occur. Just like we formed the declarative memories, just like we have memories of our first day in kindergarten or where we were when COVID happened, we also formulate physical sensational memories and their maps on this cortex. We call them neuro- signatures, and what it comes down to is repetitive activation of the brain neurons in different regions as you move the body part, so the more you move the body part, the more smooth, fine, the more surface area, the faster the connectivity in the brain, and we see this in everything from athletics to piano playing, to typing, to using a new language. The more we use and practice moving our body, the more connected and densely populated the neurological systems will be in our brain.

So, keeping in mind when repetitive activation of the brain fire becomes associated with particular movements, that memory occurs. Once again, when the repetitive activation of a body part continues to occur at the same time, another experience occurs, the brain is going to map them together so those of you who have studied posttraumatic stress disorder, it is one of the logical reasons why we understand certain triggers to result in a flashback. Seemingly neutral events are often occurring at the same time the incident takes place, and the brain remembers that as if they go together. Like cookies and cream. So movement reinforces and maintains these neurological boundaries, so you can tell the difference between your index finger and your middle finger and your ring finger and your pinky. We have to do this test. Movement reinforces and maintains batteries. If you are a player, you can probably go twice as fast. When we injure ourselves, and this is the hard part because pain is a natural response in the moment to perceived or real tissue damage. This is the hard part. When the brain is processing pain, as if it was real, the likely response is to stop moving the body part. Lack of that movement

will in fact alter those boundaries and how they are mapped on your cortex. The less you use it, the fog year it gets. The less you use the body parts, the more it may blur and cross over into another area. If you look at this illustration, it is our little guy, and if you look at his right hand, I want you to assume he has not used that right hand in months, so his original ability to do this is now really foggy. He is not as dexterous, he is not as acute. If you don't use it, you lose it. The neurological term for that is called smudging.

Next slide please.

This is what happens when we see our chronic pain patients. They may have been so phobic of moving, they have become so afraid to move that ironically, that same neural plastic process that can help rewire and help us learn a language or improve our piano playing or become a more skilled athlete can work in reserves. So absence of use not only do we become less dexterous and less able to feel where one body part stops and another start, we start to notice that our patients may be reporting to us that they feel clumsy, they are clearly deconditioned, they may say that they used to be super coordinated and now they are bumping into things. I am curious, have you guys heard that before? By a show of hands, how many of you have worked with patients who are dealing with this change in their identity of I used to be stellar, I used to be so agile, I used to be coordinated, and now I feel like a klutz, I am tripping over myself. Yeah. That is neural plasticity and reverse. Okay? And we have seen this.

For example, braille readers, there was a really interesting study that was using brain imaging to look at what was happening in the brains of a blind person who used braille. If you took away their eyes for just a weekend. What they did was they took a brain scan of these individuals in the middle of a work week. They were able to see all the neurons firing and wiring in the part of the cortex. That was responsible for the hand on a Thursday. The weekend passes, their brains were scanned again on Monday and guess what happens, it was not quite as fired up. So, the brain can change very swiftly. Sometimes it can take days, sometimes it takes weeks. This is another caveat that we try to educate our patients on.

So keeping in mind, I feel like I am digressing a little bit, but what is really important when you are talking to the patients, how do we get them to start to reengage their body parts? How do we get them to cognitively approach what we are asking of them by thinking about their sensations in a new way in order to create better neural plasticity in a positive realm? Okay, for more information on that, I definitely encourage you to read books by Norman Deutsch and I will put him here. The brain that changes itself. Studies on how we get rid of phantom limb pain have a lot to do with retraining the brain to learn that the body part is actually okay, and that is where mere therapy comes into play.

By a show of hands, how many of you are familiar with mere therapy for amputees? Yeah. It is really playing with the brain capacity to learn that this body part is okay. If we don't do that, the reverse of neural plasticity takes place. When we stop using the body part, the brain is

very clever and what it is going to start to do is say where are you, where are you, I am going to give you some electrical pins and needles, I will give you some sensations because I don't know if you are there. Tell me you are there, I need feedback. I need sensorimotor feedback to know you are okay. So the mirror is actually used for the individual, and they use their own reflection to move the body part that is with them, but it looks like the mirror image of the one that is missing and it calms the brain down. The brain goes you are okay, on some. I know you are there, we are going to be all right. The pain and sensations die down.

This is just an illustration. It is not by any means an accurate snapshot, but I think it drives home the point that the experience of pain is not just about what is happening in the physical sensory cortex. It just underscores my thought about how many places in the brain cognitively and psychologically we are anticipating, thinking about it, worrying about it, planning, how we are going to respond to it, and it underscores what fires together wires together. We need to make sure that if we are reinforcing our patients to stop moving, and I am speaking about patients with chronic pain, if we reinforce them to not move, we are actually rewarding the phobic response and possibly reinforcing the pain sensory system to become stronger and more loud and more activating in order to find out what is wrong with the body part. There will be smudging, boundaries of where to use what body part, as well as the deconditioning.

Okay, next slide.

So, part of this mindfulness practice is to acknowledge that pain is both a brain issue and a tissue issue. It is both a real and perceived threat, but either way, the brain responds the same way. Pain pathways are shared with anxiety, pain perceived as a threat to the body, whether it is real or perceived. It is real to the patient. What is interesting is perception must be there in order for the patient to experience it. So in other words, just thinking about it perceives it in some respect, and then the brain creates that sensation. When paint persists, there is a greater activation of pathways associated with emotional regulation. We have just discussed this, and that is what leads to changes on the HPA axis, which are not involved in hormones, immunosuppression activation, the inflammatory response, and what could be proceeding aspects of long-standing disease or illness. Just so you know, human studies of the HPA stress access shows that patients with established and to those psychologically at risk for chronic widespread pain and demonstrate abnormality of the HPA access function, which supports this concept. The longer they are engaged in unhealthy coping behaviors to response to pain, which is the kinesiophia responses, avoiding doing things, the more likely they are putting their dis-regulations at risk.

Okay, next slide please. Just checking in on time.

Okay. Linda, any thoughts on time at the point?

I think we are doing great if you want to do a 15-minute break.

That is what I was thinking. We are almost at the half hour mark. Okay. So why don't we finish this one slide, and then we will break.

We lost you on the video.

Okay, I think I lost connection, can you see me now?

Yep.

Sorry about that. Let’s do this one slide and then we will have a great place to pause. The neuroscience of mindfulness. I felt like I was digressing, I talk a lot about neuroscience, but I want to talk about neuroscience of mindfulness. Present moment awareness and experience of the self are rooted in the anatomy and neural circuitry of the brain. I think we can all agree about that. This awareness and experience is processed through verbal and symbolic systems of our mind. Language is key. Imagery is key. Memories are key. When we elicit present moment awareness, and present focused treatment appropriately, we are actually training patients to use symbolic processing skills and change the circuitry of the brain in the moment through their own experience. We cannot emphasize that enough. Your experience is key. Please check in with yourself to see what your experience is showing you. We can structure present moment awareness intervention to take advantage of the neuron specificity and the neural plasticity in positive ways to begin that process of changing how the wiring and firing of the brain goes. When we elicit present moment awareness, we are not only working on that processing, but we also re-strengthening the circuitry. Attention is a dynamic and finite. Different forms of attention have distinctive and significant functions that determine and help sharpen what we attend to. What a screened into the present moment influence motivation and it can influence behavior.

Okay. So on that note, let's take a break. I have got 11:29, so we will come back at 11:45. Please hydrate and stretch and grab a snack if you can. I will see you in 15. Thank you, everyone.

[Event is on a 15-minute break. Captioner is on standby]

Ira Levin has been a long day for many of you. The afternoon is winding down, so let's see if we can't cut through this next hour and 15. I want to get back to this slide just to kind of underscore what we know is happening when our patients with pain are coming to us. So how does that represent what walks in the door, what we often see is someone who is emotionally distressed, physically hurting, agitated, worried, depressive, right, looking all these areas of the brain that are involved in thinking, feeling, and being hyper aroused. These patients are very well known for being challenging. I think we can all agree, so if we have this understanding about their brain looks like, I will just say you are lit up like a Christmas tree inside. So ideally, what we are trying to do is we know that chronic persistent pain is now tapping into all of these different brain domains. You are going to have someone who walks into the office. They heard their story might not have been heard. Treatment is not working because it is not addressing the whole thing. It is challenging.

That brings me back to the current slide. What are the clinical applications of mindfulness? When we sit down with our patients and stop them from bracing, it does an amazing job of role modeling for them how to slow down, how to take a pause. So, it can shape their attention. When we engage in present moment awareness, a beginning instruction is to say it can involve a focus tool. What is a focus tool? It can be a candle flame. It can be the sound of a bell. It can be a song on Pandora. It can be the sensation of your breath. If they always have a focusing object to return to, then when the mind wanders, and it will, and it does, that is natural, the brain naturally is used to grabbing onto this, thinking about that, thinking about that, especially in a stressed-out pain and oozed brain, the mind is going to be restless. So, one step. Identify a focus tool. It is usually something as simple as the breath because you do not need to take anything with you. That will shape attention, and when the mind wanders and you practice the skill of bringing your awareness back to the breaths, you are sharpening that ability to refocus your attention. We are also aware that if flight, flight or freeze, stress response claimed by Herbert Benson is in fact involving aspects of the sensory nervous system, right, it is going to involve the lower primitive parts of the brain. These parts of the brain have been around as long as the human being has been a part of this earth. These are the survival mechanisms of the early brain, designed to keep the heart beating, lungs moving and the body moving for survival. The earth older aspects of the brain that have been around longer than the Neo cortex.

When we actually are in a spate of pain, it is perceived as a stressor so the brain is going to react the same whether it is a real threat from the outside, like a saber tooth tiger or a perceived threat. I have to sit for my exams, I don't sit that long. It hurts. The brain will react the same way. It will reactivate the lower parts of the crane, the heart rate is going to get intense, muscle tension may take place, headaches may occur, all of these things are going to exacerbate or amplify what may already be a baseline level of anxiety, stress and pain. When we engage in mindfulness exercises, we are actually transferring processing from the lower parts of the brain to the upper parts of the brain. We are now activating and engaging what we call a top-down process. Through the Neo cortex, aspects of thinking, visualizing, proceeding moment by moment, we are counterbalancing the effects of the central nervous system. When the prefrontal cortex is activated, blood pressure decreases, blood volume changes, in temperature calm and cool, heart rate slows down, respiration rates all change. That is a basic fact. Prolonged proliferative nervous system activation has been associated with internal subjective experiences of calm, tranquility, chance and ended awareness, self-compassion, empathy, connectedness, clarity of thought, and purpose.

One second, I am turning off my fan. Okay. I feel like I am competing for its attention. Next slide if you do not mind.

As a result, we have a peaceful, quiet mind. So, with that being said, I would like to introduce you to a practice right now. So for everybody who is sitting and listening to me, I will show you my introductory bonus practice that I go back to time and time again, and it is great for people who have been doing it for years, it is also great for newbies. If you are new to this and want to start with the basics, here is how I do

it. I usually talk first and foremost about posture and the anatomy of the lungs. I sang all right, let's see, put one hand on your chest, and one hand over your belly button. Now I do not want you to change anything. You are not changing how you breathe, just settling, sit as you are, and then see if you can identify which hand is moving more. Breathing as you are. All right. By show of hands, how many of you feel like your hand over your chest is doing more work and moving more? Let's acknowledge that. If that is you, I get it. Okay. Now, go ahead and remove yourself. By show of hands, how many of you notice your belly, the hand over the bellybutton is moving more? Okay. Yeah. So for those of you who have some experience and some knowledge, that is valuable information that I start with every patient.

Here is the deal. When we think about anatomy and physiology, I want you to think about your lungs as two trees that are upside down, growing down. You have these beautiful trunks that are connected and they range down, and the bottom of your lungs, where your oxygen has maximum capacity is right down at the bottom of your rib cage, right above your navel. What we feel when we are breathing and taking all of the oxygen and maximizing the oxygen, it will go all the way down to the bottom of the lungs it down by the Valley. What we feel is that strip of muscle tissue called the diaphragm. When we breathe in, the diaphragm will naturally expand down and out briefly in order to give way for the lungs to expand and taken fresh oxygen. At that moment, where the in breath becomes the out breath, you feel a change in that as the diaphragm constricts, moving down and up, helping us push the oxygen out, excuse me, the carbon dioxide out into the space in front of us. When we are unconscious, when we are in deep stages of sleep, the cool thing about the breath is we don't have to think about it. All of us are born innately with this capacity of reading without machinery, thank goodness for that. Okay. Those of us who have that capability, we are very fortunate. If you have ever watched a small child or a baby, an infant, or your dog or your potbelly pig sleeping, you can tell that they are breathing. Why? Look at their bellies. Their bellies are expanding and contracting, expanding and contracting. That is the lower part of the brain, moving that diaphragm automatically for us.

So, let's everybody get back to that same position. One hand over the chest and one hand over the navel, one hand over the bellybutton. Or some of you, this may be hard because we are out of practice. As we get older and as we start to experience stressors, for example, me right now, I have to talk for three hours. When we are having to give a performance, we may be breathing from the top of our chest. If we are in a hurry, and we are running around, we may be breathing from the top of our chest. When the brain is in fight or flight mode, all of this will happen. The heart rate is going to start pounding. Your HPA access is a dumping adrenaline into your bloodstream, which is causing that rapid stimulation of your heart. The blood is actually selectively being pumped to the large muscle groups of your body, your arms and your legs. You may feel a hot flush. You may start to feel a little bit of sweating us, and there is that energy where we feel like I have got to do something, like we have had too many shots of espresso. I have got to do something. There is that sense of urgency. It is one of the flaws in our human divine. Because of that sense, there is this, one way of thinking about it like,

I need air, I need air, I need air, and ironically, it is not maximizing our lungs full potential.

One hand over the chest, one hand over the Valley. I would like for each of you now to gently, on your own follow my voice, and I will guide you through a very brief five-minute practice. For those who have patients that struggle with intrusive memories, flashbacks, or have trust issues, it is perfectly appropriate to say it is fine. Please just allow your gaze to fall down at a nice angle half-mast, maybe 45 degrees down so allow the vision to soften. You are not changing anything. The goal of mindfulness is to be fully present without changing, without controlling, to just be aware. If you do feel comfortable enough to close your eyes, feel free to do so. Otherwise, having your eyes gazing down ever so softly is fine. Thinking about posture, if we want to maximize our bodies ability to fill our lungs with all of that oxygen, I want you to gently carry your torso and imagine that each vertebra of your spine is stacked gently on top of the other like those toys we might have had, or building blocks as children.

Lifting the chin up ever jointly gently tilting up you may experience [Indiscernible], flight, elevation. Ask yourself the following questions, is the pace of my breath Seth fast or slow? [Silence] and my breathing from the top of my chest or from my belly? Maybe both? [Silence] does my breath fill rushed or pressured? Or is slow naturally? Sounds notice we're taking inventory. [Silence]

Now, to help you learn how to better activate your diaphragm, I want you to practice counting so on your next in breath you will count one Mississippi, to Mississippi, three-Mississippi in, when you are ready to exhale stretch out the out breath breathed out through the mouth extending the exhale to four, six, or eight Mississippi's out. In a long pause for a count of two.

I will model it for you on my next in breath I am counting one Mississippi, two, three, one Mississippi, two Mississippi, three Mississippi, [Indiscernible - low volume]

Pause and again. One Mississippi, two Mississippi, three, take your time. Keep practicing. Wonderful in and out breath is one full cycle. Using your fingers to count I want you to count 10 cycles. Three Mississippi's in, 628 out and pause for two. [Silence]

As you are getting into your finals cycles stay in the space and wait for my final word. Just breathe. [Silence]

As you are wrapping up your final breath gently tune into my voice and I'm going to ask the following questions to see if anything has shifted. Maybe it stayed the same. Nevertheless, we're checking to see what our body is showing us today. Gently tuning in ask yourself, am my breathing from the top of my chest or my belly? Maybe a little bit of both? Is my breath feel rapid and pressured? Is it slowing down and feeling a little slow? Does your breathing feel awkward or uncomfortable? Or does my breath feel smoother or little more soft? Again, listening to our body.

Seeing what feedback our body gives us can help us understand what options we have next.

This go ahead and lift your gaze. If you need to stretch, often times people notice that needs to happen. Feel free to do so. And I'm going to ask a question in the chat box. Better yet I'm going to ask a question with a show of hands. How many people, through that pack is, were able to absorb observe a shift in how their body was breathing?

Wow, amazing. Fantastic. I appreciate you blowing sunshine at my. We were literally paying attention to the breath and using our focus on counting. It can be a great help, feeling the sensation. Feeling my chest and belly. For those who do physical therapy my colleagues have often talked about if you are not comfortable you cannot tell with the handover the belly. Notice where the rib cage is. Noticed the bottom. When the diaphragm is activated those ribs will now attach to our fun. There is Cartledge to enable the lungs to expand. Another way of feeling whether they are engaged is to notice if their lungs were also expanding down low by the bottom and diaphragm. Not everyone notices a change right away. It does not mean you have failed. It means the person is unfamiliar with it. And, for many people, especially those with any kind of early trauma, silence or quiet has been paired with a trauma. It has become a trigger. When things are too quiet something bad is going to happen. If you have ever noticed that with your patients, I would definitely include an iced open exercise. Or practice in auditory brigade in the exercise. This is one form of mindfulness. If we take the definition to its fullest degree, we can engage in movement as a mindfulness task. It is sitting still if sitting still is too awkward or comfortable and beginning you can have your patient take their mind for a walk and use what they see, feel, hear outside in the world as their focus tool. Is a great thing to do since we're at home. Take a walk around a garden or park or your block. Describe what you see. No judgment. Just described.

Next slide please.

Just to summarize, what we're doing is activating the relaxation response by down regulating the S& S and activating the peripheral noted nervous system. Shifting and going from the bottom to the top down. We are improving the brain's ability to prioritize and focus by improving our cognitive processing of potentially distracting information and using it as our focus tool saying we can sharpen our attention. In so doing with seated practices, it may very well be awkward, painful, or uncomfortable and unbeknownst to the patient, we may also be enabling the patient to experience emotional or internal stress, pain, or sensation that they can observe while sitting still. It is a wonderful practice of teaching the patient stress tolerance, quiet mind, Paul's, taking Paul's. It can consolidate and refine experimental memory. Your mind may say I cannot do this, cannot tolerate it, it is too much but yet here you set. What has experience told you? Your brain said one thing, but your experience showed you it is doable. It is also used in distancing from immediate stress or pain. When we are able to slow down and activate the prefrontal cortex, we have an amazing way of getting perspective and putting things into context. Things are not as bad as they seem because they are not up in our face. And sometimes with some people what I would do before is if

I had people with panic, I would take their pulse. The Chevy take your post before we practice. Hold and count for 15 seconds multiplied times four and I have evidence. So, we check it before and after the completion of the practice and show the patients that you reduced your heart rate by 10 bpm. Now you are in the resting zone. They like that. It is good concrete evidence.

Next slide.

Again, to summarize, when we're using this in therapy it is to shape and activate top-down processing to counteract the flight or fight response. To strengthening significant control network by using our own skill set not relying on an external focus of control. One of the things recognizes patients with pain have lost the internal sense of control. The internal drive of self-efficacy. And by showing them that was their effort without medication. Without needles or knives, they have the capacity of turning it down. He can really build self-comfort and some semblance of confidence. When they have a flareup or panic attack they can do something about it in that moment. It may not be a perfect cure, but it will take a 45-minute flareup or attack. If we can cut the time in half, they will take it. We can reduce the length of time experiencing distress and reduce the intensity at which they are experiencing the helplessness.

We are helping improve complex decision-making. I do not want to listen to that I'm going to focus on this because it is my priority. In so doing this will help me with a goal to get better. Next complex decision-making. Focused problem-solving. I cannot tell you how many times, how many of you out there, by show of hands, had patients with chronic pain say, I did not have ADHD as a kid this for to God I cannot concentrate my memory is shot. I cannot remember things. It is too much. Maybe there is no indication of ADHD they just have an incredible amount of pain. It is an interesting situation. I almost always rollout and referred them to a psychiatrist to make sure and check their history but we recognize because concentration gets skewed with chronic pain and constant worry the ability to dial down in shape concentration and memory with mindfulness which can improve concentration and focus.

And we have a wonderful opportunity to build one of the first stages of empathy which is perspective taking. If I can envision and imagine what it would be like to be in someone else's shoes or imagine myself doing something with my imagery I am more likely going to replicate that in my mind on certain aspects of my brain designed to activate muscle groups will actually get activated on that level just with using your imagination. That is helping the brain rewire. Want to break down the interesting thing that does happen tier and Western mind-body medicine practices. As an introduced and beginning I mentioned several of these frontrunners. Again, going back to the definition as I see it. The definition of a mindfulness practice is the exercise and engaging and being fully aware moment by moment without judgment. Experiencing something as it is not as I think it is. Not as I believe it should be that as it is whether it is positive or negative. Without judgment I see it as it is.

Jeff Kornfield was a clinical psychologist who became a Buddhist monk and now has a monastery established on the East Coast and West Coast. He defined his mind torment based on recognition of a focus tool, acceptance which is usually without judgment. Investigation using a curious mind. What is happening? Where my feeling it? And non-identification. That is a very Buddhist concept of the way. As soon as we attach a label on to something there may within that label be additional assumptions, additional stigma, and additional words that could very well taken abstract path away from what is presenting just as it is.

Our Western doc or of molecular biology. His concept of mindfulness practice includes the following. Non-judging, patient, the ability to tolerate things that may be distressing and tolerate internal experiences you have spent so much time distracting yourself from paying attention to. He mentions of the beginner's mind which is similar to Kornfield's investigation. Maybe because of COVID you may have adopted a puppy or kitten. If you ever watch a baby or a puppy investigate is world it is beginner's mind as you have never seen it before. If your patients who engage in the this sometimes report they have a unique experience, I have heard everything from I'm getting memories of things I do not want to think about. It is bringing up a bunch of feelings. Kornfield has an interesting way of acknowledging when we sit still for many of us and it was to him world it may be the first time ever we are giving our body permission to open up what we may have been keeping compartmentalized. What we may have been keeping suppressed. And the body and mind have a fascinating way of opening have been letting things go.

For those who remember Tupperware products if you have ever been to a Tupperware party then we are breaking diluted and letting the gas out by allowing earlier memories and bodily experiences to manifest. That is valuable information as clinicians so we can garner more details about what is going on in the person's world. How is this going to help me help the patients given the card in history they have been dealt? I cannot emphasize this enough. Non-striving. There is a misconception that practices of mindfulness create relaxation.

I want to invite you all to remember the function of what you are doing. There are so many different types of mindfulness. Transit meditation is more in line with spiritual as being selfless and experiencing things bond the Rome of the here and now. Yet, other forms of mindfulness are designed to help lower the heart rate. The exercise I do with you was more relaxation training and stress reduction. Yet, it is still mindful. Use your choice with an understanding of the function. If you really want patients to begin the experience of what it's like to be fully present than that is all you need to have. No matter what shows up, positive, negative, no motion, frustration, you are getting important information that will guide you clinically. Again, one of the best pack this is in so doing is as something arises a natural tendency when the brain comes into contact with an unwanted experience, is to try to get away from it, escape it. Those our efforts to control what may be very important information that can help the patient gain insight into why they may struggle with recovery. Often times, as a means to get perspective, we will talk through a relaxation process and say notice your pain physician, notice it may rise and fall. If you are willing to lean them

more closely, if at color with color would it be? If you had shape what shape would it be? If it had sound what would it sound like? You are helping the patient recognize that it will rise and fall. It is not all you, it is the moving experience that is temporary and time. This shall pass. And in so doing creates perspective to come into distancing and stress tolerance. You again. Some of the movers and shakers and the acceptance community. [Indiscernible] have talked about how they see mindfulness and their practice. Notice for showing up. Describe it as it is. Noticed that it is a passing experience and let ago. If it is there and persistent see if you can notice a sensory tension around that pain is a good example.

I invite patients to do more of an exposure based mindful base practice. There is a mental garden. A mental wall that many patients put up because they know if I go there it will really hurt. So, I invite them to imagine softening the muscles. There is a front door with a window, and you will gently open the door and put out the welcome mat. Noticed that if there is a resistant really great work can happen. As is often around eight there may be opportunity for greater tolerance next time you practice. Greater capacity to withstand to some of this. Because the patients have done it before and still alive and breathing. Compare this to Herbert ensigns model. The steps involved in mind-body awareness. Stuff which are doing. Check yourself. Reflect on what just happened. Where am I? What is going on? What was I doing? Describing that to yourself. And in that time, you have an opportunity to choose how you want to respond. It requires reflection and requires stopping, paying attention on purpose.

I had a really valuable question yesterday. I hope you're with us today. If this is new to my patients and I do not want to throw them into a challenging practice what is a progressive way to introduce them to this process? I have rank ordered from my experience what I have found to be a graduated practice. Always begin education first like I do with the ghost.

Education on the anatomy lungs diaphragm and rib cage. That the usual can go a long way. And after that take the time, 2 to 5 minutes. If you're going to throw down a 35 minute practice people with high anxiety and never slowdown will not like this it will be off-putting. I will always encourage them and Herbert Benson program and the mind-body medicine really emphasizes the difference between the brief versus practices. I like that. A brief is when you are driving home from a long trip. Or from those of those that are on a long trip. You are at a four-way red light and do this. Is Lenny step away from your desk and go to the water cooler. Is when you take that smoke break step aside for the five minutes what you doing? You are taking a deep breath. You are looking around getting perspective and letting your senses help around you. Get some contacts and distant. Take a look. I almost always start out by teaching about the anatomy. Many of your physical therapist would agree. A good physical therapist will teach it in order to do certain physical exercises. Resistance trading Pilates dynamic stretching and movement all involve breathing appropriately. If you have a valuable physical therapist or yoga instructor you've accomplished complement each other's work. Your patients will see how does effective in a clinic and in the

classroom. After that I go into progressive muscle relaxation. It is a strictly guided exercise and as indicated for people with insomnia.

As I mentioned in other classes over 70% of our patients referred to the pain clinic struggle with sleep disorder. So as a result, we use cognitive behavioral therapy as a equal valuable therapy for patients with chronic pain. Progressive muscle relaxation has been recommended as an evidence-based method that can help patients falsely more quickly and eventually fall into the birthday stages of sleep and get them into the stages of recuperative restoration of the body. Sometimes I will go to a body scan which is a loose description of a body part. Sometimes it starts from the feet. Moving themselves up from one body part knees, hips, legs, bottom in the chair. Pelvis. Glued, abdomen, rib cage. They are not doing anything. It is more advanced in the sense that patients are guided to simply observe not change anything. So, in the purest form a body scan is a more. Form of mindfulness. Paying attention to body parts on purpose not changing them or manipulating them for any benefit as I mentioned before imagery has been studied in athletes and performance artists, like musicians. If you see or utilize as many as possible, I mentioned practice. There is evidence to show that even if we cannot see it on a human level the mere thinking about it on a microscopic level does activate the same that would be activated if they were carrying out the practice. I got some fantastic data on my master's thesis where I was using certain imaginal scripts for people. In terms of seeing whether or not just thinking about something act of its [Indiscernible] and sure enough it does. Having patients imagine what it would be like to walk in feel strong were to imagine themselves jogging on the grass moving smoothly with an agile nature. Taking it easy and stretching. If they are not in a position to do it physically this does activate the same muscle groups ever so slightly. So, if you have someone that cannot handle sitting still that is where I would do the walking meditation. Swimming is a great mindfulness technique. As long as they are focused on the focusing tool. How does my body feeling what taking an apple and putting it in my pocket?

If the patient is getting a good response to this compassion based guided meditation then we may get into deeper aspects about how to associated, omissions, memories, and for those doing more psychotherapeutic work, you may be able to do meaningful cognitive behavior therapies so patients can learn ways to change their relationship to their body. Changed the relationships with the thinking processes and how they are making sense of events in their life. In our functional restoration pain program unfortunately, we are on hold, but we have transformed much of our curriculum into a virtual platform. We have the virtual integrated pain program. It is not nearly as dizzy or product of as we know physical function programming is. I wanted to share with you what they have been applying and the day that we have with that. It is an eight-week program. I was teaching the former class of mindfulness and it was 45 minutes once a week. Again, after each credit practice in the classroom setting, every class had a check-in and a little education on why we were doing to particular practice and a guided exercise. Patients were invited to practice at least once a day starting at five minutes a day. Ideally, we know from program prior trials that if person practices at least 20 minutes a day for seven days a week for eight weeks, that is when we

start to see physiological changes or imaging studies of the brain. Greater activation of emotional centers and the prefrontal cortex in areas of emotionality, critical thinking, compassion and this is also for self-reports as well. Take a look year.

If anyone is curious on how to implement a class on their own this is basic guidelines. A start with education and so it transitions based on the feedback from the patient. Whether or not they want to maintain to a willingness approach, even if it is not your favorite thing would you be willing to see what you are you open to trying what it might be like? And then inviting them into use applications. I often recommend the common app. I believe it is initially free. If you want to upgrade, you may have to. I would say everyone mostly has Pandora or Amazon music. There are channels called meditation. You can usually stream Pandora Chai yoga music, or classical, or even, meditation. There is a free DoD at that is less popular called Breath to Relax. That is for people who really have lost that initial concept of how do I breathe through my diaphragm. We have people that have a disconnect. Who really need more concrete methods of teaching how my breathing and how my counting. If you cannot refer them to biofeedback the breed to relax up is a concrete structured guided app to show people how they can try to work on breathing. And, lastly, if you go to -- if you Google military meditation coach it does not matter if you have an iPhone, Samsung, Galaxy, smart whatever, there is a link on the inter-web. You can download and listen to guided meditation practices from our colleagues in San Diego. Length of time differs from 25 to 25 minutes. Depending on the availability you can play around with those. Cause for another product is. I would like to show that to you.

I am curious, by show of hands, how many of you have already practiced or are familiar with progressive muscle relaxation?

It looks like several of you. Again, there is a simple protocol. I think for the time being what I would like to do is, do more of a distress tolerance imaginal exposure base mindfulness practice. Particularly for those who struggle with pain. It will be a little more unique. If you have never had muscle relaxation you can Google this and consult with your mental health dividers. It is a very common practice and not hard to find.

In the meantime, I would like everyone to the best of your ability to get into a comfortable seated position as possible. When I taught this in the classroom setting sometimes I will tell the patient that because I'm trying to get buy-in and trying to get them comfortable being in their body with pain. I will often begin by letting them know if they want to lie down or elevate their legs or bring a pillow. The biggest thing is that they do not fall asleep. If you have patients who have never done this before or maybe it's the first time, they are sitting still invite them to sit upright if they can. Will offer the second can everyone find a comfortable seat? Thinking of posture, feet firmly on the ground. Ideally your legs and hands are not crossed. That is coming from a request. We do not want to put pressure on the blood flow through veins and arteries. We want to maximize the flow of blood. Take in some nice easy breaths through the nose and out through the mouth. Remembering our posture here. Imagine your spine is elevated. So that each vertebrate is

stacked gently on the top of the other. There is a lovely, elevated quality. No slouching. We want to give our lungs the auditable environment. Optimal environment.

If you prefer invite you to put one hand over your chest and one old belly. If you rather keep your hands at your side that is fine. If you have difficulty dozing off, I would prefer you stayed in the present moment not be pulled away with images or memories. Please keep your eyes open. Allow your day to fall down. I often say half-mast. Allowing year per funeral [Indiscernible] let's begin by turning your awareness over. Perhaps you have noticed as you sit quietly close your eyes and lower your gaze perhaps you noticed how much your sense of sound opens. Notice when you can hear around you in your space. Size thanks

Gently in knowledge to sounds but come back to your own and I want you to pay attention to the tiny space underneath your nostrils above the upper lip. As you breathe then noticed the temperature of your hair in the air as you inhale.

Then noticing the temperature of the air as it reaches your body. Even notice the tiny space right between the in breath and out breath. Checking in with your body asking yourself is my breathing comfortable? Uncomfortable? In my breathing fast or slowly? In my breathing from the top? Or from my belly? Just take in inventory. Listen to what your body is showing you. And when you are ready, I want you to prepare and see if you can gently and carefully find a location in your body where you have been feeling discomfort and as you hear my words see if you can notice whether there is a hesitation or flinch. Are you ready to be able to take a close look at this part of your body? Or are you hesitating? Acknowledged that.

Think your mind. It is caring for you. And those that have intentions, as you take in the next breath through the nose you should recognize, if you can, finding this area. And now XO and feel the release of tension. Leaned in close to it. What do you notice? Perhaps you notice it may shift or move. Maybe it arises and falls only to Haitian arise. Are you hesitating to lean and? You take in your next breath. Feel the coolness in your lungs. As you breathe out it releases tension into the space in front of you. As if you were a scientist looking through a microscope let's examine the boundaries. See if you can identify where the discomfort stops or where you feel just fine. You see where the pain begins and where it begins. You guideline around the boundaries of it.

See if you can practice that. See if you can answer the following question when you take in your next breath. Preparing to collect the fresh oxygen. As you excel, letting go of the tension, releasing the breath from the space in front of you. If it had color, what color would your pain be?

Is there an emotional feeling connected? What would that be? You can see thoughts running across to mine. Noticed them. If you could reach out and touch them, touched the discomfort and pain, what would the texture feel like on your fingertip? Breathing in along the expanding and breathing out release it. If this pain had movement how might it move?

Does it pump or throw? Does it vibrate or travel? Does it shoot? You can watch it move. Into the nose and out to the mountains.

If the pain had sound, what might it sounds like? Does it make it sound? Notice. [Indiscernible - low volume] I want you to now moved to the boundaries of where it stops. Now see if you can locate an area of your body that feels just fine. Maybe two hands, chest, feet, four head. Using the investigating eye, expand your view and notice all the other body parts around you. They are alive, they have color, what color are they? How does it feel when you touch them? They can man and have a motion. They are fluid. Take notice of that. Then asked to take the final step gently come back and check in. You see whether or not your breathing from the top of your chest or the belly. Maybe feel the same. Is your brilliant thing feeling pressured or uncomfortable? Or is it moving? Is your breath the rapid and swift or low and natural? When you are ready gently give your body permission to lift your gaze and acknowledged the experience as it is. Let's have a chance to check in and ask any questions regarding this practice.

I am mindful of the clock. We have about five minutes. I'm going to move a couple of slides over. I want to open the room if anyone has questions. I think Linda has -- if you are feeling bold and want to ask questions virtually, I love it when people show face. Now is the opportunity. Does anyone have any comments or questions about the material? You can type them in the chat box, wave your hand, or if she can get the microphone. Whatever you are most comfortable with it looks like we have a couple of people writing.

What do you do to encourage someone who tried this and did not experience so well?

Excellent question. Sometimes it will depend on the format. When I have done a group I always chicken. Sometimes I begin mindfulness in my mind. When these people have signed up for eight weeks of therapy I always in the beginning when I break down the expectations, I will often say in our program in the pain behavior health clinic you will be introduced some alternative treatments that may not be what you are from a with. We understand you are going to the hospital and maybe getting medications that are helping and injections that are helpful and you may have been told you are not a surgical candidate. We're here to teach you how to be your own self care provider. It is like trying unchanged. Or even a good pair of shoes. Not all of these skills fit perfectly yet, you do not know if you do not try. I will also try to get feedback. Some people cannot stand medication. So, I invite them to be mindful with walking. Maybe take them for a walk. It may be unconventional, but I consider it a therapeutic practice. We can do socially distancing if we have our facemask on. I will tell them to slow down growth side and see what we notice. If they said they did not enjoy I want to know why. Went to the notice when they tried? Often you may find it is too painful. Are I had an out of body experience? These are common responses. It may also be they are unfamiliar with it. They may need to practice. I will often say you may not notice anything the first few times, but many people notice when they stop that something is different.

My patients is shot I need to get back to mindfulness. If you're paying attention moment by moment on purpose watch in the animal as it sniffs, takes a step, peas and poops and not listening to your iPhone or talking on the phone is being shipped focused on the task. I try to troubleshoot that. I hope that is helpful.

Any other questions? Try again or alternative methods. One side you may have in your handout on the PowerPoint is yoga is a form of movement mindfulness. Tai chi is a form of movement mindfulness. It doesn't necessarily have to be in December might pick if patients want to give it as ago, I let them know that will try lots of different things to see how they fit. You may find that you really enjoy it or it is not a good fit but that is okay we tried. Any other questions?

I will say certain forms of mindfulness are not recommended for patients have severe clinical depression. If they are doing it on their own one must be careful and cautious. If they are doing a form of unguided into Meditation there is a risk of their thoughts and thinking patterns to spiral downward. It doesn't mean you cannot do mindfulness with patients who are depressed. I would be careful and encourage them to engage in methods that offer guidance, purposes designed to practice distancing or diffusion. And monitor and check in regularly to see if they get stuck on certain thoughts. Cognitive behavioral methods can help direct that. It is not uncommon for people to have an out of body experience or sensory experience. To me that is a positive sign in some respect. A brain that is in active as a brain that will get frustrated. We have seen from people who study folks who go to deprivation chambers. When you deprive someone of all of their senses so they feel here nothing the brain will create stuff and hallucinate on the healthiest individual. People start to have unusual sensational experiences. Definitely investigate the be sure to understand the patient history. If the patient is scared, I would normalize that is not being usual. AB try and I open practice pick can reduce the distant entity experience. Grounding exercises can reduce them as well. Any other questions or thoughts?

I do not see anything else pop up in the chat window. Any other folks want to raise their hand?

From our side if everyone would fit in the chat box where they are from it would be great to see where we have people from.

While you guys are chatting that I have one final thing. When we studied our practice of mindfulness and the functional program, patients with chronic pain after practicing mindfulness report greater social satisfaction and improve and in accepting the chronic pain they have a gain in self-efficacy and reduced pain catastrophize and. That is true the self-report. If the patient feels the benefit, then why not. They just need to be willing to try. Keep gone and went to see where everyone else is going. Stay safe there. Biggest a dry. Any others?

I will remind everyone as FAR as the sign in sheet downloaded from the files pod please remember to complete it and return it. Thank you.

If you want to know more information there are a few more slides I did not bring up they are more about research outcomes. I am available on email as well if you have a question or want to do a consultation for the my email is in the Chat box. I am on the global, the only Kathleen McChesney I am aware of want to extend my thanks to all of you for staying dialed in and sitting in front of your computers all afternoon thank you to Linda and Mitchell my technical people behind the green curtain and thank you for the coordinators and hopefully we will see you all in person this time next year.

Thank you so much.

[Event Concluded]