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Transcript Webinar 3 **Exercise Therapy for PAD**

Intro

Hello and welcome to the peripheral artery disease Webinar about Supervised Exercise Therapy for PAD. I'm Diane Treat Jacobson, a professor at the University of Minnesota School of nursing. PAD affects more than 200 million adults worldwide and over 8.5 million in the United States. While it's a serious risk factor for coronary artery disease and cerebrovascular disease PAD remains a largely overlooked condition, but together we can change that. Janssen pharmaceuticals is a proud sponsor of the American Heart Association's efforts to educate healthcare practitioners about peripheral artery disease. Let's get started. These are my financial disclosures.

Objectives

And the learning objectives are that the audience will learn basics of developing an exercise training program for patients with symptomatic PAD, and we'll learn how to implement the exercise training program for patients with symptomatic PAD. I'm going to talk a little bit about the evidence supporting exercise training in patients with PAD.

History and Physiology

The efficacy of supervised treadmill training to improve walking distance in patients with claudication is very well established through numerous randomized clinical trials that have taken place over the past 30 years.

The mechanisms by which exercise training improves walking include both local and systemic changes. To understand the impact of exercise on patients with claudication who have limitations in blood flow because of blockages in their arteries, you have to understand a little bit about the distribution of blood flow that changes when patients are at rest versus when someone is exercising. I'm particularly with heavy exercise, so at rest the blood flow is much more evenly distributed between the gut, the kidneys, the brain and the muscle. Whereas when you engage in heavy exercise, that distribution shifts so that the skeletal muscles are getting a much greater percentage of the blood flow and the blood flow to vital organs is decreased. However, when you have a blockage in the artery of your leg, that prevents the body to be able to respond to that demand for increase, then you have a mismatch.

This slide depicts what's happening inside the artery in the normal artery on the top and the bottom artery, an abnormal diseased artery on the bottom. So if you have a normal artery without any obstruction, you have laminar flow. There's nothing obstructing the flow, the endothelial cells are healthy and they release substances that can help mediate vasodilation demand, in response to increased demand. So you have no ischemic pain. You can maintain that the distal pressure and flow, you have a normal ABI. The oxygen supply and demand is matched. Efficient oxidation and low oxidative stress. However, when you have a stenosis in an artery that prevents the flow of blood through, you have turbulent flow, there's a pressure drop across that stenosis, so there's lower pressure inside the artery. You also have impaired endothelial function, and the inability to increase the flow with exercise, which as you saw on the left side, is imperative.

The ankle brachial index is reduced. The oxygen supply and demand mismatch such that the demand far exceeds the supply. You have inefficient oxidation, high oxidant stress, and this causes ischemic pain, which occurs in patients with claudication every time they walk.

Pathophysiology of PAD

So the pathophysiology of PAD is a vicious cycle. You have the reduced lumen that is caused by the atherosclerotic obstruction, reduced blood flow and oxygen delivery, which leads to endothelial dysfunction, ischemia, systemic inflammation, ultimately skeletal muscle fiber denervation, atrophy and altered aerobic muscle metabolism, poor aerobic capacity, reduced strength and endurance, which then leads to impaired walking and decreased quality of life, and then deconditioning and worsening of risk factors which further can advance the disease and so breaking the cycle of the pathophysiology of PAD is imperative and exercise is a wonderful therapy to be able to do that. Now, the mechanisms by which exercise may improve function and symptoms include a number of them, but improving endothelial function, improving muscle metabolism, improving mitochondrial function, also increasing muscle strength and improved walking economy are also factors that may be part of this.

Mechanisms of Exercise-Based Improvements

Also, people may increase their pain threshold or tolerance, but in addition with education, they come to understand that claudication will be uncomfortable and not pleasant is not necessarily dangerous and so that they don't need to keep on limiting and limiting and limiting how much they exercise. In fact, if they keep moving, they'll be able to do more with less pain.

Studies for Treadmill Training for Claudication

This slide summarizes 15 studies that looked at treadmill exercise training for claudication. There's a wide range of response, but overall there's a very significant improvement in both the

change in claudication onset distance and then the change in the peak walking distance and in the 12 weeks. Changes are substantial for both of these outcomes in 24 weeks. In this meta-analysis, the studies that did 24 to 52 weeks were even more substantial. So a big body of evidence supporting treadmill exercise for claudication.

In those studies, the treadmill exercise was done in a very traditional way where you have people walk into moderate to moderately severe pain, rest until the pain goes away. And then walk again.

There has also been a group of people from Poland who have looked at four studies that do a 12 week intervention of treadmill training to the onset of pain only. So instead of walking into pain, you're stopping before the pain starts. They've seen a substantial increase in pain-free walking distance and in peak walking distance with no increases in inflammation after the exercise training. And so the ischemia that's induced during, during with in patients with claudication during exercise can cause inflammation and in particularly in patients with more severe disease, this can be quite substantial. And so in this study, they didn't see an increase in these inflammatory markers, which is a positive thing. Also the formability of the erythrocytes. So the ability of them to be pliable and maybe slip through smaller spaces was improved in the exercise group with no improvement in the control group.

Now, the fourth study that they did compared the two treadmill walking protocols, the traditional treadmill walking into moderate to severe discomfort versus treadmill walking only to onset. And both groups had statistically significant improvement in walking distance without any difference between groups. So they both had really substantial increases in both pain-free and improved walking distance and no differences between them. So this is an option for patients who may be extremely pain averse and don't want to walk into pain if they can walk far enough before they get the pain, maybe that's enough of an aerobic benefit too to have them improve.

Studies for Non-Treadmill-Based Training for Claudication

There are a few studies that have looked at lower extremity cycling and those have been a little more mixed. One study which was only six weeks in length and had a much more modest improvement with legs cycling compared to treadmill training. But then there have been a couple of other studies, one of only six weeks and one 24 weeks, that have shown more substantial increases in both pain-free and peak walking distance. So I think the jury's out a little bit on cycling and cycling may be a perfectly fine mode of exercise for some patients who can't do other modes of exercise. Also, there's been some evidence about the effect of aerobic upper body exercise, arm cycling or arm ergometry, has been shown to improve both the pain-free walking distance or onset of quite a distance and peak walking distance in a couple of different studies.

And also one of these studies found that there was a delay in how long it took for the oxygenated hemoglobin to decrease to the bottom in the calf muscle following 12 weeks of arm exercise. So there's some signal of benefit here. In Minnesota, we did a study, the Exercise Training for Claudication study, which was a pilot study looking at the relative efficacy of supervised treadmill training in the traditional manner versus arm ergometry alone, or a combination of both versus usual care. And we also found that there was an improvement in both the onset of claudication distance and the peak walking distance in both the treadmill and the arm groups. The combination group also saw benefit and there was no improvement in the control subjects in this study.

The CLEVER study compared supervised exercise training versus iliac artery stenting in patients who had aortic iliac disease. And this was a six month intervention in the exercise group and they compared that to optimal medical care and you can see in the slide that the supervised exercise in the green line had a significantly greater improvement in their peak walking time compared to the patients and the aortic iliac stenting or control groups. And the change in the claudication onset time was the same in these two groups and then you can see that at 18 months, which was 12 months after the intervention stopped, these effects were durable so that they maintain their peak walking time and claudication onset time. The cost effectiveness analysis of this study show that there was about \$122,000 per quality adjusted life year gained for stent versus supervised exercise. And that was a substantial amount but it was a minimal improvement of stent versus supervised exercise.

This was based on quality of life questionnaires, which had been a little bit better in the stent group than the supervised exercise group. But regardless, the conclusion in this paper was that given the increased expense and the marginal benefits of spending versus supervised exercise, there would appear to be no rational justification for covering stenting but not supervised exercise for the treatment of claudication. So taking the approach of not an either-or, but both should be covered.

2016 PAD Guideline Recommendations

Now the new 2016 PAD guidelines have recommendations related to exercise. The first is similar to the original guidelines in 2005 that the patients with claudication supervised exercise is recommended to improve functional status and quality of life. And that's a Class I recommendation, the highest that you can get. And an additional recommendation was added that a supervised exercise program should be discussed as a treatment option for patients with claudication before revascularization.

So you don't have to jump to a procedure, you can offer exercise first. Also, because of some studies that I didn't present here in patients with PAD, a structured community or home based exercise with behavioral change techniques can be beneficial to improve walking ability. And that's based on several trials that have been recently published. And this is not just telling someone to go home and walk. This is really a structured program. We'll talk a little bit more about that in a second. And also because of the recent exercise, looking at other strategies that have shown to be somewhat effective, that alternative strategies may be appropriate. And I think that this would definitely be considered or should be considered in patients who have a very low walking ability and they can't walk for more than a few minutes. So they're really limiting their ability to get aerobic exercise.

Structured Programs for PAD Exercise

So there are some definitions. The important thing is that when you're talking about a structured exercise program, if it's a planned program, it has individualized recommendations, and also recommendations for exercise progression so that you're constantly challenging the body to increase intensity, so that we can improve functional status over time. And there are a number of elements that are described that a supervised exercise program would have. I think the take home message for this is that this can be a standalone or within a cardiac rehabilitation program. It needs to be directly supervised by qualified healthcare providers, and is performed for a minimum of 30 to 45 minute sessions for at least three times a week for a minimum of 12 weeks. So there are definitions in the guidelines that can help us understand what this program should look like.

And then for a structured community or home based program, again, this isn't just a sit-home, go-home-and-walk program, this is a program that takes place in the personal setting of the patient rather than a clinical setting and it's self directed, but it has the guidance of healthcare providers and they provide a prescription regimen and counseling, to ensure that they understand how to do it, how to maintain it, and how to progress. And then they can also incorporate behavioral change techniques such as health coaching or use of activity monitors to help increase the effectiveness of these programs.

CMS Coverage For PAD Exercise Therapy

So finally in 2017, after a long wait and many, many, many years of research and advocacy, a center for Medicare and Medicaid services or CMS proposed that the evidence was sufficient to cover supervised exercise therapy for patients with PAD and who had intermittent claudication. So the patients have to be symptomatic in order to be qualified for this benefit. And I think that this is coming from a place of that this is seen as a therapy to increase, to improve function, to improve symptoms – a little different than the traditional cardiac rehabilitation. This is more of a

therapy, active therapy. The session should last for 30 to 60 minutes and they should be comprised of a therapeutic exercise training program. They can be three sessions a week up to 12 weeks. There's a CPT code attached to this, and there's the providers have the discretion to refer patients for a second 36 sessions over 12 weeks if the patient continues to be symptomatic. And so that that will be covered. It's important to note that the first 12 weeks, the 36 sessions need to be completed within 12 weeks. And but the second 36 sessions can be completed over a longer period of time. And it sounds like there is a lifetime cap of 72 sessions.

Now in terms of reimbursement, there's the CPT code, there's the payment for an on campus hospital. Outpatient setting is about \$55 a session, but it's important to know that the patient has a 20 percent copay. And I think that the billing aspect of this and the reimbursement aspect of this is still a work in progress in terms of sites getting this set up and finding what the CMS is saying and also what the private insurance companies are saying. So many people who have a supplement may that may cover their copay and so that they won't have out of pocket expenses, which could be quite daunting for people. There are also CPT codes associated with this. They're listed here and then they get a little more complicated because you add a sixth character if you're talking about right leg, left leg or both legs.

So I want to talk a little bit about experience that we've been having in Minnesota implementing PAD in the clinical setting. So there've been two projects where we've been implementing this on the ground outside of a, of a formal clinical trial or research setting. The PAD Prairie initiative. In this we're working in four rural Minnesota communities, implementing supervised exercise for PAD. In addition, we're raising awareness for PAD, doing public screenings and other things, educating providers and nurses and teaching the cardiac rehab therapists how to do PAD rehab according to the guidelines that have been developed. Additionally, we've been implementing supervised exercise program therapy for PAD throughout the Fairview Health System here in the Twin Cities metro area, and this has been going on for three years. So both of these projects have had three years of experience implementing this in the real world.

Programmatic Infrastructure

And this allowed us to see the real world implications of this implementation in the patients that may have not been participating in a clinical trial or were not going to qualify. So what you need is to develop programmatic infrastructure – a medical director. You need to establish a referral process. Making providers aware of the availability of this therapy is really important and it may need changes to the electronic health record. You want to train the cardiac rehabilitation staff about how to implement supervised exercise therapy for PAD and develop an implementation process because it's a little bit different. Looks a little bit different in these patients compared to the patients that they see for cardiac rehab. Actually, our experience has been that the patients

seem to be a little bit sicker or more prone to other co-morbid conditions, et cetera. So it's not just the direct translation from cardiac rehab.

Baseline Assessment

We encourage a baseline assessment that can be done through a treadmill test, a graded exercise test, or a six minute walk test. The short physical performance battery is useful to look at fall-risk balance, just general strength and the timed up and go test, which is the timing of how long it takes a patient to get up out of a chair and walk a short distance turnaround, come back and sit is very revealing in terms of maybe what they're up for in terms of what kind of exercise they could be doing in additional. In addition, there are a number of a subjective assessments of the Walking Impairment Questionnaire assesses community-based walking the from the patient's perspective, so how far they can walk, how much difficulty they have going faster and how much difficulty they have climbing stairs. In addition, there are several quality of life questionnaires that have been validated specifically for PAD patients and then more general functional status questionnaires that can be used to assess functioning in PAD patients, but then also allow comparisons across other kinds of patients who have been assessed with these instruments.

Equipment Orientation

The other thing that's really important is to orient the patient to the exercise equipment. So helping them understand how it works, what they need to do, what they, what control they have so that they're not intimidated by it is really important. This is an example of an evaluation form. A number of these are being developed and posted on different websites. There'll be available for use. I think the important thing is to develop something that makes sense for you and your institution and gets that the data that you want, but you certainly want a medical history. Know what their risk factors are, doing a pain screen. If they have a stress test, you want to document the results of that. You want to make sure that you inspect their feet and know if they have any wounds on their feet.

Wound Examination / ABI

Sometimes people will start an exercise program without wounds, but if they don't have the proper fitting shoes, they can develop blisters on their feet and it's really important to help them be aware of how important it is to do a foot inspection, to take care of their feet and to know that they're not injuring their feet. You also want to know if they've had an exercise ABI, which we strongly encourage and both a resting ABI and Post Exercise ABI can be, can give a lot of information about what the baseline status of the patient is in terms of disease severity. And also what are their symptoms of claudication? What's the location, what did it feel like?

Tracking Over Time

This is an example of a therapy evaluation for a six minute walk test that can be used where you would do an initial and then a discharge. So you can see the comparison over time. You look at the time and the distance walked, their heart rate, their exercise and recovery, heart rate, their blood pressure, both resting and during exercise and recovery. How long did it take them to develop claudication and, and what was that distance and then what their total distance walked and when they were doing that walking test, how far, how much exertion were they during, what was their rating of exertion? You can use the Omni scale or the FORD scale and you might want to measure oxygen saturation just to make sure that they're safe to do that exercise test.

Fall Risk Screening

Again, you can do a fall screen. Have you fallen within the last year? This may affect the mode of exercise that you choose. And then what was their initial net level either during their six minute walk test or during their first exercise session, what were the times of their timed up and go test? Sometimes these can be done twice. And then you can record these levels again at discharge to see the difference, that that's happened. And it's quite impressive when you have somebody starting at a zero percent grade at two miles an hour. And suddenly they're at at 12 weeks they're at an eight percent grade and two point four miles an hour. And that's a big difference in terms of mets and a change in one met level has a significant impact on mortality. So this is a nice measure to record and also looking at their goals, and, and what, what are their goals for the exercise therapy, what do they feel like they need to accomplish to feel like it's going to make a difference in their lives?

So treadmill walking exercise, as we've mentioned, is considered the gold standard for exercise therapy. Initial prescription is determined by the baseline functional testing or by the first exercise session, determining what's the best speed and grade for the patient. So you perform a treadmill familiarization to determine their preferred walking speed. And then the training consists of intermittent bouts of walking and resting based on their claudication level.

Claudication Pain Scale

You use the claudication scale to determine these exercise and rest cycles. Too have a claudication pain scale. This is from the ACSM where zero is no pain, and then four is the most severe pain you can experience. And then one is that claudication onset time or distance that that's the first feeling of any pain in the legs and then a two or sometimes three is where the pain level at which exercise should cease. Some patients will be saying that they're at a two and they're limping and can barely walk.

And some patients will say they're at a three when they're not really exhibiting a much discomfort. So it's very individualized of how far you push between these two. The pain scale that we use is a six point scale, zero to five scale. Again, the first zero and one are the same and there's just a little more gradation between mild, moderate, moderately severe pain. And in this scale, the patient should stop exercising a during between a three and a four and they should stop before they get to that five before they have severe pain. That you don't want to push them that far. So in terms of the intensity and the time you begin at an initial speed and grade, they'll bring on claudication within two to five minutes. So you walked to bring on the claudication there, you gradually, patients are going to be progressively increasing in that walking time and that's what we want.

So then when they get to a two or three to four, depending on what scale you're using, they stop and sit and when they reach this moderate intensity pain, and then they resume when the pain has completely subsided. Now, some people don't want to sit, they just want to stop on the treadmill and then wait for the pain to go away, which it often does in a couple minutes, and then start again. But if they want to sit, that's okay. So either is fine and you can continually repeat this process for a total time of walking and resting of 30 to 60 minutes. And then you progressively increase the grade and speed over time as they're walking duration improves. This is an example of a supervised exercise therapy progress note. So each line would be a bout of exercise.

Documenting Modality and Change in Time To Claudication Pain

So they document what they're doing in terms of modality. If it's a treadmill would be the speed and the grade, the time that they walk. When was the onset of pain? What was the maximum pain that they reached before they stopped? What was their rating of perceived exertion during that time? And then how long did they have to rest, but before the pain subsided, if you're using another workload such as arm bike, leg bike, total, recumbent stepping machine, then you would record potentially watts or level of exercise as opposed to grade and speed and then each- When they start again, you do it again. And so then you can gradually, you accumulate the time, document that total exercise time, their total rest time, total session time, if they had any other symptoms beyond claudication, are they doing any home exercise?

So this is a way for the therapist to kind of keep track of what happens and how the patient progresses with each exercise session.

Progression Scheme: Changing Grade and Walking Speed

This is an example of a progression scheme that we used in the ETC study where they choose a comfortable walking speed and you adjust the grade as needed, so that they can get to a three

to four at a claudication within five, no less than five and no more than 10 minutes. And then you have the participant rest until the pain dissipates and you repeat those intervals for 60 minutes as tolerated. And then the second session you'd repeat the same exercise prescription. And then once the patient can go for eight to 10 minutes or more, then you start increasing the grade and then you would continue increasing the grade until they can go to 10 percent. Once they go to 10 percent, we try to start increasing the speed and then that would continue in until three miles an hour.

And then you can start increasing the grade again. However, most patients are not going to get to a 10 percent rate in three miles an hour. So you're going to be usually at exercising patients between two and three miles an hour, and between zero and 10 percent grade. And then if they're not able to get to that eight to 10 minutes, you just keep them at the same intensity. The caveat is if they don't progress over a period of time, if you're going for a couple of weeks, and they're not progressing at all, you may want to evaluate whether a different mode of exercise is indicated. So in the real world as we've been experiencing this, we realize that most of the PAD exercise trials have compared treadmill exercise to another condition – a procedure, an alternative exercise or control and that patients needed to be able to walk on a treadmill at two miles an hour to be included in this study, otherwise they were excluded.

Considering Alternatives for Hesitant or Challenged Patients

So we found that a lot of our patients are not willing or able to walk on a treadmill or particularly not at that speed. They may have balance issues, they may just be uncomfortable with a treadmill or unfamiliar with it. So the treadmills also may be limited. And in these instances, alternative forms of exercise should be considered or a modification of the speed of the treadmill if they are willing to be on a treadmill. The other thing is that patients could only walk on a treadmill for a very short period of time before they have to stop. They're really not getting that aerobic benefit of the walking exercise and they may be getting a lot of inflammation in their lower extremity, which could be making things worse. And so in those cases, an alternative motive exercise may be indicated.

So we recommend that we try a treadmill walking or another walking exercise first and if they're unable to do that or, as I said, if it's so short that the benefit is unlikely, consider an alternative mode. The seated aerobic arm exercise, as we saw it can be effective for some people. I think that that's particularly true for patients who have a very short walking distance or tolerance. Also, we've been using recumbent total body stepping, which is a very popular mode of exercise in the patients. And we've been finding that patients who can do only a couple of minutes on the treadmill can do as much as 20 minute bouts on new step. We've also seen that patients are

really improving their thigh strength, their quadriceps strength, because this, this machine really engages their quadriceps and less their calves, which probably explains why they can go further.

We have some great stories about patients who've been able to do 12 weeks of total body stepping, and increase their ability to get up out of a chair to when they needed help before. One man was a farmer who wasn't able to climb up on his combine and by the end of 12 weeks he was able to do that to bring in the crops that he had planted earlier in the year. So there's some, I think there's a lot of exploration and that we can be doing apart from what all the previous studies have shown. In addition, I think we need more research on alternative modes of exercise. The important thing, I think is to encourage the exercise therapist to apply their art and science as they do with cardiac rehabilitation so that they're using their gifts and their experience to apply individually to these patients.

Upper Body Protocol

This is an example of our upper body protocol. Essentially we start people at two minutes on and two minutes off, increase that until the end of 12 weeks they're at five minutes on one minute off, so they get 50 minutes of exercise and gradually increase the resistance to increase the workload. Again, this should be individualized. If patients are stronger in their upper body, they may be able to go for longer. And you just want to base their exercise progression on their rating of perceived exertion and their target heart rate. This is just our stepping protocol. It's similar to the treadmill protocol in terms of you base it on when they get claudication, and progress the workload accordingly. If the patients don't get claudication using this mode of exercise, then you would progress them based on rating of perceived exertion and their heart rate.

So there are some issues that are specific to PAD rehab that aren't encountered in other kinds of rehab because of the intermittent nature of the exercise. If you need a chair to sit down, where do you put that? These places can be pretty tight in terms of space, so that's a consideration. And also the consideration of somebody stopping and resting and then somebody else getting on the treadmill, while they're resting and so trying to make accommodations for preserving that treadmill, but it also lends credence to the idea that you should think about maybe when they're off the treadmill or resting, they could do a different mode of exercise for a bit and then go back to the treadmill.

Additional Safety Considerations

There's safety considerations. There's the potential to unmask new angina due to increased exercise capability. And we've seen this in a number of our patients, so you want to make sure that you're following up on new signs and symptoms of coronary disease.

We've had patients who stopped, who develop angina, get evaluated, get a coronary procedure, do cardiac rehab, and then come back into PAD rehab. There if you see an abrupt increase in claudication symptoms or a decrease in how far somebody can walk from one day to the next, that could be a sign of worsening lower extremity arterial disease and they need to be evaluated for deterioration in limb blood flow. There are also safety considerations related to the lower legs and feet. For indications of critical limb ischemia. You want to be checking with patients about sores or pain. Are they having any rest pain? If they are known to have an open sore that needs to be assessed and you want to make sure that you're not exacerbating that by exercising on weight bearing surface where the wound is, looking at the skin for the color, the lack of hair, sometimes, particularly in CLI Patients their skin is shiny, thin and fragile. And sometimes people can have what we call dependent rubor and elevation pallor. And so this is the mother of one of our therapists who gave me permission to use these. When her mother, who had critical limb ischemia, had her foot dependent, it was very, very ruborous or red and you can see that it looks very painful and angry there. And as soon as she elevated it within 15 seconds this pallor came on and that's a sign of severe arterial limitations and a classic sign of critical limb ischemia and patients may need to be under the care of a vascular specialist if they show signs of this and that should be a referral right away. I think it's important to collect outcome data. It's not a requirement by CMS, but it's part of best practices for Cardiac Rehab. And I think that if you can collect the same measures that you do at baseline, at least some kind of functional measure, objective and subjective and a quality of life measure that that can be really helpful in us documenting the efficacy of this therapy as we implement it in the clinical setting.

Available Resources and Conclusion

There are also resources that are available. There are a number of places that are starting to develop intake and progress forms. They're being finalized. They're going to be able to be adapted by people for use. We have a website for our PAD Prairie Initiative where we've been developing educational tools. We've got videos on functional assessment testing, hydro initiating and progressive patient in supervised exercise, treadmill, exercise and aerobic arm exercise. The American Association of Cardiovascular and Pulmonary Rehab website has an updated PAD rehab toolkit.

And also the AHA has commissioned a science advisory on how to implement supervised exercise therapy for patients with symptomatic PAD and that's going to be completed within the next six months at least. So that's going to be a nice summary, short kind of advisory on how do you implement this, what are the elements ranging from the therapy principles to billing and other things. So it's wait for that and that should be coming soon and I'm sure they're going to be many other resources popping up as people start implementing this on the ground. Thank

you for joining us today for this PAD Webinar. Again, I'm Diane Treat-Jacobson. My work is focused on promoting timely diagnosis and the use of evidence based therapies to treat PAD and improve the quality of life of patients coping with this debilitating disease. Janssen Pharmaceuticals is a proud sponsor of the American Heart Association's efforts to educate healthcare practitioners about peripheral artery disease. If you would like to watch this webinar again or show it to your colleagues, please visit [heart.org/managing PAD](http://heart.org/managingPAD). Thank you and have a great day.