CASESTUDY

Meeting the Challenges of Diverse Seniors – Many with Dementia, Stroke, Parkinson's disease

Odom Health & Wellness

BIODEX
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The Lighthouse of Waconia, MN is one of the region's premier senior living communities. It offers independent living, assisted living apartments, short-term stay and a special activity-based memory care facility. The physical therapy needs of Lighthouse residents are served by one of the state's best-equipped and staffed physical therapy clinics, operated by the Odom Health & Wellness group founded by Minneapolis sports medicine physician John H. Odom, MD.

Managing the Lighthouse of Waconia clinic is Meghan Klein, DPT, director of clinical development for the Odom group. The clinic recently took delivery of a broad spectrum of Biodex physical medicine equipment: The Balance System SD, Gait Trainer 3, BioStep 2 Semi-Recumbent Elliptical, FreeStep SAS - Supported Ambulation System, and Upper Body Cycle.

Recently, Biodex sat down with Dr. Klein, to review her experience in rehabilitating the broad range of residents at the Lighthouse.

Meghan Klein, DPT, Lighthouse of Waconia and director of clinical development at Odom Health & Wellness.

What was your rehab experience prior to the Odom clinic here, and how did it compare to the patients you treat today?

Dr. Klein: Before I worked at Odom Health and Wellness, I worked at a skilled nursing facility in the Twin Cities, and surprisingly, the patient population was very similar. When I came here, I expected my patients to be at a higher functioning level, with fewer problems, due to the fact that they were still living outside of these skilled nursing facilities. I discovered the residents here to be at about the same functional level, with the same number of difficulties as my previous patients.

Dr. Klein uses the Biodex Balance System SD for stroke and Parkinson's patients, providing immediate feedback on weight shifting and COG exercise.

Among your Lighthouse patients, where do you find the Biodex Balance System most useful?

Dr. Klein: We use the Balance System with a number of different types of patients. One of my favorite types is the stroke patient. It gives them immediate feedback on affected-side weight bearing. It is also very helpful in rehabilitating patients with Parkinson's disease, who have a tendency of falling backwards without sensing their risky stance. The Balance System can show them feedback that emphasizes that fall risk. But they also can use the machine to practice getting their weight forward on their toes, and being able to control their balance and their center of gravity in ways that they may have been too afraid to attempt prior to Balance System training.

Surprisingly, we successfully use the Balance System with patients with dementia, many of which have balance issues. Balance System games and training techniques are usually simple enough for them to figure out the task or the goal without frustration. We often put them into our FreeStep Supported Ambulation System, where a harness relieves their fears (and ours) of their falling. Combining the

Balance System and overhead harness system enables dementia patients to adjust their center of gravity in different positions outside their instinctive sway envelope, which would ordinarily frighten them.

For Parkinson's patients, the Biodex Balance System is very valuable. Parkinson's patients often don't realize that they are at risk of falling backwards, or that they are leaning backwards. Their sense of midline can often be off, so it is common for a Parkinson's patient to keep their weight in their heels. When they can see their weight distribution directly on the Balance System screen, ideally, they will be able to help themselves to find that actual midline. If we can show them when they are at 50%, when they have as much weight in their heels as they do in their toes, when we consider them neutral and safe, they will be able to see that they are in the green. It helps them develop a more accurate sense of midline, and gives them a better perception of themselves in space.

And where do you find the Gait Trainer most useful?

Dr. Klein: On the Gait Trainer, the patient can see virtually every aspect of their gait pattern. While they are walking, it shows their feet and it shows the zone that they want to be in, in terms of step length. Each step shows a foot in a particular zone, and if they hit it, then that is when they get the auditory feedback of a beep. They can listen for the consistent beeping while watching for the placement of the foot inside the desired zone. The patients also love to get competitive with themselves, so they can see their gait speed and the time they are going, and each time they want to try to beat the speed and beat the distance that they have gone before. It is a big motivational tool for a lot of the patients.

Real-time biofeedback on the Biodex Gait Trainer 3 prompts patients into a correct gait pattern.

Could you give us examples of how you use the Balance System and the Gait Trainer with a patient with both orthopedic and dementia issues?

Dr. Klein: One example of such a patient with early-onset dementia came to us with knee pain. She had some patella-femoral tracking issues, with weak quads and poor control of her knee. Our therapy attempts to strengthen her hips, quads, and hamstrings, so that she can maintain better knee alignment. By working up the entire chain, we try to keep her joint stable, and thus reduce her arthritic pain.

As part of her therapy, we like to work on her balance. She does not trust her balance. Prior to receiving our Biodex Balance System SD we gave her a lot of pool therapy and gym exercises. But we started using the Balance System to give her more feedback so that she could learn to trust her balance more.

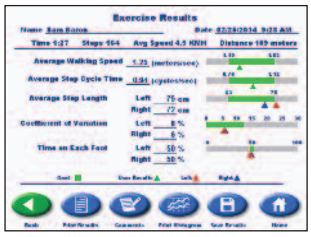

To strengthen hip adductors, Dr. Klein has her patient walking sideways, uphill, on the Biodex Gait Trainer 3.

In my experience, many patients fall because they're just too fearful to push their comfort level to the degree necessary to improve their balance. Within the safety of the Balance System, we can challenge her to stand on one leg or do-squats and reach out past her limits of stability. Not only are we challenging her balance, we are also working on her ability to follow multiple-step directions, so that as she does one component of the task, she has to remember the next component of the task as well.

We also exercise this patient on the Biodex Gait Trainer. It enables us to extensively alter the challenges for her - sideways walking up a hill, to help strengthen her hip adductors, in particular. They get real sore real fast, so we are just trying to strengthen the chain. In part because of her dementia, her coordination is a bit off, so the fact that we can challenge her walking up a hill is something that we could not do on a level surface. We also can do backwards walking with her, which is another way we work on coordination and strengthening at the same time. She's in pretty good physical condition overall, so the Gait Trainer effectively gives us unlimited amounts of walking ground – she can go for as long as she can tolerate, whereas otherwise, we would be doing laps around the facility.

How do you use the Balance System and Gait Trainer with a stroke patient?

Dr. Klein: One of our residents had a stroke about two years ago. She came to us with complaints of an increased difficulty with transfers, as well as her walking had suffered some decline. We began with her a while back doing the basic things like squats and standing on uneven surfaces.

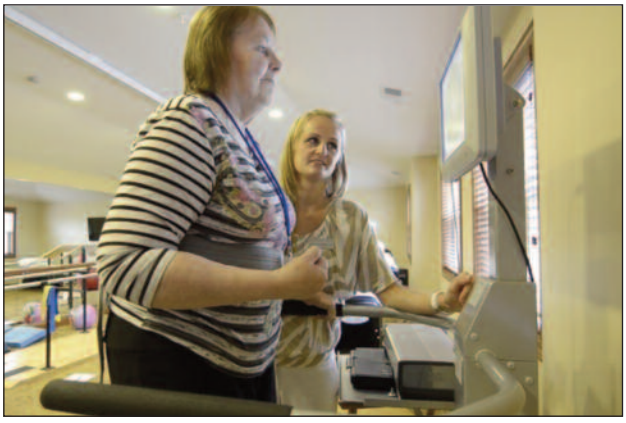


Performance screens and printable reports demonstrate patient progress and proves need for continued therapy.

Audio feedback on the Biodex Gait Trainer 3 serves as a metronome to foster equal step length.

When we got our new Biodex equipment, we started a more detailed Gait Training routine with her. While she walks, we turn on the audio feedback so she can hear when her steps are occurring. We are trying to get her step length and her weight bearing to equal out on both sides so that she is using that affected limb more.

In addition to the Gait Trainer audio feedback, she can see the percent weight bearing on each leg and compare the two; we get excited when we see those numbers come closer and closer to 50% on each leg. She is also looking at the covariance, how her step changes as she walks. As her affected limb becomes fatigued, does it take shorter steps? As she tires, is it handling less of the weight bearing than it was before? The display on the Gait Trainer lets her see when she is taking big steps. She has been able to normalize step length on the Gait Trainer, so her steps are exactly equal now at this time.



Visual feedback helps stroke patients become more aware of their gait pattern and their affected side, learning to trust in its strength.

How do those Gait Trainer improvements translate into overground walking?

Dr. Klein: One of the biggest changes I have seen is this stroke patient's improved gait pattern. Once we get off the treadmill, she is a lot more confident. While she still has to use her narrow-based quad cane, she has a bigger step length and more normalized cadence.

Our goal with this patient was to get her on an ambulation program with the staff, so that once we are done with her, she will be able to maintain this walking routine every day, to maintain her strength. She has also become much more aware of her gait pattern. Whereas before, all I could really tell her was, 'Take big steps. Now she knows that she does not rely enough on her affected limb, where it has the strength, she just needs to trust it more. She shows a little more courage when it comes to taking those bigger steps with her non-affected side.

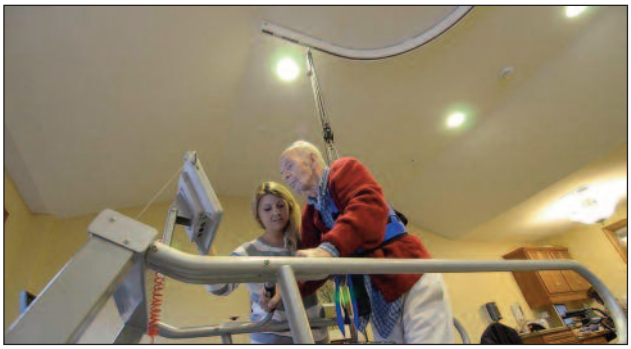
I noted you using the Biodex FreeStep system with this and several other patients.

Dr. Klein: We just call it "the harness." Surprisingly, it's one of the systems that I use the most in the treatment room, because it has so many different options that you can do with it. The greatest thing about it is that it frees up the therapist, so now I don't have to stand and hold the patient. I can be around them, throw things to them, and have them kick things back at me. I can safely challenge not only their postural reactions, but also, their anticipatory postural reactions.

Dr. Klein explains that the Biodex FreeStep SAS is one of the systems she uses most in the treatment room; no longer having to hold the patient, she can engage hands-on in their therapy.

One of the greatest benefits to the harness is its contribution to encouraging the patient to develop their postural reactions. If you are holding onto a patient with a gait belt, as soon as they begin to show signs of falling, you are going to grab on tight and correct it so that they do not fall. In the harness, you can trust the system, so that as they start to lose their balance, they have to take corrective steps. They may feel like they are going to fall, but as a therapist, you know they are not. You can actually give them the opportunity to take those steps and perform what their body is trying to perform, and develop the reactions they need to reduce their fall risk. It also gives us a chance to have the patient walk without an assistive device.

For example, we had a patient who started in a wheelchair, but with our rehab, she became strong enough where she could walk without her walker. Good, but a potential problem: Since she had dementia, she left her walker in her room all the time, and the staff would find her walking without it. Our goal was to get her steady enough to walk without an assistive device at all. In that case, we put her in the harness, we had her walk over obstacles, up and down



With a patient in the FreeStep, we can give tactile cues that we would not be able to provide without the protection of the harness.

steps, on and off uneven surfaces, and eventually, she was able to do all of it without holding onto anything and without evidence of loss of balance. Now we can tell the facility, 'This patient is safe to walk without their walker anymore because they have demonstrated such an improvement.'

I noted you using the FreeStep with an elderly man on the Gait Trainer – how does that combination help you rehabilitate him?

Dr. Klein: He's an elderly patient in his 90s with pretty significant dementia. We like to use the harness system with him, as he can be compulsive in his acts. He will stand up or sit down when we are not ready for it, so the harness is just a second hand to make sure that he is safe.
His gait pattern reflects his personality right now. He will go from taking very small, slow steps to taking huge strides, almost at running speed, at a moment's notice. We love to use the Gait Trainer with him because it forces him to keep an even speed. Then with the feedback it gives him, we can have him take normal step lengths so that he is not over exerting himself or using up energy by taking his tiny, quick steps. The harness keeps him safe as we exercise him on the Gait Trainer.

Similarly, with him in the harness, we can give tactile cues that we would not be able to give without it. We often need our hands free to tap patient's legs or give them feedback to let them know when they should be firing what, or how they should be moving their leg while they are on the Gait Trainer, in the safety of the harness.

No longer requiring the assistance of a walker, this patient has restored her center of midline and built enough strength to walk completely unaided.

I also observed you using the harness system, Gait Trainer and Balance System with an obese younger woman – what are your therapeutic goals with her?

Dr. Klein: She is a seriously obese patient who first moved to the assisted living facility after surgery to remove a 50-pound hematoma on her left side, near her stomach. When the hematoma was under control, she came to the assisted living facility for rehab. Upon examination, we discovered her sense of midline was completely off. She had become habituated to carrying an off-center 50-pound weight, so we had to reorient her as to where her midline was and where her center of gravity should be.

Although her balance has been improving, she also has bilateral knee pains from her arthritis, but she is not now a candidate for total knee replacement because of her extensive medical complexities. Instead, we are trying to strengthen the muscles around her knee joint to keep the joint more stable and prevent some of that pain.

Who are the appropriate patients for your BioStep elliptical trainer?

Dr. Klein: We use the BioStep with virtually everyone. The patients that I like to use it the best with are cardiovascular patients; the ones with COPD or low activity tolerance, because we can get exact measurements on how far they can go, how fast they are going at what resistance, and then they see those numbers and they try to beat them every time. We can monitor their oxygen and heart rate, and we can push them to go further and further distances.

Not everyone is going to tolerate walking far distances or using the treadmill far distances, but it is surprising, as far as the people you can put on the BioStep. We have some patients who cannot even stand and we can put them on the BioStep to strengthen their legs and to stretch out their legs, as they are stuck in their wheelchair for long periods of the day. Just about anyone can tolerate it.

Utilizing Biodex mobility-rehabilitation systems, Viola progressed in just six weeks from almost completely confined to a wheelchair, to using it only 10% of her day.

For more information on Biodex Physical Medicine & Rehabilitation devices, please contact:

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