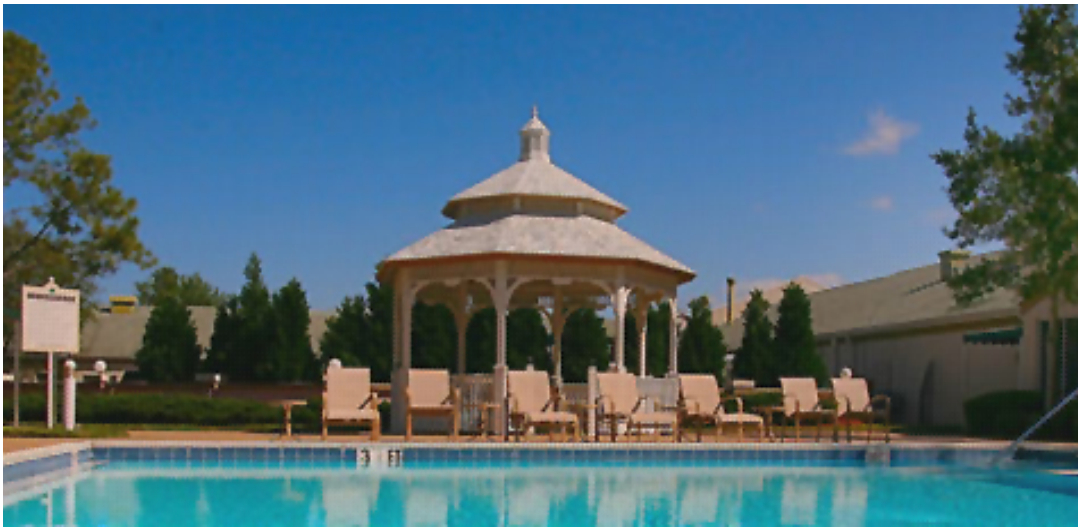
CASESTUDY

Five Star Uses Balance System to Treat - and Attract - Broad Range of Neuro, Orthopedic & Fall-Prone Patients

Five Star Quality Care



BIODEX
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Simple touch-screen display is easy to navigate and lets patients see their performance.

Five Star Quality Care

Five Star Quality Care, Inc. is the third largest continuing care residential community (CCRC) company in the U.S. It owns assisted living, independent living and healthcare facilities throughout the country. Its Five Star Rehabilitation & Wellness division operates out of 72 CCRC sites in which it provides therapy services. It also provides outpatient therapy at almost 30 locations, primarily to seniors, although its North Dartmouth (MA) facility sees a demographically varied population.

Susan Sherman is area rehabilitation manager for Five Star Rehabilitation & Wellness, a division of Five Star Quality Care. She oversees its Massachusetts clinics, and is based in its North Dartmouth clinic.

Laura Cronin is clinical rehab manager for all of Five Star Rehab & Wellness. She holds a masters degree in occupational therapy.

Heather Robinson is a physical therapist specializing in rehabilitation of neurologically impaired patients. She has worked at the North Dartmouth facility since 1999.

What makes Five Star's approach to senior care and rehabilitation special?

Laura Cronin: We think way outside the ordinary boxes of residential living and rehabilitation. Our focus is continuum of care, assisting our clients, patients and residents to "age in place" - whether that "place" is their home, or a Five Star residence. They can enter our system at any point. Perhaps they've had an acute illness, and then they progress through their rehabilitation in one of our skilled nursing facilities, and then return home, and get outpatient rehab from us. But perhaps they need to stay in a healthcare setting such as assisted living, or maybe just a less demanding independent living setting than a private home.

A Five Star senior living community allows residents to age in place. They might start in an independent living facility where we provide outpatient physical therapy while they live in their apartment. They can remain there as independent as possible, until they need assisted living. Throughout that independent and assisted living period, they have access to our Five Star Rehabilitation & Wellness services, like those of the North Dartmouth freestanding clinic.

Introduce us to the North Dartmouth Five Star Clinic - the kind of patients you see, the kind of facilities and capabilities you have here.

Sue Sherman: We are a large clinic, about 10,000 square feet over two stories. We treat patients aging from three weeks to 100 years. We have a very varied resource base of our referrals: local physician groups, orthopedists, neurosurgeons, and neurologists. We have a very stable PT staff - some have been with us since we opened the facility for a prior corporate owner 17 years ago. Most have been with this facility for over 10 years: only two have been here under five.

One of our most important rehab programs is affiliated with the New England Spine Center. The majority of those referrals come from physiatrists associated with New England Baptist Hospital, or local physiatrists that are aware of our program. We're now expanding our spine services program marketing to include orthopedists and primary care practices. Our program is a very dynamic approach to spine care, attempting to go beyond remediation of symptoms to actually treating the problem, focusing on issues such as core stabilization and teaching the patient how to self-manage their care.

We also treat a large neuro population, mostly referred from a few neurologists, but largely from primary care. Our therapist Heather Robinson is a neuro specialist, and so, some of the more acute stroke and head injury patients in the area will come to see Heather specifically. We have two staff dedicated only to manual therapy, and they have a large patient following for those indications as well.

Our largest therapeutic category is orthopedics, largely patients referred by Boston surgeons who know we've had an excellent record in this area for many years.

Progressing to single-leg stance exercise. Great achievement.

What are the diagnoses of the neuro patients you most commonly treat?
Sherman: We see Parkinson's disease, multiple sclerosis, stroke, traumatic brain injuries, spinal cord injuries, peripheral neuropathy and ALS. The largest single diagnoses among those neuros would be either CVAs or Parkinson's. We see a fair number of Parkinson's patients at this clinic.

The CVA patients that you see - are they patients who have been discharged from an acute care facility or a skilled nursing facility, chronic stroke patients or both?
Sherman: It's a mix. Being an outpatient facility, most of our referrals come from either an acute rehab or skilled nursing facility. Some may be too high level for home care therapy, so they're coming straight to outpatient. Or we may get them as chronic patients after home care has maximized their recovery there, and they're ready for outpatient therapy.

We certainly have our share of patients that are older CVA inflicted patients that have plateaued, gone home, and have either declined or improved, and are ready to start something new.

What typically triggers a chronic stroke patient to come back in for rehab?
Sherman: Unfortunately, I think that it tends to be a fall or a family concern that they're getting more debilitated. They're seeing a lack of independence. They're seeing some of those good skills that they learned when they were in either acute rehab or in outpatient starting to decline. It's almost like they need a "bump-up" or a refresher.

What is the trigger for a chronic, progressive-disease neuro patient, like one with Parkinson's disease, to come to Five Star?
Sherman: Almost always falls. By the time they are coming back as a chronic patient, the home modifications have been made; the scatter rugs are pulled up. They seem to be doing well, and then, they begin to fall.

When you get a Parkinson's patient referred to you, what kind of assessment do you do prior to writing a treatment protocol?
Sherman: We'll do general-strength and range of motion evaluations. We'll look at gait. And obviously, we look at balance. That's probably one of our key evaluations, because falls are generally what has brought them back to rehab.

In the past, before we had our Biodex Balance System, we would use a Tinetti assessment or the Berg scale to assess them – subjective data. Now that we have the Biodex Balance System, we're able to perform objective evaluations. Usually the "limits of stability" test is key. We'll do a weight shifting evaluation as well, to set a baseline of their tendency to be retropulsive - that is, put more weight on the heels. Then we can design a plan to improve their balance.

Parkinson's patients have specific neuro aspects of their fall risk, like their reduced sway envelope and freezing gait. How has your assessment and treatment protocol changed since you acquired your Balance System?
Sherman: The Tinetti and Berg are good subjective indicators of fall risk, but they don't necessarily tell you which parameters need to be treated to reduce a specific patient's risk of a fall. With subjective testing, you may be able to gauge that they have difficulty with initiation of movement when they need to get up and walk and turn and come back to the chair - they score lower than just sit-to-stand.

What you don't see with conventional subjective testing, but can with the Biodex: is it the right leg or is it the left leg? Are they retropulsive in putting more weight shift on their heels than on their toes? Is it when they first initiate the motion, or is it that they have poor control and they start to shift to the right and can't control it and therefore end up falling to the right?

So those are examples of the nuances that the Biodex Balance System has been able to provide. A Berg or a Tinetti, although still very useful, can't guide us to developing a protocol to help a specific prevent future falls.

How do you convert information on the particular azimuth in which they may have issues into a treatment protocol using the Biodex System and perhaps other techniques?

Sherman: For example, you put a patient on the Biodex and have them shift their weight left and right. Suppose you see that they're overcompensating to their left - they don't feel comfortable to the right.

That guides us to consider, is it a strength issue? Are they weak on their right? Are they weak on their left? Are their left abductors weak, so they can't stabilize on their left while they shift to the right? Is it that they can't initiate? Is there something in footwear that we need to change? Is it a visual component?

The Balance System helps us plan the therapy protocol. It helps us dig deeper. If they can't shift to the left, or to the right...why? You can set up the Biodex in its random weight shift mode. You can move them on the footplate so that they have to overshift to their right. That's one example of how you can manipulate the system to optimize therapy for a specific patient.

You also can enlarge the display circles that they have to hit so that visually impaired patients can see them better - and better appreciate the effort they need to make. One of the bigger components of therapy is making sure the patient "gets it." They can see, for example, that they can't reach that red dot on their right. That transfers to establishing home exercises with their caregiver. Let's say they're doing cone taps – they're standing, raising their foot and touching the top of a cone (at home, we have them using paper cups). We tell them to push the cups more to the right, because we need to get them to weight bear over there more. We might say to them,

When you're setting up your home exercise, think about pushing things to the right because we want you to learn how to lean more to the right.

And so, we take the information we get through the Biodex assessments, and roll that out into the clinic, their home exercise, and then home carryover.

"Now that we have the Biodex Balance System, we're able to perform objective evaluations. Usually the "limits of stability" test is key. We'll do a weight shifting evaluation as well, to set a baseline of their tendency to be retropulsive - that is, more weight on the heels. Then we can design a plan to improve their balance."

What are some of the other exercises you develop as a result of Balance System information in the clinic to help enhance their fall resistance?

Sherman: One of the things we use in the clinic is a lot of ball toss. Patients will initially stand on a flat surface with one therapist guarding them with a gait belt, and another of tossing the ball. If Balance System tests have identified that they can't shift to their right, then obviously, we need to throw the ball to the right more.

We then graduate them from flat surface to Airex mat, to Bosu. Eventually, we may start tossing them a ball while they're on the Balance System. I can see that those kinds of exercises will evolve from Balance System information.

Cronin: The Balance System and the manner in which we treat patients are both multi-dimensional, especially for Parkinson's patients. We help them to clearly focus on that component of their balance - but visually, cognitively and sensorially, they are also working on strengthening and isolated core strengthening. The Balance System encompasses so many dimensions of our rehabilitation efforts that, especially for a Parkinson's patient, it's a really great treatment modality.

And then in turn, as Sue noted, with all these other exercises, we're translating Balance System information and exercises into something similar on the ground. So it's not just a straight strengthening. They're still using the Bosu. They're still involved in activities where they have to concentrate on, for example, touching the cone. At the same time, they're working on their balance. I like the Balance System because it's inclusive of all those different aspects of treatment. And it encourages the clinician to continue that same multidimensional rehabilitation when the patient is off the unit.

Sherman: One of the consequences of adding the Biodex is that it also motivated our PTs to stretch their therapeutic boundaries. Prior to the Balance System, most of our Parkinson's patients did some sort of balance work, whether on the trampoline, on the Airex mat, on the balance board, or on a BAPS (Biomechanical Ankle Platform System). The Balance System firmed up what we knew was going on, but beyond that, it allowed us to then take that information and guide development of more effective treatment protocols.

Can you give a specific example of how that works in treating a Parkinson's disease patient?

Sherman: Suppose a patient can't go to the right – what do you want them to do? Do you want to have them kick a ball to the right? Do you want to have them do the cones to the right? Do you want to have them do side-steps over the cones only to the right? The Balance System has validated objectively what we knew generally from clinical intuition and skills, and encouraged us to challenge the patient to try to do more - and that's what really kicks up the quality and degree of rehabilitation.

How have your patients and therapists reacted to the Balance System?

Sherman: I think the positive reception to the Balance System from the patient feeds the therapist, and the excitement the therapist feeds the patient. The patients like using it. They love using it. They really get excited about it. They enjoy it.

We have used the Wii video game at other facilities with good success, but it doesn't give us objective data. The Wii is fun, but it doesn't necessarily tell us the precise therapeutic needs for a specific patient. The Balance System reveals and objectively and repeatedly documents the patient's therapeutic needs, but it's also fun for the patient to use as a therapeutic tool. I expect that as the Balance System evolves, so will its graphics, and the degree of interactivity it offers.

How does the North Dartmouth facility attract patients?

Sherman: This clinic has a long history in this community, both under prior and current management, and its reputation for quality care is well known, because so much of the staff has remained with us through acquisition.

Generally, the referral comes from the community when family members note a deterioration or falls. Perhaps a spouse or children get concerned, bring it up to either their family care doctor or the neurologist, which generates a referral to our facility.

Do you do any outreach marketing?

Sherman: We are starting a program called Senior Safe – we're targeting it to caregivers with just that program in mind. We're going to the Lion's Club, the Rotary Club, the Women's Guilds, the Senior Centers, and saying, "Is mom still safe to be home? Does dad need help going up and down stairs?"

So we bring them in. We do an extensive occupational therapy and physical therapy evaluation with objective measures, for which the Balance System will certainly be crucial. In fact, I'm loading it in to my Suburban and taking it to a local health fair where we're going to do some Biodex screens.

Cronin: We do similar outreach to residents of our assisted and independent living communities. Often, we attract acquaintances of those residents, as well as referrals from their physicians. Our outpatient clinic introduces the community to Five Star, and to our continuum of care offerings.

In addition to purely rehabilitation, Five Star outpatient clinics also offer Premium Wellness Services. It's not skilled therapy - mostly therapeutic yoga, therapeutic massage, personal fitness and other privately paid types of wellness programs for those residents who don't need prescribed skilled therapy.

However, while screening residents into that program, we put them on the Balance System. If they test normal, they may use it to maintain their capabilities. But if we detect a fall risk, we can notify their physician, provide a Balance System printout that demonstrates fall risk, and suggest prescribed therapy.

Can you describe a "typical" stroke patient you're rehabilitating with the Balance System?

Robinson: We see a broad range of stroke patients, ranging from those who come to us from inpatient rehabilitation to those who go home and right to us, because they're high level.

First, we evaluate them to determine their weaknesses. And it's not just walking - their walking issues are usually the result of compromised weight shifting, balance, lower extremity weakness, maybe some proprioception loss. We may find some neglect and cognitive issues. Most have sit-to-stand difficulties, which compromise their ability to rise from a chair or get out of bed. Then, of course, there are upper extremity issues. From our evaluation, we do a plan of care.

So if they have sit-to-stand or transfer issues, we practice with them on a solid surface. We give them the most support possible, while still making them work. Over time, we start weaning off the support. Then, strengthening, and usually, some gait training as well. If they're having trouble weight shifting, I do a lot of tapping of the hip I need them to move to the side, as well as verbal cues. We can practice on the parallel bars, and with their cane or walker.

Patient can hold onto support bars while PT adjusts foot placement.

I also put out a set of cones for weight shifting practice, forcing the patient to put full weight on their affected limb. To clear the cone, they have to lift their leg at the hip, which is weak. Because many patients have extensor tone, they may have difficulty bending that knee, and I may have to help them bend the knee. Most patients dread the cones, because they make them work. Then they have to do sideways weight shifting – recovery of gait after stroke is all about the weight shifting. Once that's achieved, we go into walking.

How do you integrate the Balance System into your current care?

Robinson: It's a key part of gait training for a variety of patients, because weight shifting is part of rehabilitating many patients, such as CVA patients and patients with fractures.

The Balance System is visual. I can have two hands on a patient, tapping – bend this leg, shift your hips over this way –while they're holding on to something steady, getting the visual feedback to their actions right away. They need to see and to feel what they're doing, no matter whether they're walking over ground or on the Biodex.

How often does a typical post-CVA patient come to Five Star for rehab?

Robinson: Typically, two to three times a week. They're usually here 45 minutes to an hour. Occasionally, if I have a high-level patient, like an MS patient that needs to get back to work, it would be closer to four units (60 minutes).

Sherman: OT is generally about the same. As we start fine-tuning at higher-level activities, you may see more four-unit sessions. Managed care has its own constraints with how many visits they will be able to get prior to a reevaluation, or just a cap of services. In Medicare, as long as we're showing progress and objective data and working towards goals and achieving goals, then we have somewhat more ability to service them.

Let's talk about MS patients. What brings an MS patient to Five Star?

Sherman: Usually, an exacerbation of symptoms triggering falls, or family noticing weaknesses. We're one of the few neuro rehab facilities in the region, and Heather is well known by area clinicians who regularly see those patients.

Robinson: I have MS patients that come back periodically, perhaps every two years or so, due to a relapse or an exacerbation, and they need "fine tuning," as I call it. But some are initial-diagnosis patients - partly functional evaluation, partly for benchmarking. I have a patient right now that was diagnosed in December with MS. He's a high level MS patient, doing very well. He's not going to need too much more therapy. Then, at some point in the future, he may need to come back.

Sherman: Because MS is a progressive disease, it gets to a point that it exceeds their capabilities. Then, most everyone needs to come back to some type of rehab, outpatient or inpatient. Hopefully, we can catch them at the outpatient stage. That's obviously our preference and the patient's, because most are working or going to school.

Robinson: Usually, the ones that come back do so because of a change in balance. They begin having falls, or their walking has declined. They know the exercises to do on their own. But they need our skills to help them recover their balance and gait. And some of them need additional transfer training, like how to get up off the floor if they fell.

How do you use the Balance System to rehabilitate an MS patient, typically with bilateral weakness?

Robinson: It can be bilateral, but usually one side is weaker than the other. But the issues, weight shifting and loss of balance, are the same. So again, you put them on the Biodex Balance System.

Several modes are particularly useful in rehabilitating the MS patient, especially the random control mode. You can learn a lot from watching the patient perform this test. Are they staying in the middle of that circle? Do they have the motor coordination to not be jumping all over the place? In the weight-shifting mode – can they control their balance in forward-backward and side-to-side weight shifting?

When you detect or are aware of a unilateral issue, you can put the target dots all on one side, to focus on evaluating and developing stability there. However, in MS, your objective is usually general conditioning, so you're going to want to focus on all of it. You want the patient's balance reactions to come back. You want them to be quicker. And then, you can put it on the dynamic setting, to increase the challenge.

Can MS patients handle the dynamic mode?

Robinson: Yes. This is not inpatient rehab. This is outpatient, so it's more aggressive. And I would even say a stroke patient could perform in the dynamic mode.

Sherman: Life doesn't present static challenges. To function in the community and even at home, they're going to need to learn how to walk on uneven surfaces. They need to learn how to walk when the gradient changes in the flooring and the surface of the ground. So as they start to develop the skills at static, we need to push them and challenge them a bit more. As they progress, we can put the Balance System into its dynamic mode, which nicely motivates most patients.

Robinson: Before we had the Balance System, our primary device for testing and developing balance was the trampoline. The trampoline "gives" – it's an uneven surface. I make you stand on one leg. I make you step on and off of it. That's unstable. The Biodex Balance System lets you control the degree of dynamic exercise you present, safely. The patient can start with holding on the rails, and gradually reduce their grip.

This afternoon, I had a stroke patient on the Balance System for the first time. With the Balance System, the patient could hold on while I knelt down and cued him.

Sherman: You couldn't do the same with the trampoline. That's the beauty of having the arms of the Balance System. You can start them in the static mode while they hold on, and safely do the nuanced cueing – with one therapist. When they're on the trampoline or the bosu, it requires two therapists, because someone needs to stabilize the person, and then someone else needs to do the facilitation techniques and the tapping and the stroking and the approximation and those things to get the joints to kick in when we want them to. The Balance System eliminates the need for an extra therapist – or more – to stabilize them.

How precisely does the Balance System provide feedback to both the patient and therapist?

Robinson: It gives the patient instant feedback. He sees the target lines or balls, and gives him the immediate feedback – this is what I must do with my weight shifting to stay within the weight shifting range. It give the therapist feedback, because I can see if he's not completely weight shifting, or I can see a jagged line if he lacks coordination.

Five Star North Dartmouth has had its Balance System only a month at the time of this interview – and yet you all seem very experienced using it in all its modes. Did any of you have prior experience with it?

Robinson: No, but I'm the balance person here. The Balance System doesn't force me to change my regimen - it just makes it easier for me to perform all my standard balance-training regimens without any other PTs or aides helping me. It gives me and the patient feedback and objective documentation we both need to correct issues that PTs can't always see, and patients often can't sense. It frees me to do more cueing, rather than focusing on stabilizing the patient to minimize the risk of a fall. It helps me give the patient the feedback they need to connect a certain effort with a certain result. It helps me to be a more effective hands-on therapist.

Sherman: It doesn't really matter whether the patients we put on a Balance System have a CVA or MS or Parkinson's disease, or a hip fracture, or an ankle sprain, or an ACL recon; the bottom line is, it's weight shifting. It's balance, it's coordination, it's motor planning; that's what we're treating. It doesn't really matter what the diagnosis is. What we're treating are the issues and the Balance System is just one tool in our toolbox that we can use to treat what we're focusing on.

As therapists, we have to be looking holistically at the patient: What are the patient's needs? This patient has decreased weight shift. This patient has decreased balance. This patient has a neglect issue. That's what we're treating. We're not treating the diagnosis. We're treating the whole.

Robinson: When I'm seeing a lower extremity patient of any diagnosis, whether it's a hip, knee, ankle, stroke, deconditioning, fall, or impaired gait patient, all of my flow sheets now are including Biodex evaluation. If you're hurting on one side, you're going to compensate. It's human nature not put as much weight on that side. That's when the Balance System helps most with weight shifting.

Total knee patients are examples of patients who have pain on one side, usually for quite a while before they have surgery, and then, due to the surgery. How do you use the Balance System with a recent post-TKA patient?
Robinson: For the first few visits, we have to get them through some of the discomfort and focusing on weight shifting. In many cases, they think they ARE weight shifting, until you put them on the Balance System, and show them what constitutes proper weight shifting. Yes, they're going to have pain, but we explain, this is what you need to do.

On the Balance System display, they can see what percentage of weight they are putting on each side. Most experience pain, but most also say, "I know there's pain. I know I have to work through it." The Balance System display gives them the visual cue to know when they're shifting weight properly, because the pain doesn't tell them that.

Sherman: I think some of the difference of treating neurological versus orthopedic patients comes at how we do what we do. We may have them on the same program – for example, a total knee patient may be doing weight shifting just like the CVA patient did. But for the orthopedic patient, we may not be doing tapping. We may be doing approximation to the joint. We may be actually gliding the joint into position. We may be using an extension and trying to get them to kick and fire their quads and gluts, to get them into a better standing position.

For example, I often use the maze challenge with our orthopedic patients because it's a faster movement. In orthopedic patients, we're focused on helping them reacquire motor coordination and improve motor planning. We'll put it in random mode and ask them to try to keep the cursor in the circle.

Do you see any athletes coming in for rehab, and how does the Balance System assist you in treating them?
Sherman: The Balance System has an athlete mode that we've been using with our higher-level orthopedic patients and some of our non-surgical patients – those with bursitis or knee arthritis. We get patients who must go back to a job where balance is critical – for example, one orthopedic patient is going back to his job as a roofer, and another who's an ironworker and must walk iron beams 20 stories up. Both need to have tandem gait. These patients need the most aggressive rehabilitation we can offer.

Sherman: The Balance System engages the younger patients more than conventional balance training techniques. Every kid has or wants an Xbox, and using the Balance System ties into something that's familiar for them. They like the dynamics of the product. They like that it's more modern than a balance board or a balance beam that, to them, is archaic.

Young patients and older ones enjoy the Balance System's objective measures. With it, you can push somebody a little bit harder. "Yesterday you did it at level nine and you had an 85% proficiency. I want you to get on today and our goal is going to be getting you as low level as we can, maintaining 86% proficiency. Let's see what we can do." It gives people something to strive for.

Robinson: The Balance System has objective testing and documentation. We can't offer that visual feedback with conventional balance training techniques.

Sherman: None of our other balance training devices can be as quickly recalibrated as the Balance System to match a patient's initial capabilities – or to increment the challenge as they improve. We can adjust the Balance System challenge almost instantaneously. If their performance on an "11" setting was too easy, we can ratchet it up until it's too hard – and then, back off. As a result, we are always challenging them, and yet, they're always seeing a positive result."

With focus on improving motor coordination and motor planning, we use the Random Mode and have patients work to keep the cursor in the center.

You mentioned earlier that one of your therapists has been using the Balance System for upper extremity rehab, with the patient kneeling down in front of it - can you explain?
Sherman: One of the other therapists has used it for rehabilitating a patient with multi-directional shoulder instability. We routinely do a lot of closed-chain stabilization activities for our shoulder patients, usually wall pushups or

planks, or pushups over a physio-ball, or maybe walkouts over a physio-ball. Using the Balance System gives us another, more dynamic tool. It's multi-directional for those patients that have that multi-directional instability, which can further lead to tears or impingements. It's a nice way to strengthen them and makes therapy a little bit more fun.

As a dynamic, multi-directional tool, the Biodex Balance System strengthens those with multi-directional instability.

Any other patients, beyond the ones that we were talking about so far, where you think the balance system has been useful or you think it will be useful?
Robinson: I have one patient with a total hip replacement who recently "graduated." He was never shifting his weight over to the involved extremity. His hip implant got infected and had to be removed and reimplanted. And so, we encountered this patient three times - once for the first implant, then without the implant, and now following reimplantation.

He was treated before the Balance System with regular exercise, gait training, balance. But his weight shifting still wasn't even. We were doing some step-ups, the cones and the trampoline, but he had difficulty because of weakness and weight shifting. When the Biodex arrived, I put him on it, and did just the weight shifting side to side.

As soon as he got off the Balance System, he walked, and could weight shift a little better, and actually volunteered that he could feel the difference. And that was after one session, just five minutes, just on weight shifting. He needed more than my cues – he needed the visual feedback. It finally all "clicked" for him.

Sherman: For quite a few weeks, Heather had been doing all the same techniques and shifting him over. But it wasn't until he got on the Balance System and saw, "Wow, I have to be way over here for me to be where you guys want me to be. Now I get it. Now I understand."

Two weeks later, in reevaluation, he was able to walk up and down the stairs reciprocally.

Robinson: He could never do that before Balance System training.

Sherman: I'm not saying that the Biodex was the only reason he's now able to climb stairs reciprocally, but it gave him that feedback he needed for that "light bulb" to go on in his head and realize what he needed to do. And the Balance System is safe. He didn't fear falling down because he could hold on if he needed to, and it didn't cause a lot of pain.

With the Balance System, they can see the results of following our direction; they can feel it. They start getting muscle memory. You can actually have them close their eyes and shift their weight and say, "Right there. Feel that? Close your eyes. Get that? Feel that? - That muscle memory? - That's what we want you to feel every time." And you can do it over and over, until it's automatic.

Then they get off the Balance System, and suddenly, they have carryover.

Have you seen similarly rapid carryover in patients with Parkinson's disease following Balance System training?
Robinson: Yes. I have a 40-year-old patient with Parkinson's disease who first began displaying symptoms in her thirties. She comes in periodically when her balance deteriorates and she begins falling. She does the cones and the trampoline. And I've been trying to verbally tell her, "put more pressure on your feet. Try to feel for it." But it's been difficult for her.

I put her on the Balance System because she kept saying, "My feet freeze up, my feet freeze up." We did weight shifting, interior/posterior. She got off and walked back to her caregiver. "How do your feet feel?" I asked her. "They're defrosted." It was a nice to hear that after a single session.

We're also using the Balance System to train her to better distribute her weight. She puts most of her weight posteriorly, on her heels. She's retropulsive; she doesn't like to lean forward when she sits up. Most Parkinson's patients have an anterior festering gait, but when standing, they often will lean back. Often, people will do a retropulsive sway because the thought of falling anteriorly is very scary. Elderly also tend to go retropulsive; if an elderly person is going to fall, usually it's backwards. They may start from a neutral position, but don't have the strength and ability to maintain a clean base of support. So once they get too far backwards, gravity just takes them back.

But the Biodex does help. The random challenge helps because to follow the screen cursor, she has to work in all axes. She has to put pressure on her feet. Sometimes I still have to help her a little when she's going forward, but she's getting the sense that she has to respond in all axes. It's interesting to watch her now. We'll work with her for a while, and then put her on the Biodex, and then watch her walk off the Biodex. That's when I see the fluidity of motion that she gains from it.

Have you had any Balance System experience with lower-limb prosthesis patients?

Robinson: I have a mid-sixties above-knee amputee who puts all his weight on the posterior part of his foot. He has a posterior lean; he's not putting all his weight evenly on his foot, and not doing his complete mid-stance.
Prior to the Balance System, we've walked together and I've helped by tapping and pulling, to bring his pelvis forward, which will bring him more in alignment. But sometimes he falls back and I have to tap again.

I put him on the Biodex and for the first time he saw how his weight was going backwards. We started doing forward and backward weight shifting. For the first time, he realized how much weight he had to put on the leg, where his pelvis had to be. He could focus in on that screen, and it actually helped him when he got off. There was a little bit of carryover. Eventually, I'll be teaching him balance as well, but right now I'm focused on weight shifting, and helping him feel what he's doing at his hip.

Biodex is always advancing our technology to serve you better.

Balance System™ SD
www.biodex.com/balance

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FN: 20-031 2/20