

Lokomat Clinical Report

Where leaders in rehabilitation of neurological disease & trauma tell how they enhance care with the Hocoma Lokomat

High Hopes adds Lokomat to its nationally recognized TBI rehab facility

“High Hopes is a non-profit traumatic brain injury program, the first of its kind in the United States, and we take the most challenging cases: People who’ve had falls, car and motorcycle accidents, and some sports-related injuries.”



*Mark Desmond,
High Hopes Director/
Instructor*

Your program is well known. How did it start?

High Hopes started as a support group for families with brain-injured members. I got involved shortly after that. At the time, I was coaching swimming, and a group called High Hopes wanted to use the pool. None of my staff was available to lifeguard, so I began working with them. Fortunately, one brain injured person who was non-ambulatory was able to regain his walking ability.

I enjoyed the experience, so I started inventing programs and services for High Hopes’ brain injured students. Over time I figured out how to raise money, hire staff, get results – and 30 years later, here I am.

You noted that the group was founded for people with brain injuries. Who do you serve today?

Primarily most of our students are TBIs – traumatic brain injuries. We do have a few people with brain injuries from anoxia, heart attack, and stroke.

How are you set up?

We’re set up like a school, so we don’t call the people we serve “patients” – we call them “students.”

We have about 50 brain injured students in the program. We offer different

classes throughout the day and each student is placed in classes according to their needs and goals. For instance, a person who needs hours of physical rehabilitation a day can receive it here at High Hopes. We never give up on anyone. If one door closes, we find another door to open. We address the whole person, cognitively, physically, emotionally, and behaviorally. We provide occupational therapy, speech therapy, cognitive re-training, computer assisted instruction, vocational training, physical programs, music therapy, art therapy, and resocialization. We have the best and latest equipment and we are always looking to improve our program and services.

How are you staffed?

I have 20 hands-on people, which includes instructors, therapists, and aides. Most of my full time staff has been with me 15 years or longer. We use a lot of volunteers, and have an



High Hopes instructor Matt Desmond prepares student Jonathan Aragon for a training session on the Lokomat.

“We’re now serving about 55 students a year. The average stay in the program is about five years...”



Jazz saxophonist Eric Marienthal gives concerts, the proceeds of which all go to High Hopes.

internship program with most of the major universities in our area, so we get a lot of PT and OT students; and have about four or five court referrals in here at any one time. The judges in our community assign DUI violators to us for community service. People picked up on drunk-driving cases have an opportunity to see what could happen if they injured somebody.

What does it cost to be a student at High Hopes?

Our cost is \$2,300 a month for full time service, Monday through Thursday, from approximately 8:30 in the morning till 3 in the afternoon.

Lifetime medical care for a person with a traumatic brain injury averages about \$7 million. Initial medical cost is typically several million dollars. Most insurance caps at about \$1 million, although the better plans cap at about \$2 million. Despite those limits, the hospitals still want to be paid. People sell their homes, and/or their businesses. They lose everything that they have. About 50,000 people a year need the kind of support we provide, but very few can afford it.

For-profit programs can charge between \$25,000 and \$50,000 a month. Most people can not afford the cost of rehabilitation. Even the \$2,300 a month is a stretch for most families. Because of the high cost of medical care, families have typically sold their houses, moved into a small apartment, and are very stretched to care for the injured individual, hold down a job, and maintain family life for others. For this reason we provide a scholarship program, where we raise funds through fundraisers, donations, and grants.

As a 501C-3 charitable organization, I try to accept



Entertainer Pat Boone, shown here with his grandson Ryan, a High Hopes student. Boone donated the funds for the first High Hopes Lokomat; the charity-financed clinic now seeks contributions for two more needed units.

all the people that we can really help, but the demand for services is huge. We have about seven calls a day from people that are looking for assistance.

The issue is money. We’re clearly the lowest-cost provider in the rehabilitation of adults with traumatic brain injury, but who we can serve really depends on how much money we can raise to support the program. We get a lot of publicity – CNN, the Today Show, Larry King... one of our students was on Oprah Winfrey, and lots of newspaper articles have been written about our students and the progress they make here. It cost about \$1 million a year to operate High Hopes at its current level.

Currently we are serving about 55 students every month. The average stay in the program is about five years, and of course, we have people in and out sooner, and some students that are here longer.

We don’t just use our own facility, we also use community facilities. For example, I have a class this morning that I take to the fitness center and I also have access to an Olympic pool facility down the street where I take a group of students for an aquatic therapy program.

Once somebody comes to us, we don’t give up on them. If their funding changes, we’re going to go out and raise the community support they need. There have been programs modeled after us, and unfortunately, most have failed because you have to have a very good community structure to provide the financial support to help this population.

HIGH HOPES HEAD INJURY PROGRAM

Why it exists, why it's unique

The High Hopes Head Injury Program was created in 1975, as a result of hard work and the unfulfilled need of several families of brain injury survivors. This one-of-a-kind non-profit charitable organization is dedicated to the rehabilitation and retraining of their loved ones who have been devastated by traumatic head injuries.

Traumatic head injuries resulting in a coma or loss of consciousness are the leading cause of death and disability in people under the age of 35. Automobile, motorcycle, and sports related accidents cause the majority of head injuries.

High Hopes estimates that 1.6 million Americans suffer head injuries annually, of which more than 400,000 people will survive with some degree of impairment. Of that total, more than 50,000 each year are left with severe physical and cognitive impairments.

On average, seven million dollars will be spent over a lifetime for the rehabilitation and care of each survivor. For any individual and family faced with the prospect of significant life-changing

disabilities and lengthy rehabilitation, the task and financial responsibility often feels overwhelming.

There are 22,400 survivors of brain trauma just in California, and another 22,000 stroke survivors. Orange County alone sees about 3,000 new brain injuries a year, with roughly a 50% fatality rate.

And so, within a few miles of our Tustin clinic, there's a large percentage of those 1500 new brain injury survivors every year that need our services.

Since our inception in 1975, High Hopes has been recognized as a pioneer in the development and facilitation of community-based services for those with severe physical and mental impairment following severe brain injury. By a considerable margin it is the lowest cost provider of such services in the nation, and has a strong record in rehabilitating those it serves.

The program at High Hopes is unique in a variety of ways. The physical programs includes conditioning classes, therapeutic swimming at a local pool, nautilus weight

training at a local gym, and physical therapy. Rehabilitation activities are available for cognitive and social challenges. Students manage a "Lunch Express" business that makes lunch twice weekly for students and staff. Other services include vocational art classes, pre-vocational training, music classes, community activities, independent living classes, occupational therapy and speech therapy.

High Hopes offers scholarships for many of those otherwise unable to afford the program. High Hopes is able to offer such assistance through fund-raising by direct donations and events like the annual Eric Marienthal and Friends benefit Concert.



“We had looked at some other systems, but the Lokomat is unique because it's able to be operated by one person.”

How did you first learn about the Lokomat?

I first learned about the Lokomat from a friend who was an announcer on a cable show called "Tech Television." She sent me a tape of the television show, and I followed up with Hocoma, who suggested I visit UCLA to see it in action. When a Hocoma specialist was visiting to train the folks at UCLA, I went and spent the day training on the machine, saw how it would benefit our program and our students, and then

went out to try to figure out how to raise the funds in order to purchase the machine.

How did you finance your Lokomat?

Pat and Shirley Boone knew that we had a need for it, because their grandson is here in the program.

We had looked at some other systems, but the Lokomat is unique because it's able to be

“I’m excited about the relationship we have with Hocoma. It’s a very good support system.”

operated by one person. If you have a machine that takes three staff people to put somebody onto it and work on it, that’s a lot of manpower not being used elsewhere. HealthSouth claims to have a similar kind of walking machine that they invented, but they use it exclusively in their own for-profit clinics.

Also, I wanted a robotic walking system that could take a pounding. I wanted something really to train with, not something just to look good in the corner and have somebody on it occasionally. Beyond the therapeutic capabilities of the Lokomat, it’s built to work hard. Finally, it’s got acceptance in the research as well as clinical worlds. It has a great user network. From their guidance, I decided that it was just what I was looking for. I’m excited about the relationship we have with Hocoma. It’s a very good support system.

Now, I’m trying to figure out how to get a second one, and even a third.

How did you provide gait training prior to the Lokomat?

Prior to the Lokomat, we did gait training with a variety of techniques. We started with aquatic gait training, and then tried to transfer it to the clinic with four aides – two people, one on one side, one on the other, holding the person up, and then another person on each leg. We also had a treadmill with a vest unweighing system. But that was people-intensive, too. We used, and still use, the Arjo Walker, a stand-up walker that carries their weight, which is good. But it still requires one or two therapists or aides to handle foot placement manually.

You have many students here, but just one Lokomat. How do you decide who to train on it?

In selecting students for training on the Lokomat, we consider anyone who has any gait issues. Of course we have some students who have no use of their legs. They’ve been injured in the part of their brain that controls motor response.

We’ve been noted for having the highest success rate in the country in getting people with TBI who are wheelchair-bound ambulatory. Many people with a brain injury have left side or right side deficit, but we get some students right out of the hospital, many with basically no use of their legs at all when they first start with us.

With some, it’s almost like teaching a young child how to walk. They first must learn how to stand, and then we work on retraining their legs. Before the Lokomat, we attempted to do that manually, with different modalities. With the Lokomat, we’re able to do the walking, the steps, and most important to start training proper gait repetitiously enough to avoid developing poor patterning that can result from the inherent inconsistency of attempting manually to do the same tasks, day after day.

When I have someone who’s starting to walk, the difficulty of getting them to take the exact same step every time is astronomical. You can’t do it without the Lokomat, but with it, you’re able to repeat that same step in a proper way. And that precise repetition is critical to retraining our students to walk again. Of everything that we’re doing, the Lokomat pulls our entire program together – and that’s exactly what we were hoping for.

One of our students who cannot use his legs just started on a Lokomat. Yesterday, during his second time using the machine, he was excited because it was the first time that he’s actually taken steps since his injury four years ago. His parents were here, crying, watching him be able to stand up, and take a step again.

What percentages of the students have gait issues?

About 80% of our students, including some that are ambulatory, have gait issues. And so, theoretically, about 80% of our students could be using the Lokomat. Realistically, however, it may be closer to 50%, strictly because of limitations with a single machine. Optimally, we could probably keep three Lokomat systems busy, just with our current students.

Are there any limitations as to the kind of students you can train on the Lokomat?

With our student population, the only real limitation of the Lokomat is weight – it can’t handle people who weigh more than 297 pounds. But this can also be an asset – it can encourage our larger students to lose enough weight to qualify for the Lokomat. In other words, it’s a good motivator, too. The good thing about the Lokomat though is it can handle tall people. Some of our students are tall – six foot four, six foot six- and the Lokomat can handle them without any problems.



“Of everything we’re doing, the Lokomat pulls our entire program together – and that’s exactly what we were hoping for.”

After just two sessions on the Lokomat, Jonathan displays improved gait and speed on the Arjo walker.

Based on your discussions with other Lokomat users, how quickly would you guess you can get TBI patients ambulatory with the Lokomat?

One of the open issues is precisely when we would transition students from the Lokomat to other forms of therapy. Right now, we’re getting everybody on, but we don’t confine their therapy to just the Lokomat. They come off a session on the Lokomat and go directly into an Arjo Walker,

because I want to get the transfer between what we do on the Lokomat to what they’re actually doing when walking or taking steps. And we’re still learning how to best do this.

At High Hopes, there’s no insurance clock ticking, so we can take time to get know our students. They are part of our family and we put an enormous amount of time working with them every single day. For instance, I have a new young woman who started with us a week or so ago. I probably won’t put her on the Lokomat for a few more weeks. It takes awhile to get to know

a person, to see how much they can handle. Plus, other people with whom we've worked longer want to get on it.

What has been the effect of the Lokomat on student morale?

The effect of the Lokomat is profound, especially with our students with short-term memory issues. They get off the Lokomat, and they decide they're going to go and start taking off and walking, like they were on the Lokomat. We have to slow them down and then work on their steps and get their gait going and transfer.

But I notice right away their step length is longer, and so I can see already the difference in our students coming right off the Lokomat.

But when they come off the Lokomat, we put them right back into the rest of the High Hopes program. So I'm using the Lokomat somewhat differently than in an insurance-driven rehab hospital or clinic. In those settings, a patient comes in, and gets whatever therapy they need for as long as their insurance or private funds hold out. And then, therapy ends.

In our setting, we're going to keep putting the Lokomat to work, to help our students throughout the whole period of time, even if, that period is five years. So if somebody needs the Lokomat every day for the next six months, we're going to try to grow to the point that we can provide that. This is why we need more Lokomat systems. Lokomat therapy for a High Hopes student won't end until we see their gait improving with alternative therapies. But even then, that doesn't mean they still won't go back on the Lokomat periodically, if needed.

Can you give me examples of typical Lokomat candidates at High Hopes?

Bo Aragon is a perfect example of the kind of student we're putting on the Lokomat. He's one of our biggest guys, he was a high school football player. He was injured four years ago, as a passenger in a car driving back from Newport Beach. There was no alcohol involved, the vehicle just bumped up against the curb, he flew out of the vehicle, and suffered severe head trauma.

For four years, Bo was at home and in several

different programs, which is all his family could afford. Today he is semi-ambulatory and can walk with a walker.

I put him on the Lokomat for two reasons: He is deficit on balance and gait on one particular side. And he weighs 240 pounds – it was a good test to see just how the machine and we can handle a big guy. And it worked quite well. Good steps, good placement, and again, the Lokomat creates the perfect gait pattern. At this point with us, we're just starting training, so he'll be training on it more and more, and adding more and more weight, and we'll see what his capacity is.

As with all our students we put on the Lokomat, we're very cautious about how much weight they're carrying themselves, how they handle how much gait, what they're able to do versus the machine doing it for them. The Lokomat is programmable so the therapist can choose how much they want the brain-injured person to do themselves, and how much the machines will do for them. For a student like Bo, it's perfect.

Another of our students who's just starting on the Lokomat is Spencer. He ran a nursing

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High Hopes student Brent Hickman with director/instructor Mark Desmond. Brent quickly improved his gait length on the Lokomat.

company in Newport Beach when he was in his late 30s, and had 300 nurses working at different hospitals. He went in to a local hospital for a minor operation, during which he stopped breathing for an estimated five or six minutes. He suffered anoxic brain damage, and is very contracted.

His parents lived in Atlanta, and moved here to take care of him. We've been working with Spencer for about 5 years. We've had him on the Lokomat twice now. Despite his contractures, the Lokomat handled him perfectly. Spencer is one of the toughest kinds of patients to handle on any other therapy I know of, but the driven gait mode of the Lokomat offers him real hope of someday walking. So it was a big thing for him and a big thing for his family to see him standing up and taking steps again.

What kind of improvements, and how quickly, have you seen them with the Lokomat?

Brent Hickman is one of our students who has been with us quite awhile. Brent was a passenger in a small truck. The driver was under the influence and ran into the rear of a semi. The truck went under the semi's T-bar, which sheared off the truck cab. Somehow, Brent slid down in the seat and survived, but he suffered multiple injuries, as the entire cab was crushed.

He came in nonambulatory and couldn't speak. Now, after several years, he speaks – not crystal clear, but if you listen carefully, you can understand him. He now walks with a locking knee brace, but it takes one-on-one to help him walk.

We put him on the Lokomat without his brace, and he was able to handle a normal gait. Also interesting in his particular case, after being on the Lokomat for just a short time, we were able to get the extension and also a lot more motion in his paretic left knee.

What surprised us was that, after he was on the Lokomat just a few minutes, we had to readjust the gait length, because he was able to take longer steps than we expected – a first for Brent.

How do you document improvements like that? How do you set goals?

Our documentation differs somewhat from an insurance-model clinic like those of rehab hospitals, who need to document as thoroughly as they do because they need that to have any chance of getting paid. As a charity that is not working against any clock or insurance cap, we don't document quite as thoroughly.

We have a system we call an ISP, Individual Student Plan. Unlike hospitals, it has nothing to do with getting paid. It has to do with the establishment of realistic student goals, and what we need to do to help him or her achieve them.

The computer on the Lokomat system and its data base will help us to better set those goals and measure how our students are meeting them.

We need more Lokomats to handle our current flow. UCLA is getting about five patients per day through its Lokomat. We're up to three now, and with our second harness system, we can get a second student prepared for the Lokomat while the first is in therapy.

We'll be up to five a day pretty soon, but 10 a day would be better.

“We’ve had Spencer on the Lokomat twice now. Despite his contractures, the Lokomat handled him perfectly.”



High Hopes student Walter Anderson with Mark Desmond. Anderson, 54, former VP of marketing for Kia Motors, Irvine, was disabled two years ago following surgery for a brain tumor. He had been confined to a wheelchair since the surgery. After four 22-minute sessions on the Lokomat, he was able to use an Arjo walker for the first time.

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