reflexion health

Reflexion Health's Rehabilitation Measurement Tool is Advancing Physical Therapy with Kinect for Windows

Organization: Reflexion Health, Inc.
Website: reflexionhealth.com
Organization Size: 1-99
Country or Region: United States
Industry: Medical Software
Collaborators: US Navy Medical Center San Diego

Organization Profile
Reflexion Health is a company committed to re-imagining the tools we provide medical professionals and their patients. Reflexion Health publishes purpose-built, prescribed software that improves health and lowers costs, and was founded with technology developed at the West Health Institute.

Hardware
Kinect for Windows Sensor
Windows 7 Computer

Software and Services
Microsoft Kinect for Windows
Microsoft .NET Framework
Microsoft Visual Studio
Microsoft DirectX
Microsoft Remote Desktop Protocol

For more information about other Microsoft customer successes including Kinect for Windows solutions, please visit: www.microsoft.com/casestudies

"The Navy is offering us helpful feedback on how patients interact with the system, and how it can be used to best deliver therapy."

Dr. Ravi Komatireddy, co-founder, Reflexion Health

Reflexion Health is on a medical mission to make physical therapy more effective for patients—and more measurable for clinicians. It paired Kinect for Windows sensor technology and software development kit (SDK) with its proprietary software to deliver an interactive solution that could help patients and physicians improve physical therapy results. The technology, which went into clinical trials in October 2012, makes physical therapy come alive by using the Kinect for Windows sensor and SDK to delivery customized therapy plans to patients.

Business Needs
Historically, assessing physical therapy outcomes has been challenging because accurate measurement, constructive feedback for patients, and accountability is lacking.

Patients receive individual sessions from physical therapists, but do much of their rehab alone, only guided by papers with stick figures that illustrate how to perform the prescribed exercises.

That stale experience and lack of timely feedback between patient and therapist lowers patient engagement, adherence, and can negatively impact recovery time, health outcomes, and overall cost of care. Reflexion Health is a San Diego company that originated from the West Health Institute to overcome these obstacles.

Solution
In late 2011, the Reflexion team approached Dr. Eric Hofmeister, Chair of the Orthopedic Surgery Department at the Naval Medical Center San Diego, about using Kinect for Windows as part of a proprietary software solution that would allow physicians to prescribe rehabilitation plans.

With an agreement from the Navy Medical Center of San Diego to help test the software, Reflexion Health set out to build a solution that could revolutionize physical therapy. The result is Reflexion Health's Rehabilitation Measurement Tool (RMT).

Reflexion Health developed the RMT quickly using the Kinect for Windows sensor and SDK. The Kinect for Windows sensor includes a camera, depth sensors, and a multi-array microphone that can see what a person is doing and hear what they are saying. The SDK provides tools for assimilating all of this rich sensor data to create useful applications that solve business and societal challenges.

RMT is a prescribed software application that addresses musculoskeletal disease. Musculoskeletal disease costs Americans $127 billion a year, according to the American Academy of Orthopaedic Surgeons[1]. Reflexion launched its first RMT research trial with the U.S. Navy in October 2012, beginning with 20 healthy patients.

Here's how it works: The physical therapist sets a prescription like they do now, but instead of static paper handouts the patient receives a rich, engaging application. The Kinect for Windows-enabled software guides the patient through her prescribed exercises, providing feedback and encouragement in real time. That information is then reviewed by the physical therapist, where they can review patient results and update the prescription (as needed). With RMT, both patient and provider know more about whether the patient performed physical therapy exercises correctly, how often exercises were performed, and how the patient is responding to therapy.

"Naval Medical Center San Diego has many wounded, ill and injured service members in need of musculoskeletal surgery and rehabilitation," says Navy Captain Dr. Hofmeister. "In an ongoing effort to continue to meet the healthcare needs of our patients and their families, we pursue innovative technology that advances the medical field in order to deliver the best care available while becoming more efficient."

Benefits

"Kinect for Windows helps motivate patients to do physical therapy—and the data set we gather when they use the RMT is becoming valuable to demonstrate what form of therapy is most effective, what types of patients react better to what type of therapy, and how to best deliver that therapy. Those questions have vexed people for a long time," says Dr. Ravi Komatireddy, co-founder at Reflexion Health.

Customizing Patient Plans
By using Kinect for Windows, the RMT allows medical professionals to customize plans and schedules, and eventually will offer the ability to remotely monitor patients. The therapist retains the flexibility to customize exercises and help reinforce that prescription through a fun and engaging experience.

Helping Patients Do Exercises Properly
Reflexion Health hopes to drive better adherence to therapy and help patients recover faster and more completely from injury. The software motivates and engages patients with avatars and educational information.

Reviewing Patient Data
Physical therapists can view actual patient data to see if they are completing their plan, helping them coach their patients and do more to customize their therapy plans. The software collects range of motion and other clinical measures. If a patient is off balance or moving incorrectly, for example, the RMT could provide feedback to the patient and flag the issue for their clinician.

Lowering Treatment Costs
With its Kinect for Windows-based solution, Reflexion Health is demonstrating the role of prescription software alongside pharmaceutical and medical devices as a means of lowering the total cost of healthcare. This is the central mission of the West Health Institute that developed the core technology.

With 25 million physical therapy sessions a year in the United States alone—and a $28 billion physical therapy market that impacts a $127 billion musculoskeletal market[1]—the potential impact of RMT is clear.

"RMT is a breakthrough that can change how physical therapy is delivered," Spencer Hutchins, Co-Founder and CEO of Reflexion Health says. "Kinect for Windows helps us build a repository of information so we can answer rigorous questions about patient care in a quantitative way."

The RMT System is pending clearance by the U.S. Food and Drug Administration.

RMT virtually guides patients through physical therapy
RMT includes two unique user experiences: A patient interface guides the exercises and a physical therapist interface sets the prescription.
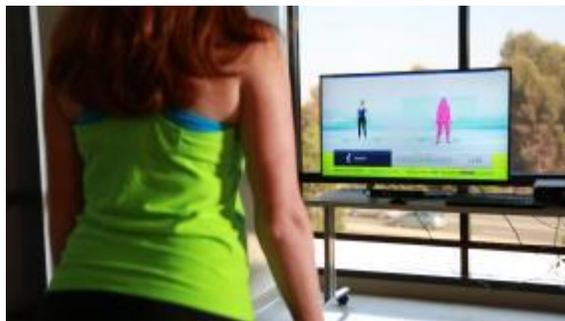
Motivating patient participation
RMT with Kinect for Windows motivates and engages patients with avatars and educational information.

Helping patients keep proper form
If a patient is off balance or holding an incorrect posture, RMT with Kinect for Windows reveals the issue in real time.

Better patient adherence to therapy
Since they know their exercises are being tracked, patients are more likely to follow their program.

Measuring therapy impact
The Kinect for Windows-based tool helps measure how patients are responding to physical therapy, making it possible to quantify rehabilitation like never before.
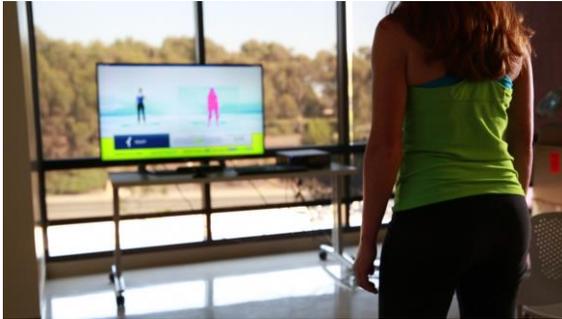
Driving better patient outcomes
By using Kinect for Windows, RMT allows the physical therapist to customize exercises remotely, and help reinforce that customization even when the therapist isn't there.

Immersive & natural experiences that put people first
The Kinect for Windows sensor includes a camera and depth sensors to see patients' movements and a multi-array microphone that can hear their voice commands.

Physical therapists enjoy maximum visibility
Physical therapists can view actual patient data to make sure they are doing their exercises on schedule and correctly to plan.