Rehabilitation exercises for stroke are not as monotonous as we think. Experts at The Hong Kong Polytechnic University have created virtual reality games to make the rehabilitation process more interesting. Body-motion games including “Good View Hunting”, “Hong Kong Chef”, and “Cockroach Invasion” have been out for public trial, aiming at improving limb functions, mobility and sense of balance. Immersed in 3D environments, patients can now wave at a TV screen and enjoy the fun of playing while exercising their arms and legs to therapy standard. The novel rehabilitation tool is good for elderly workout and can be used at home, in hospitals and in care homes. Come and experience this fun-filled physical exercise first-hand for free by downloading the games from http://www.polyu.edu.hk/kinelabs

The Xbox Kinect games offer huge fun in playing virtual sports and have become a sensation across the world. Building on the “Kinect” concept, experts in the Interdisciplinary Division of Biomedical Engineering at PolyU have created a free software platform called “KineLabs” with body-motion games for rehabilitation after stroke.

The game set includes a Kinect sensor wired to a personal computer (without Xbox console) and a TV. A front-facing Kinect sensor will scan 3D body movements while a stroke patient waves at the TV to interact with the games. Games are specially designed to strengthen their limbs and regain their sense of balance. Simulating daily household chores, the 3D games require patients to do things like preparing a meal and wiping windows. Games like “Good View Hunting” cleaning the window panes help patients exercise the arms and encourage them to hold up their stiff arms as in therapy sessions. To make it more fun, some games even add a local favour. For example, making Hong Kong egg tart and preparing BBQ Pork (Char Siu).

Game exercises are designed for therapy. The games will adapt to individual’s ability through a calibration function. Therefore, patients can do rehabilitation exercises at home and work out their training progress with therapists. Unique formula is in place to trace and measure physical movements with precision. Movements are therefore detected, recorded and rated, which help therapist assess progress by data such as frequency and range of movement. Data can also be uploaded onto the internet.
for remote monitoring by therapists.

While conventional rehabilitation exercises are repetitive and monotonous, virtual reality therapy is stimulating and entertaining. The KineLabs games were found to have encouraged patients to keep going with the therapy.

Stroke patients had been invited to try out the new games at PolyU’s Jockey Club Rehabilitation Engineering Centre. Uncle Sam Chan was one of them and had the chance to play a series of fun-filled games: “Good View Hunting”, “Hong Kong Chef” and “Cockroach Invasion”. And he just loved it.

Uncle Chan recalled, “I used to love sports and was a keen canoeist, but I was out of the game after a stroke twelve years ago which seriously affected the left side of my body.” The KineLabs games compared favourably with the repetitive and dull exercises he had been instructed previously. He said joyfully, “The new games are pretty engaging and they make me sweat. My love for sports came back and I wanted to get on with it. When I did well, I was given a ‘trophy’ on the screen, which brought a bit of competitive side out of me.”

Clinical studies have been underway to look at the benefits of video games as clinical treatment. In the meantime, Ir Prof. Raymond Tong Kai-yu who was heading up the research found video games a powerful tool for improving patient health. Prof. Tong commented, “Video gaming makes monotonous and repetitive tasks more compelling and in preliminary trials, patients were seen to stay for longer in exercises and have more repetitions than traditional approach. The benefits were improvement in limb strength, range of motion and mobility.”

Stroke survivors usually face a long recovery time ahead and experience incremental but slow improvements as they progress. Consistency and practice are key to making recovery. “Game-based therapy that keeps patients active and happy can help them through a journey which is distressing and daunting,” Prof. Tong continued.

Integrating therapy, video gaming and computer software, this innovative solution is developed by Prof. Tong and his team members including Dr Fong Ching-hang, Mr Lawrence Chong Kwok-wai and Mr Nathan Lam Kim-fung, who are experts in rehabilitation engineering and software engineering. KineLabs has recently scooped the top prize in the “e-Health” category at the Asia Pacific ICT Awards (APICTA) 2012 in Brunei. Locally, it also won a Silver Award at the Hong Kong ICT Awards 2012: Best Innovation & Research Award.

Over the years, PolyU has been committed to supporting home-based rehabilitation systems and bringing breakthroughs in perfecting health and patient care for the elderly and stroke patients. Prof. Tong and his research team will continue to advance such work to bring better outcome in the long-term and help stroke survivors get back on track to a fulfilling life.