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CASE STUDY

Inside Stanford Hall: The Most Advanced Rehabilitation Centre in the UK



The Defence Medical Rehabilitation Centre (DMRC) Stanford Hall, recently completed a £300m renovation aimed towards the rehabilitation of actively serving military personnel, and further the future of rehabilitation research.

Since opening its doors late last year, Stanford Hall has been making its claim as one of the most advanced rehabilitation facilities in the United Kingdom. And arguably, the world.

In August 2018, DMRC Headley Court, Surrey, began the relocation process to Stanford Hall, Loughborough following a multi-million-pound renovation of the Stanford Hall Estate to become the new home of the DMRC with the aim of building on the success of its predecessor. Not long after, Stanford Hall began admitting serving military personnel for rehabilitation for the first time. Utilizing the facilities inside the purpose-built centre, serving personnel receive high level treatment from a multi-disciplinary team. One of the key facets

of what sets DMRC Stanford Hall apart is their Academic Department of Military Rehabilitation (ADMR). Acting as a central hub for clinical research activity across defence rehabilitation, ADMR houses some of the most advanced clinical and research laboratories available.

Utilizing motion capture technology, near virtual reality, cutting-edge software and more, the laboratories on ADMR offer MOD researchers some of the most sophisticated and precise tools available to assess, treat and research key conditions and injuries affecting serving military personnel. The laboratories primarily encapsulate three key areas; the Biomechanics Performance Lab (BPL) – used to study human locomotion; the CAREN (Computer Assisted Rehabilitation Environment) High End – a system that engages patients through immersive virtual reality; and the Physiology Lab-used to assess muscle function and cardiovascular health. Together they offer assessment and research options unlike anywhere else.



“You’d struggle to find a lab of this magnitude anywhere in the country.”

“For both clinicians and researchers [at Stanford Hall] it’s a dream come true,” said Richard Allan, Higher Scientific Officer on ADMR. “You’d struggle to find facilities of this magnitude anywhere in the country.”

The BPL is a 30m long laboratory equipped with high-speed, high-resolution, motion capture cameras provided by Vicon, the industry leader in mocap technology in healthcare and entertainment. The lab features 32 Vicon Vantage V16 cameras, used in everything from engineering and medical technology to performance capture in blockbuster movies and big budget video games. The cameras record the movement of markers down to the millimetre, allowing the movement of a patient to be assessed far beyond what the naked eye can see, while ten additional Vicon Vue high-speed HD cameras positioned around the lab record the patient through traditional video. The data is captured and processed through Vicon’s Nexus software and then reported for analysis via Vicon’s Polygon software.

Along with the performance lab, DMRC Stanford Hall is also the first facility in Western Europe to feature the high-end version of Motek’s CAREN, an immersive multi-sensory system for clinical and research applications, which also utilises Vicon cameras. Using a combination of virtual reality, interactive inputs (including an instrumented dual-belt treadmill, a 6 degrees-of-freedom moveable motion base, 360-degree projection, surround sound and 18 Vantage motion capture cameras), patients can go a step beyond traditional rehabilitation and experiment with techniques and scenarios barely dreamt of in years past.

In addition to the motion capture technology, Vicon and Summit Medical and Scientific also helped deliver 15 AMTI force platforms, a Cortex gas analysis system to measure oxygen consumption and energy expenditure, and an isokinetic dynamometer for evaluating and training muscular strength. The new facility allows the researchers to study important areas in military rehabilitation whilst offering clinical support to the patient’s multi-disciplinary team. As the labs continue to grow, so too will the clinical case mix it receives. Treatment at Stanford Hall begins at admission, with medical practitioners being able to refer patients to the laboratories

for assessment/treatment. Once at the lab, patients can be assessed, and the results then fed back into their multidisciplinary team for review whilst the CAREN itself can be used as an assessment and analysis tool over the course of their rehabilitation. The primary focus therefore is to return injured service personnel to the highest level of function possible and to maximise the number of personnel fit for operations, whether it be in the treatment for traumas that affect locomotion, amputees learning to utilize prosthetics to neurological issues.

As the treatment progresses, patients work with the Stanford Hall staff to understand the results of the analysis. The goal isn’t just to help the patient during their stay, but train them to understand how their injury is manifesting in their locomotion in order to recognize it and continue the rehabilitation on their own.

To accommodate the changing nature and demand of its work, the BPL has a unique modular setup allowing the size and number of capture volumes to be altered-allowing the creation of one large capture volume or broken down into two/three autonomous capture volumes. That opens the possibilities

for both assessing multiple patients at once, whilst allowing for research where larger scale movements i.e. running.

Since Stanford Hall’s first admission, the BPL has already seen 40 patients to date – often with multiple visits – adding up to around 40-50 gait sessions, and 51 patients for the CAREN.

“During visits to DMRC Stanford Hall, high-ranking officials within the military, the civil service and the NHS have been briefed on the laboratories and the work of ADMR and they love it,” said Allan. “It’s had a really great response from senior personnel.”

While this work with patients will have an immediate impact on those treated at Stanford Hall, the long-term benefits may end up overshadowing its daily operations. Along with the goal of individual patient rehabilitation, the laboratories act as ADMR’s key facilities for movement analysis and military rehabilitation research. With the support of the MOD, the staff of ADMR have the perfect facility to research both current and new approaches to treatment, the findings of which will help to inform future strategies to rehabilitation for years to come.



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VICON



VICON DENVER

7388 S. Revere Parkway
Suite 901
Centennial
CO 80112 , USA
T: +1.303.799.8686
F: +1.303.799.8690

VICON LA

3750 S. Robertson Boulevard,
Suite 100
Culver City
CA 90232, USA
T: +1.310.437.4499
F: +1.310.388.3200

VICON OXFORD

6, Oxford Industrial Park
Yarnton
Oxford
OX5 1QU
T: +44.1865.261800