



Dr.med. Andreas Krüger is a Swiss board orthopaedic and trauma surgeon in Zurich, who specialises in knee and shoulder surgery. Andi is a second generation of tournament doctors for equine sports, known as Polodoc since 2013

Next Level Rehab

When a single helping hand is not enough

Time is healer was a longstanding principle when complicated bone fractures were still treated with a simple cast. As the world gets more and more industrialised with computers and robots in daily life, the medical world is not standing still. Modern concepts in post-traumatic rehabilitation consist of staged muscle and joint training with different levels of active motion; additionally the precise brain-muscle cooperation is of immense importance. Sophisticated manufactures and their scientist teams have entered this field to improve patient outcome and minimise time out from a sport.

Injury Upper Extremity

The upper body is the most injured part during polo accidents, especially the shoulders and elbows, which need a lot of rehabilitation time until full function is regained. After surgery, the first goal is stability with bone or tendon healing. During this early healing time, only passive motion or assisted mobilisation with a physiotherapist is possible. Fractures of the upper extremity have a tendency to heal with a reduced range of motion, even with perfect surgical reconstruction, due to that fact an intensive recovery plan with scheduled appointments is needed to recover. In central Europe, an intensive physiotherapy concept exists of two sessions of 20-30 minutes per week in a non-professional player setting. The rest of the time training and rehabilitation is mostly a self therapy with possible mistakes through over or under exercising.

Next-Level Rehabilitation

With the help of computers, robots, motor machines and sensors, any treatment algorithm can be set up even away from medical institutions. In remote area the journey time to the therapist may already be longer than the therapy time itself. Immense time-consuming travel is a burden of yesterday, when a mini training area can be set up at the player parameters under remote control of the surgeon's therapist team. The initial phase needs mostly passive motion in the allowed limits. It is best when this is done by a well-trained sport physiotherapist to find



Complex fracture of the shoulder with multiple fragments



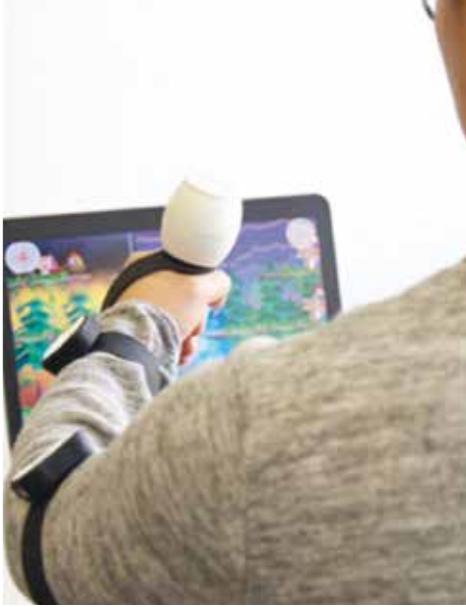
Computers, robots, motor machines and sensors allow for at-home rehabilitation

out what is possible with a relatively pain free range. Activities of daily live will be looked at as well. When these parameters are set, a patient controlled motor machine can do the continuous passive movements on request. These early movement-training intervals can help to minimise post-traumatic stiffness, so that in the later phase of the rehabilitation less work on flexibility is needed. Every training interval can be recorded and monitored online if needed. Th second step is partial weight bearing and a more active phase when stability of the bone or the soft tissue is established. Again, the gain in range of motion and forces can be recorded so

that any step back or early complication can be detected. Finally, when flexibility and power is back, agility and endurance is the final goal. With exergaming, a platform is given where sensors can help to increase the precision in action (eye-hand control) and perfect execution of complicated coordination tasks.

Outlook

With nearly all sports getting faster and more technically demanding, a preventative check-up is recommended to detect imbalance or suboptimal physical performance. This prevention examination can be a possible



Photography courtesy of Polodoc

milestone in minimising unnecessary dead time when recovering from an injury. When injuries happen these new technologies have the potential to speed up recovery time. ✕

Expert Opinion

Dr. Dipl. Ing. Liliana Paredes – Rehaklinik Zihlschlacht AG

Head Of The Robotics And Sports Department

Accidents happen but modern rehabilitation has developed elaborated training methods to regain functionality early and minimize recovery time.

Technology-assisted therapy, especially robot-assisted movement therapy, has become the standard in rehabilitation in recent years. Patients start a specific therapy, such as gait therapy, much earlier - and do it very repetitively, which promotes motor learning and neuronal reorganization. Step-wise training with different levels of support by the machines and robots can guide the patient individual and precisely through the healing process. Sensor-based devices for upper limb rehabilitation can exactly monitor the gain in range of motion, muscle power, reaction time and precision of movement. Through modern technology even remote therapy session at the patients home are possible. We have these technologies in our robotics center in Zihlschlacht, one of the largest centers in Europe.

<https://www.rehaklinik-zihlschlacht.ch/>



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The ArmeoSpring



The ArmeoSensor