

Düsseldorf, January 4, 2024

Frontiers in Neurology: Evidence-based therapeutic success with CUREO®

The independent study entitled "Neurorehabilitation of the upper extremity – immersive virtual reality vs. electromechanically assisted training. A comparative study" by Lülldorff et al. (2023), looked at the effectiveness of virtual reality therapy (VR therapy) using CUREO®. VR therapy was compared to electromechanically assisted arm training in the treatment of severe arm paresis in stroke patients and the very promising results were published in the journal *Frontiers in Neurology* in December 2023:

- Significantly more patients in the group treated with CUREO® showed clinically relevant improvements in arm functionality (measured by ARAT scores).
- In addition, the extent of improvement in the group treated with CUREO® was significantly greater than in the comparison group.
- The successful implementation of the study in a group setting is also relevant to society, as it shows a way in which clinics and practices can counteract the ever-increasing shortage of staff.

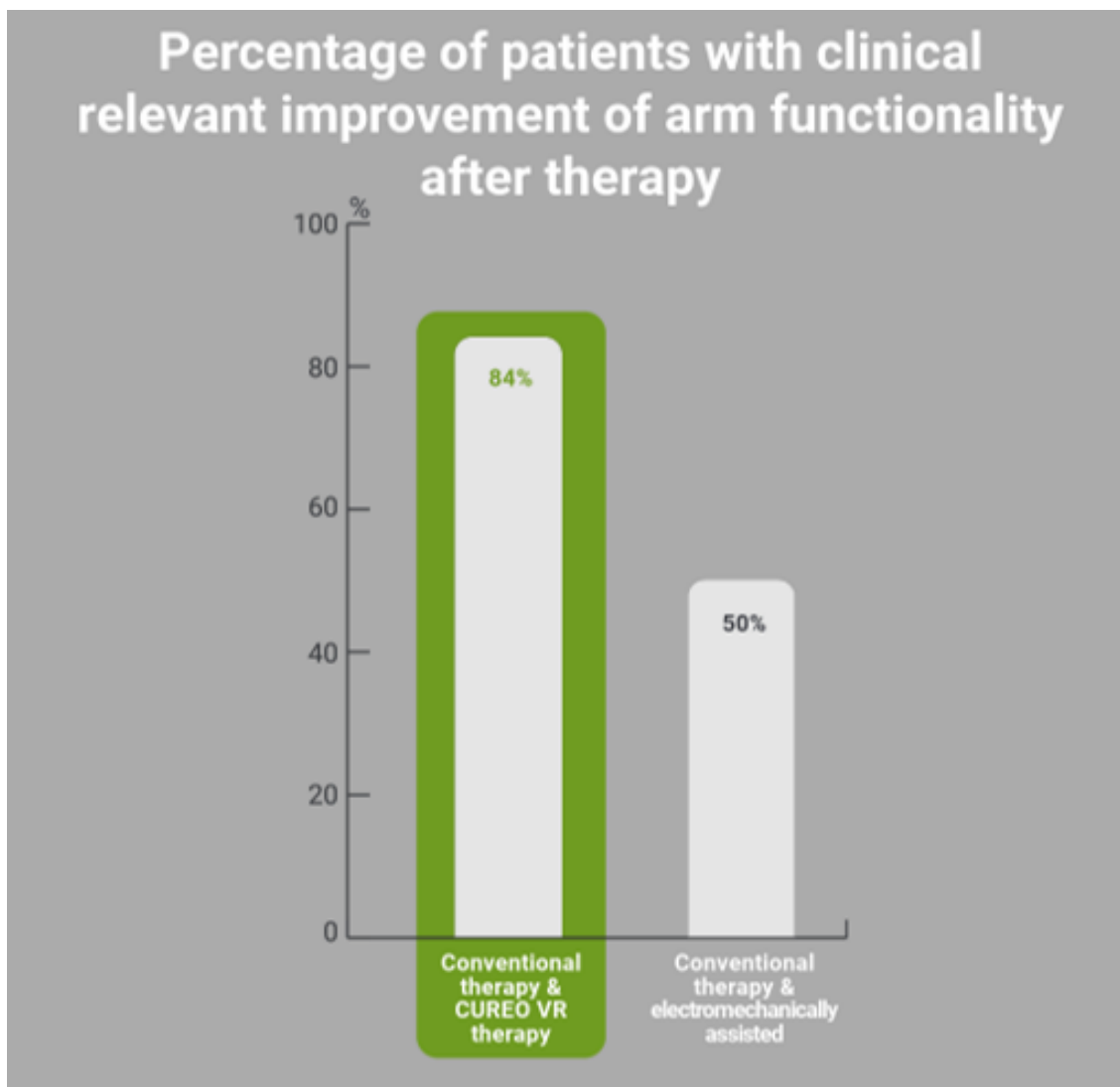
Thomas Saur (Chief Visionary Officer): "Not many empirical studies on the effectiveness of VR-based training have been conducted to date, so this result is particularly important. We at CUREosity have long been convinced that virtual reality therapy with CUREO® should be a fundamental part of the patient care landscape. We are therefore all the more pleased about any further scientific proof of efficacy such as this one for stroke therapy."

Paresis of the contralateral upper extremities is one of the most common and most debilitating consequences of a stroke. Three out of four survivors of a first stroke suffer from arm paresis. To date, the outlook for patients with severe paresis is particularly bleak: up to 62% of these patients do not regain functionality in their arm (Kwakkel et al., 2003). Scientific studies show that the more intensive and frequent physiotherapy is carried out after a stroke, the greater the patient's chances of recovery. On the other hand, the number of physiotherapists is decreasing, which leads to a gap in the provision of cost-effective and highly intensive neurorehabilitation. The development of new technologies that support conventional therapy methods and relieve the burden on therapists is therefore urgently needed.

Under the direction of Kira Lülldorff and with the participation of several scientific partner institutions at the St. Mauritius Therapy Clinic in Meerbusch, VR therapy was compared with electromechanically assisted therapy. 52 stroke patients with severe paralysis of the arm received a total of 10 therapy units over a period of three weeks. The exercises took place in a group setting: One group initially received 20 minutes of conventional therapy followed by VR and the comparison group underwent a combination of conventional therapy and an established, electromechanically assisted procedure. The

success of the therapy was measured using the Action Research Arm Test (ARAT), which is the international standard for the assessment of arm functions.

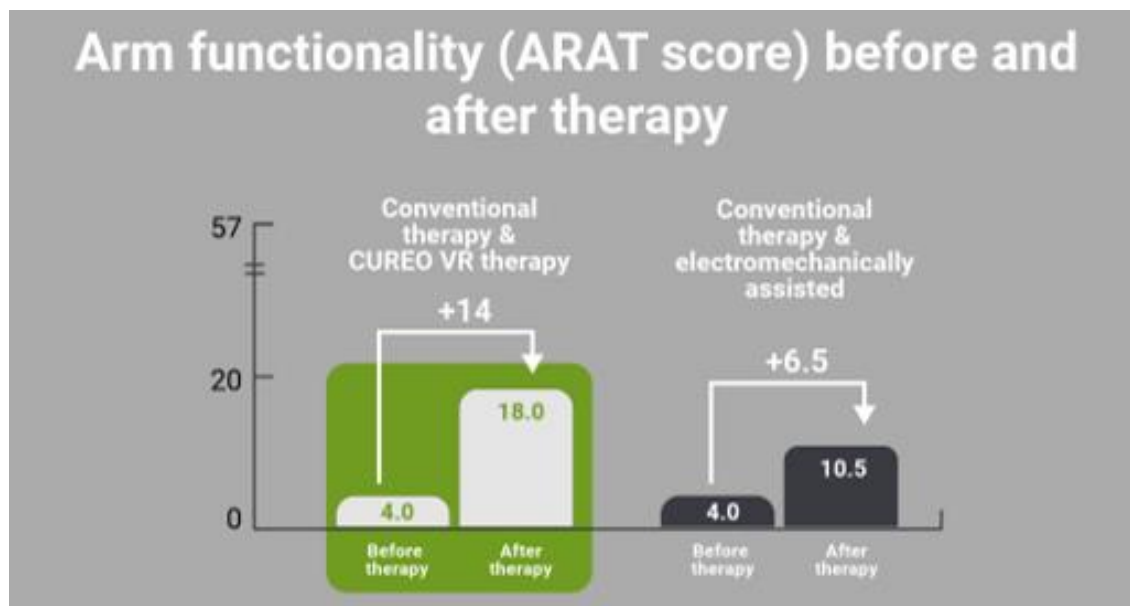
The results of the study, which were published in December 2023 in the highly respected journal *Frontiers of Neurology*, clearly speak in favor of the effectiveness of virtual reality therapy: 84% of patients treated with CUREO® showed a clinically relevant improvement in upper limb function. With electromechanically assisted therapy, on the other hand, only 50% of patients did. This difference is independent of age, gender, time of stroke or ARAT score at the start of therapy.



Own illustration of main study results (1/2)

The second highly relevant result was the extent of the improvement in arm functionality: patients treated with CUREO® were able to improve their ARAT score by an average of 14 points (from 4 to 18). Although the comparison group also showed success in therapy, they only achieved an average

improvement of 6.5 points. These two results not only confirm the research group's previous hypothesis that VR would not be inferior to the established, electromechanically assisted method, but instead illustrate the superiority of VR in this setting.



Own illustration of main study results (2/2)

Another factor that should not be neglected is the implementation of the study in the form of groups: If therapists are able to treat several patients at the same time in the future with consistent therapeutic success, this is a fundamental gain in resource efficiency for clinics and practices. This study shows that this is very well possible with the help of **CUREO®**.

In addition to the present study by Lülldorff et al. (2023), there are several other findings on the use of virtual reality in therapy: positive effects on cognitive functions such as attention, spatial perception, and memory performance as well as on motor skills (in the form of muscle strength and tone) have already been observed. We will be happy to provide you with a summary of existing studies on VR therapy on request.



Functional arm therapy with **CUREO**® in a group setting



Media Contact
Laura Teichmann
Head of Marketing

l.teichmann@cureosity.de