

# Active exploration training in neglect with the new augmented reality app "Negami" - a randomized controlled trial

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**Aim.** A widely applied and effective rehabilitation method in stroke patients suffering from spatial neglect is the 'visual exploration training'. Patients improve their ipsilesional bias of attention and orientation by training of exploration movements and search strategies towards the contralesional side of space. Here we investigate the effectiveness of the augmented reality (AR)-based app "Negami" for the treatment of spatial neglect in a randomized control trial. Negami combines a visual exploration training with active, contralesionally oriented rotation of eyes, head, and trunk.

**Method.** Twenty patients with spatial neglect were randomly assigned to the experimental Negami group or to a group receiving standard neglect therapy. Over a period of two weeks, both groups received five training sessions per week (à 25 minutes). Neglect behavior was assessed weekly over a five-week period, with the Negami therapy group receiving a second follow-up assessment at one-to-two-month intervals after completion of training.

**Results.** Both groups improved significantly. While the Negami therapy group improved in four of five neglect tests used, the standard therapy group improved in only one of these tests. When the performance of the two therapy groups were directly compared, we observed significantly better improvement in the Negami group already after the first week of training. This difference was also significant after the end of the training as well as one week after the end of training. The effect of the Negami therapy was observed stable one to two months after the end of treatment.

**Discussion.** Two weeks of training with Negami in patients with unilateral neglect after stroke significantly improved spatial neglect. Thus, Negami can be used as an effective alternative or addition to the current standard neglect therapy, and may even be superior to it.

**Keywords:** Spatial neglect; gamification; augmented reality; visual exploration training; rehabilitation; stroke