



Biofeedback therapy using the Anika computer glove in the rehabilitation of patients with impaired motor function after a stroke

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Research goal. To study the effectiveness of biofeedback therapy using the Anika computer gloves in patients with impaired motor function after a stroke.

Materials and research methods. During the study, rehabilitation measures were carried out in 41 patients aged 45-70 years with ischemic stroke and functional disorders in the range of motion. In the first group of 13 (31%) patients underwent traditional rehabilitation (physiotherapy, kinesiomasage, ergotherapy). Traditional rehabilitation and the anika gloves recovery method were used in 28 (68%) patients of the second group.

Results. In both groups, 3 rehabilitation courses were carried out over 3 months. The durations of each rehabilitation course is 10 days. As a result, in the 1st group, the activity of the hands increased by 30-40% due to a decrease of muscle tone in the hands and muscle strength increased from 1-2 points to 2-3 points. In the second group, the activity of the hands increased by 45-60% due to a decrease of muscle tone and muscle strength increased from 1-2 points to 3-4 points ($P \leq 0.09$). There was an increase in the activation of movements in the fingers of the hands.

Biofeedback therapy using devices like the Anika computer glove has gained attention in the rehabilitation of patients with impaired motor function after a stroke. The goal of biofeedback therapy is to help individuals learn to control physiological processes such as muscle activity, which can lead to improved motor control and recovery of function.

Overview of Biofeedback Therapy

Biofeedback therapy involves using real-time data from sensors that measure various physiological functions, such as muscle tension, heart rate, or skin temperature. These sensors feed the information back to the patient, allowing them to see and feel their own physiological responses. Over time, this helps patients learn to consciously control these functions, thereby improving movement, strength, and coordination.



Anika Computer Glove in Rehabilitation

The Anika computer glove is a specialized device designed for rehabilitation purposes, specifically in patients who have lost motor control in their hands and fingers, often due to a stroke. It is equipped with sensors that monitor and provide feedback on the movements of the hand and fingers, which can be used to enhance motor recovery.

Here's how it generally works:

1. **Sensors and Data Collection:** The glove contains sensors that measure muscle activity, joint angles, and hand/finger movement.
2. **Real-Time Feedback:** As the patient performs rehabilitation exercises, the glove provides immediate feedback on the quality and accuracy of their movements, often through visual, auditory, or tactile cues.
3. **Training the Brain:** This feedback helps the patient understand how their muscles are moving and allows them to make adjustments to improve coordination and strength. Over time, with consistent use, the brain and nervous system can re-establish neural connections and pathways that were impaired by the stroke.
4. **Motor Learning:** The process of receiving feedback during the exercises helps to promote motor learning. The more accurate and controlled the movement, the more likely it is that patients will recover or improve their motor function.

Benefits for Stroke Rehabilitation

1. **Improved Motor Control:** By using biofeedback to retrain the brain and muscles, stroke patients can improve their ability to move their hand and fingers with more precision and strength.
2. **Neuroplasticity:** Regular use of biofeedback therapy encourages neuroplasticity, the brain's ability to reorganize itself by forming new neural connections. This is particularly important after a stroke, when certain brain areas are damaged.
3. **Personalized Therapy:** Biofeedback provides individualized feedback based on the patient's specific needs and abilities. This allows



therapists to tailor rehabilitation exercises that target the most critical impairments.

4. **Motivation and Engagement:** The interactive nature of biofeedback therapy can increase patient motivation by providing clear goals and progress tracking. This can lead to greater adherence to the rehabilitation program.

Potential Limitations

While the Anika computer glove and biofeedback therapy can be very effective, there are potential limitations:

- **Accessibility:** Devices like the Anika glove may be costly, and their availability may be limited in some rehabilitation centers.
- **Patient Readiness:** Some patients may find it challenging to engage with technology, especially older adults or those with cognitive impairments.
- **Duration of Therapy:** Significant improvement might require extended periods of therapy and regular use of the device, which can be a barrier for some patients.

Conclusion.

1) Rehabilitation measures have shown that the use of Anika computer gloves method with the traditional rehabilitation method increases the effectiveness of treatment and in a short time has a positive effect on fine movements of the fingers.

2) In the comprehensive rehabilitation of patients with stroke, it is recommended to use the Anika computer gloves in order to restore fine motor skills of the hand.

In conclusion, biofeedback therapy using devices like the Anika computer glove offers a promising approach to stroke rehabilitation, helping patients regain motor function and improve their quality of life. It combines technology with neuroscience principles, providing a powerful tool in the recovery process.