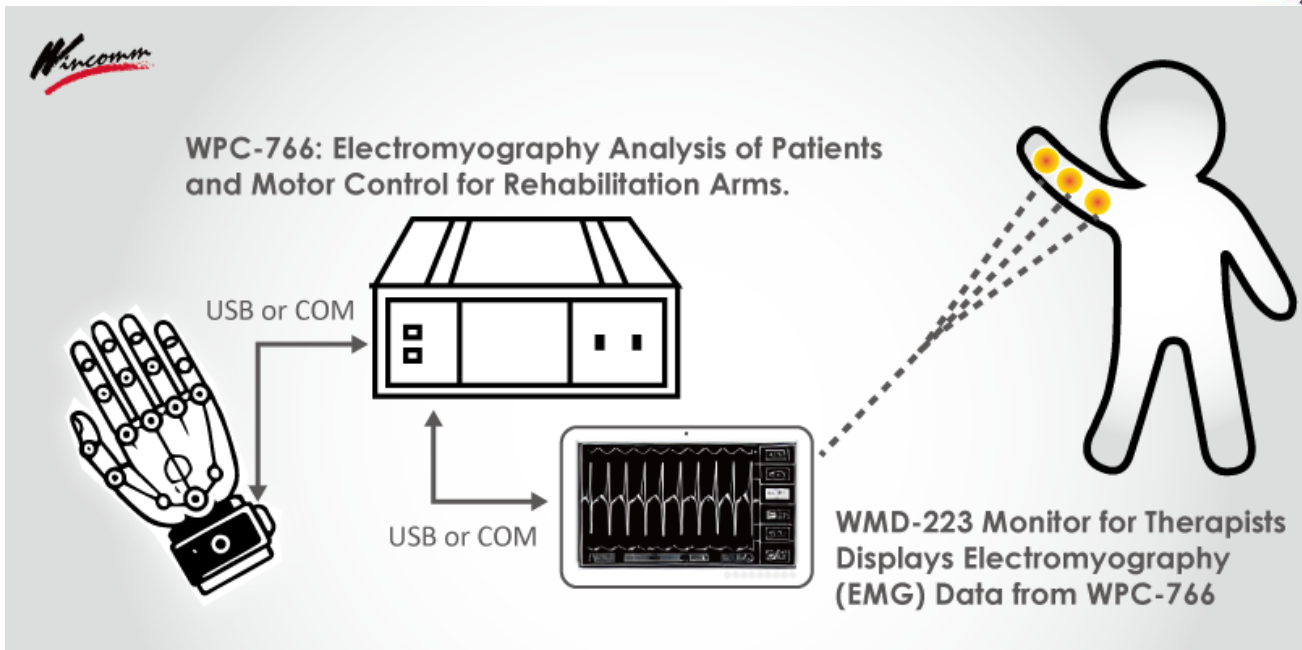


## Finger Paralysis Rehabilitation



### Background

Post-stroke patients often face challenges with hand mobility due to finger paralysis, spasticity, and weakened biosignals. These issues severely impact daily activities and the ability to regain independence. In response, a novel neurorehabilitation device has been developed to support and enhance finger mobility during therapy sessions. Housed in a cart, the system integrates a medical box PC and a medical monitor to perform bio-signal analysis and control the device's motor-driven wire system.

The device aims to provide lightweight and effective support to the paralyzed fingers while incorporating cutting-edge technology to identify movement intent through weak bio-signals. By employing advanced algorithms and compact, wearable components, this solution is positioned to revolutionize rehabilitation therapy for individuals suffering from finger paralysis.

### Pain Points

The need for esophageal temperature monitoring arises from several challenges faced by healthcare professionals:

- **Strength Requirement for Spasticity Management**

Patients with finger spasticity require significant force to open tightly clenched fingers. Traditional designs that place motors near the hand make the attachment bulky and heavy, while reducing weight often compromises power output.

- **Weak Biosignals from Paralyzed Hands**

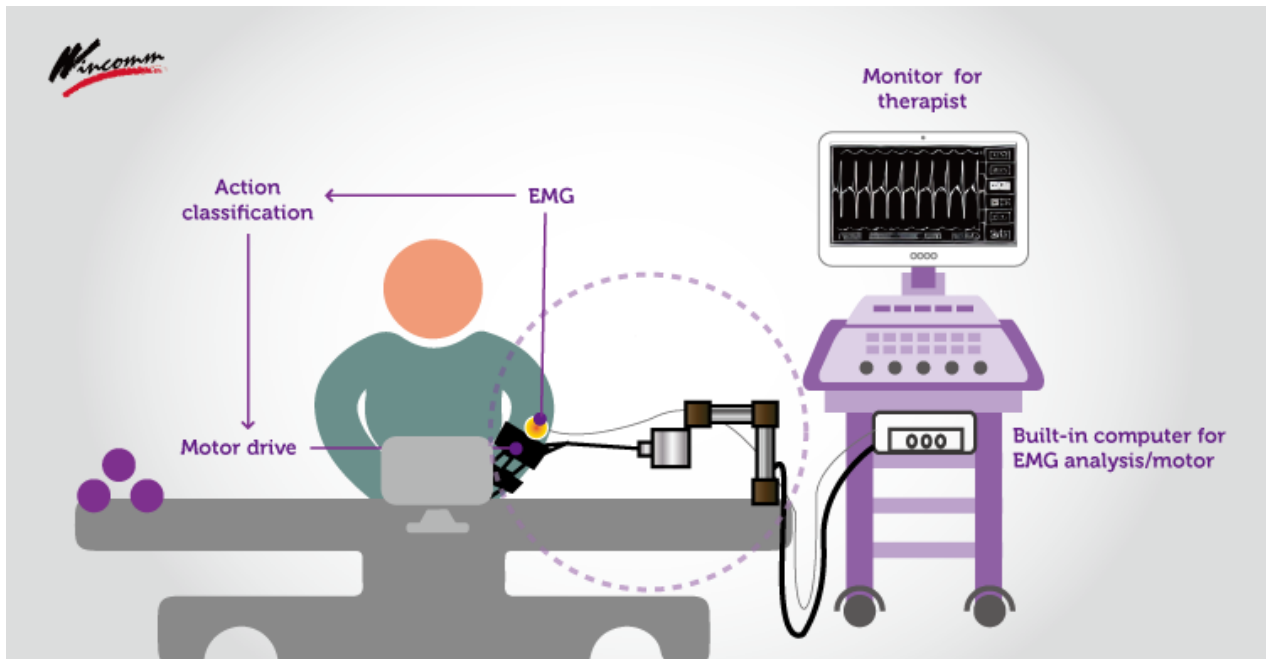
Post-stroke patients typically generate weak biosignals that conventional systems struggle to detect and interpret. This limitation makes it difficult to accurately identify user intent, thereby reducing therapy effectiveness.

- **Complexity of Finger Motion Detection**

Conventional algorithms rely on myoelectric signal intensity to estimate motion, which is inadequate for detecting complex finger movements. The intricate interplay of multiple muscles in finger motion requires a more sophisticated approach.

- **Cumbersome Therapy Devices**

Many existing rehabilitation devices are not user-friendly during occupational therapy. They restrict natural hand movements, making it difficult for patients to perform meaningful exercises that simulate daily life activities.



### Wincomm Solutions

*Featuring on efficient computing performance, high integration, uniform interface design, and medical grade certification*

The integration of a **medical box PC, WPC series** and **medical monitor, WMD series**, enables this innovative rehabilitation device to address the above challenges effectively:

1. **Compact and Powerful Wire-Driven Hand Unit**

By using a wire drive system connected to a motor housed in the cart, the device offers

strong pulling force to open spastic fingers. This design ensures the hand unit remains lightweight and compact while providing precise, powerful assistance for each finger.

## 2. **Biosignal Amplification and Intent Detection**

The medical box PC processes weak biosignals using advanced signal amplification technology and proprietary algorithms. This allows the system to identify the user's intent to move even with minimal surface myoelectric activity, making rehabilitation accessible to patients with severe paralysis.

## 3. **Advanced Motion Identification Algorithms**

The system leverages waveform analysis instead of intensity-based estimation to decode complex finger motions. This approach enables the device to distinguish subtle finger movements, supporting activities like grasping and manipulating objects.

## 4. **Wearable and User-Friendly Design**

The robotized parts are worn on the back of the hand, leaving the palm free for grasping and releasing objects. The device's independent control of all five fingers allows patients to engage in occupational therapy tasks that mimic real-life activities, improving their functional recovery.

By leveraging the medical box PC, [WPC series](#) with medical monitor, [WMD series](#), for all kinds of medical applications, Wincomm team provides the special design development and manufacturing service, and please contact us to get the design request for your unique applications.

For more product information, please visit the Wincomm website at <https://www.wincommusa.com/category-Medical-Series-C001.html>