



REHABILITATION IN GUILLAIN-BARRÉ SYNDROME: THE ROLE AND NECESSITY OF ORTHOTIC DEVICES

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ABSTRACT

Guillain-Barré syndrome (GBS) is an acute inflammatory autoimmune polyneuropathy that leads to sudden and progressive muscle weakness, often starting in the lower limbs and involving the respiratory musculature. It is the leading cause of acute flaccid paralysis in developed countries. The main clinical features include rapidly progressive symmetrical weakness, areflexia, and frequently sensory and autonomic disturbances. Despite the availability of effective therapies such as plasmapheresis and intravenous immunoglobulins, rehabilitation plays a crucial role in the functional recovery of patients. Timely diagnosis and initiation of rehabilitation are essential for functional restoration. The rehabilitation approach involves individually tailored physical therapy, the use of orthoses, and other assistive devices. The aim of this article is to explore the importance of orthopedic braces as a means of stabilization, gait support, and prevention of complications in patients with GBS. Materials and Methods: This article is based on a review of scientific literature published in international peer-reviewed journals dedicated to Guillain-Barré syndrome and modern rehabilitation strategies. Conclusion: Rehabilitation in Guillain-Barré syndrome requires a multidisciplinary approach and early incorporation of orthotic therapy. Orthopedic braces not only stabilize the joints but also facilitate recovery, improve quality of life, and reduce the risk of long-term disability. Their individualized application is recommended even in the early stages of recovery.

Keywords: orthoses, rehabilitation, motor recovery, functional support, assistive devices

INTRODUCTION

Guillain-Barré syndrome is a serious neurological disorder characterized by the acute onset of muscle weakness and flaccid paralysis. It is the most common cause of acute flaccid paralysis in industrialized countries following the eradication of poliomyelitis. The disease is marked by an autoimmune attack against the myelin sheath or axons of the peripheral nerves. It serves as a classic example of an autoimmune disorder in which the immune system attacks the body's own peripheral nerves (1).

Historically, GBS was first described by Landry in 1859, who reported cases of acute ascending paralysis. Later, in 1916, Guillain, Barré, and Strohl expanded knowledge about the condition, highlighting the diagnostic criterion of albuminocytologic dissociation in the cerebrospinal fluid (2).

The main subtypes include acute inflammatory demyelinating polyneuropathy (AIDP), acute motor axonal neuropathy (AMAN), and acute motor-sensory axonal neuropathy (AMSAN) (1, 2).

Epidemiologically, the incidence of GBS is about 1–2 cases per 100,000 people per year, with the risk increasing with age. Approximately two-thirds of patients report a preceding viral or bacterial infection (e.g., *Campylobacter jejuni*, cytomegalovirus). Guillain-Barré can occur at any age, and is most common in children between 4-9 years of age and in adults between 40-60 years of age (3). The clinical presentation develops rapidly and may include respiratory failure, cranial nerve involvement, and autonomic dysfunction. In Guillain-Barré-Landry syndrome, paralysis begins symmetrically in the lower limbs and may ascend to the upper limbs and respiratory muscles. The disease typically progresses over 3–4 weeks. In benign cases, the progression halts at the upper limb level. Fatal outcomes may occur due to sudden respiratory muscle paralysis or cardiac rhythm disturbances (3).

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In most cases, the prognosis is favorable, but patients often face significant functional deficits during the active phase and a prolonged recovery period, with 20–30% of patients left with long-term functional impairments (4). This poses challenges for clinicians and rehabilitation specialists regarding the selection of appropriate strategies to maintain and restore motor function.

In recent decades, advancements in diagnostic methods and therapeutic tools have allowed for more effective disease management. Nevertheless, rehabilitation remains a cornerstone of treatment, particularly in cases with residual weakness and impaired mobility. It plays a key role by focusing on maintaining muscle strength, preventing contractures, and promoting functional independence. Orthopedic braces are an essential component of this process.

The importance of orthopedic braces and other assistive devices is increasingly documented in modern medical literature. They are not merely mechanical supports but are part of a holistic rehabilitation plan aimed at restoring patients to a full and independent life.

MATERIALS AND METHODS

This article is based on a review of scientific literature published in international peer-reviewed journals focused on Guillain-Barré syndrome and modern rehabilitation strategies. The main sources include systematic reviews, randomized controlled trials, and official recommendations from neurological and rehabilitation associations. A combined approach was used to analyze clinical and functional outcomes in GBS patients across different phases of the disease. The aim of this article is to examine key aspects of the pathophysiology and clinical presentation of GBS, with an emphasis on modern rehabilitation approaches focusing on orthotic use.

DISCUSSION

Guillain-Barré syndrome presents a significant challenge both in terms of acute management and long-term rehabilitation. Although approximately 80% of patients achieve full or near-full recovery, a considerable proportion experience long-term consequences such as

muscle weakness, sensory deficits, and fatigue (1, 4).

Timely recognition of the condition and early involvement of a multidisciplinary team — including neurologists, physiotherapists, occupational therapists, and psychologists — is crucial. Involving the family in the rehabilitation process is also critical, as caregiving and emotional support directly influence outcomes.

Similar conclusions are supported by Khan & Amatya (2012), who found that multidisciplinary rehabilitation in GBS improves functional independence and shortens the recovery period (4). Willison et al. (2016) emphasize that strategies involving early mobilization and orthotic therapy significantly improve motor prognosis (5).

An integrated approach to GBS rehabilitation, where orthopedic braces play a central role, forms the basis for improving quality of life, independence, and psychological well-being. Future studies should focus on the long-term effects of various types of orthoses and on innovations in their design and adaptation to the individual needs of patients.

The use of orthoses and braces in the rehabilitation process proves to be an essential tool for overcoming residual muscle weakness and impaired coordination. A study by Houlahan et al. (2023) reports that over 70% of physiotherapists and occupational therapists incorporate orthoses into the therapeutic plan for GBS (6). Likewise, Khan & Amatya (2012) report that combining physiotherapy with orthotic therapy leads to faster recovery of functional independence. Patients using braces demonstrate greater independence in daily activities, which directly impacts their psycho-emotional stability (4). One of the most important aspects of modern practice is the personalized approach. Depending on the degree of neurological deficit, phase of recovery, and patient motivation, the selection of a brace must be carefully tailored.

Table 1 summarizes the main types of orthoses used in patients with Guillain-Barré syndrome, their purpose and benefits.

Table 1. *Types of Orthopedic Braces and Their Application in GBS*

Type of Orthosis	Target Area	Application	Main Function
AFO (Ankle-Foot Orthosis)	Ankle and foot	In cases of "foot drop"	Stabilization, improvement of gait
KO (Knee Orthosis)	Knee joint	Muscle weakness in the thigh	Facilitates standing up and walking
HKAFO (Hip-Knee-Ankle-Foot Orthosis)	Entire lower limb	Severe paralysis	Full stability when standing
WHO (Wrist-Hand Orthosis)	Wrist and fingers	Weakness in the upper limb	Maintains position, prevents contractures

Numerous studies confirm the benefits of Ankle-Foot Orthoses (AFO) in improving gait and reducing the risk of falls (5). In the presence of "foot drop," AFOs enable the restoration of independent walking significantly earlier compared to passive therapy without assistive devices. Knee Orthoses (KO) provide additional stability and facilitate standing and walking. In more severe cases, where muscle weakness affects the entire lower limb, combined orthoses such as Hip-Knee-Ankle-Foot Orthoses (HKAFO) are used. These devices stabilize the hip, knee, ankle, and foot joints and are especially suitable in the early stages of recovery when the patient is unable to stand independently. For involvement of the upper limbs, splints are used to maintain correct positioning of the wrist or elbow (7).

In addition to mechanical stabilization, orthoses can be used preventively. Their application during sleep or while seated helps maintain anatomically correct joint positioning and prevents the development of contractures and deformities.

In the future, innovations in orthotic design — including the use of lightweight and breathable materials, modular systems allowing adaptation according to the rehabilitation phase, and 3D printing for personalized fabrication — will enable even more effective application (7). Robotic orthoses and exoskeletons are also entering clinical practice and offer hope for patients with severe motor impairments. In our view, research in this area should be expanded to validate these new technologies over the long term. Future efforts should focus on developing algorithms for individualized orthosis selection based on the clinical subtype of GBS, the degree of muscle weakness, and overall motor function.

A comprehensive literature review and analysis of clinical practices in the rehabilitation of Guillain-Barré syndrome patients demonstrate that the use of orthoses is not just a mechanical aid but a strategic component of the overall therapeutic approach. International guidelines show a clear consensus regarding the importance of orthoses during both early and late recovery stages.

Data collected through questionnaires and interviews with physiotherapists and occupational therapists emphasize the high frequency of orthosis use in clinical practice for GBS. More than 70% of therapists in leading European and American healthcare institutions report including orthoses in individualized treatment plans within the first weeks after patient stabilization (8).

Modern rehabilitation for GBS should not be limited to physiotherapy alone. The integration of cognitive rehabilitation and psychological support is essential, particularly for patients who have undergone prolonged intensive care and isolation. According to Van den Berg et al. (2014), up to 20% of patients develop post-traumatic stress or depression following acute GBS (3).

Besides physical benefits, orthoses also provide psychological advantages. Patients report that having a stabilizing device makes them feel more confident, encourages them to leave the house more often, and increases their participation in social life. This has a direct impact on their mental health, reducing the risk of depression and accelerating the overall recovery process. Psycho-emotional aspects are equally important. Patients using orthoses report improved self-confidence, reduced anxiety, and better motivation to participate in rehabilitation activities (5).

The presence of long-term functional deficits also necessitates prolonged rehabilitation programs and home adaptation. This includes educating family members, ensuring a suitable home environment, and regular follow-up by specialists. The use of orthopedic splints at home further extends the effects of therapeutic interventions and prevents re-injury (9).

An integrated approach to the rehabilitation of Guillain-Barré syndrome, in which orthopedic splints play a central role, is key to improving quality of life, independence, and psychological well-being. Wider application of functional and adaptive orthoses will contribute to reducing chronic disability, improving quality of life, and easing the economic burden on healthcare systems.

CONCLUSION

Guillain-Barré syndrome remains a condition with the potential for severe disability, but it also offers favorable prognostic outcomes with appropriate treatment and rehabilitation. This work emphasizes the key role of orthopedic splints in the recovery process — not only as a means of motor support but also as a tool for social and psycho-emotional reintegration. Orthopedic splints not only stabilize joints but also facilitate recovery, improve quality of life, and reduce the risk of long-term disability. Orthotic therapy should be a central component of personalized rehabilitation programs for GBS patients. Combining technological innovations with a holistic, patient-centered approach is the path to optimal recovery and sustainable outcomes.

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