Ottobock C-Brace for Management of Lower Extremity Musculoskeletal Disability: A Case Report

Madeeha Lughmani, OMS III, Lake Erie College of Osteopathic Medicine – Bradenton, FL
Mohammad Alaqrabawi, Certified Orthotist, Hanger Clinic – Elmira, NY

Introduction

Most common disability is mobility, reported in 1 in 7 adults.1

1.7% of the US population is living with paralysis. 2

Causes of Paralysis Causes of Spinal Cord Injuries

Those with severe disabilities that become wheelchair-bound are shown to have:1

• Loss of functional independence
• Reduced social participation
• Fewer occupational and recreational opportunities
• Psychosocial sequelae
• Increased risk of depression

Case History

A middle-aged male presented to orthotics for a brace to assist in ambulation. HPI:

• 20 years ago, brake drum fell on his right ankle
• Sustained multiple fractures and extensive nerve impairments, worsening over time
• Lost sensation of the right extremity below the hips
• Foot drop
• Decreasing muscle strength with 0/5 in the right knee and 2/5 at the right hip
• Tried spinal cord stimulation and multiple surgeries
• Wheelchair-bound for past 4 years
• Atrophy of left leg
• Referred to orthotics

Orthotics

How Common are Specific Disabilities?

Orthotics

• Popular since middle 20th century used for patients with poliomyelitis, lower limb orthoses made of leather and steel
• Increase mobility in those with musculoskeletal and neurological conditions where other management options have been exhausted

World's first brace that controls stance and swing phases of walking8

Ambulation for patients with partial/complete paralysis of knee extensors

Sensor in knee joint monitors movements 100x per second, sending info to the microprocessor that adjusts resistance as needed through hydraulic damper9

Adapt to changing terrains in real time

Various modes (cycling) can also be adjusted by a phone application8

Can prevent falls by providing resistance when there is instability

Studies show significant improvements in orthotic mobility and safety (ADLs) compared to previous stance control/lock knee braces5

Orthotist can recalibrate your gait if it changes

Does not require locking & unlocking as you walk

Ottobock C-Brace

WalkOn

• Foot drop

Swing Phase Lock 2 Fillauer

• Automatic lock for walking
• Manual lock/unlock

E-MAG

SCO

Unilateral Joint System6

• Keep knee locked to isolate ankle joint
• Can be unlocked to sit down
• Ankle joint has foot-lifting effect

Freewalk6

• SCO
• Switches between locked & unlocked knee joint

Lower Extremity Paralysis Braces

Traditionally, in leg paralysis, knee ankle foot orthoses (KAFO) are used to improve functionality. These include:5

• Locked KAFO
• Posterior offset KAFO: prevent hyperextension, axis posterior, allows bending in swing phase
• Stance control orthoses (SCO): lock knee for stance, release for free swing

Case Outcome

Failed common braces with limitations, including circumduction gait

C-Brace fitted and showed to enable significant independence in daily activities and hobbies (e.g. hunting, hiking)

Conclusion

• The Ottobock C-Brace has revolutionized bracing for LE paralysis patients, with real-time stance & swing phase control
• Increased safety with improvement of ADLs
• Limitations: $75,000 and not covered by most insurances

References


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15. New York: Springer.