



# ErgoReJoy™

## Ergonomic Removable Joystick Platform Drive Control

Ergonomics is the science of fitting a specific task to an individual, rather than forcing the individual to accommodate to a specific task. Successful power wheelchair (PWC) seating and positioning assessments utilize ergonomic principles to allocate and adjust seating products such as pressure relieving cushions, armrests, leg rests, and even headrests, to adequately support and accommodate each individual's personal anatomy and biometrics.

Ergonomic injuries are commonly caused by obstructed circulation as a result of awkward, static postures, especially when combined with contact stress, force, or repetitive movements. Operating a PWC control requires sustained repetitive motions, making the achievement of neutral positioning of the wrist, arm and shoulder critical to injury prevention. Furthermore, due to the prevalence of upper extremity contractures in PWC users, the more lateral position of the standard armrest-mounted joystick is often difficult to access without causing a sequelae of postural adaptations.

To achieve neutral postures in a wheelchair, the elbows should rest on the armrests of the chair with the joystick or drive control positioned at a similar height to the armrests. The driver should be able to access the joystick with their arm in as close to 0° of shoulder flexion as possible. When positioned closer to the core of the body, within the ergonomic "power zone," the driver can better operate the wheelchair due to improved alignment and comfort.

The positioning of a client operating a wheelchair is analogous to the position of a person performing computer input tasks in an office chair. A recent study by Goncalves, et. al. determined that the primary way to decrease upper trapezius and anterior deltoid activity (which frequently leads to musculoskeletal overuse injuries) is to provide adequate arm support through office chair armrests and forearm and wrist supports which help maintain neutral wrist and hand postures. The second most significant factor in reducing muscle activity in the absence of armrests, is determined by the shoulder flexion angle, which demonstrates the least amount of anterior deltoid and upper trapezius activity at 0° of flexion, and sequentially increasing activity relative to the angle of shoulder flexion.

Despite the generally recognized importance of ergonomics in PWC seating, the critical task of operating the PWC drive control in an ergonomically considered location is often overlooked. One reason for this paradox is a lack of effective joystick positioning options.

The *ErgoReJoy* ergonomic removable joystick platform is a newly designed tool for clinicians and providers to easily and efficiently offer power wheelchair users a variety of joystick positioning options. The *ErgoReJoy* allows the PWC user to select a joystick position that optimizes their seated symmetry and pressure distribution, while promoting neutral, ergonomically correct positions for the upper extremity. The removable joystick platform is mounted to the armrest and provides unlimited positioning options on either side of the PWC, starting at the standard armrest placement, and migrating inwards to midline. When assessing the client in different positions, it is advised that they are initially assessed in the most lateral position to determine a baseline, before assessing within the two progressively inward locations.



Optimal seating combined with ergonomically sound joystick placement options may help to prevent and amend musculoskeletal disorders caused by misaligned input controls. The *ErgoReJoy* multi-adjustable joystick platform offers the versatility that allows solid ergonomic principles to be applied in symmetry with the PWC seating and positioning products.

## NEUTRAL POSTURES



**IN CHAIR  
WITH EVEN  
SHOULDER  
HEIGHT.**



**ARM IN  
THIS POSITION.**



**HAND AND  
WRIST ARE  
LEVEL.**

## MISALIGNED POSTURES



**LEANING  
TO LEFT.**



**LEANING  
TO RIGHT.**



**ARM  
EXTENDED.**



**HAND  
RAISED.**



**RIGHT HAND  
TURNED OUT TO  
RIGHT HOLDING  
JOYSTICK.**

The *ErgoReJoy* was created by *Active Controls* founder, Mike Flowers with collaborative input provided by ergonomist, physical therapist, and assistive technology professional, Allison Sevillano. Dr. Sevillano has extensive experience conducting assessments and implementing solutions for ergonomic and assistive technology clients across a wide range of settings and populations. This experience has provided her with unique insights and perspectives when applying ergonomic design principles to power mobility. Mike Flowers has a passion for developing and marketing products to improve the power wheelchair user-experience.