Effect of Tilt and Recline on Ischial and Coccygeal Interface Pressures in People with Spinal Cord Injury

ABSTRACT

Objective: Clinicians commonly recommend that power wheelchair users with spinal cord injury perform wheelchair tilt and recline maneuvers to redistribute seating loads away from the ischial tuberosities. However, ischial pressure reduction may be accompanied by coccygeal pressure increases. Although the coccyx is among the most common sites of pressure ulcers, few studies have reported coccygeal interface pressure. The purpose of this study was to investigate both ischial and coccygeal interface pressures in response to changes in wheelchair tilt and recline angles.

Design: Thirteen power wheelchair users were recruited into this study. Six combinations of wheelchair tilt (15, 25, and 35 degrees) and recline (10 and 30 degrees, corresponding to traditional recline conventions of 100 and 120 degrees, respectively) angles were tested in random order. Each combination was tested with 5 mins of upright sitting, 5 mins of tilt and recline, as well as 5 mins of maximal pressure relief recovery. Peak pressure indices were calculated at the ischial and coccygeal sites.

Results: Ischial pressures monotonically decreased in response to increasing combinations of tilt and recline. Increments of 15 degrees of tilt did not produce significant differences under either recline angle, whereas increments of 25 degrees of tilt produced significant differences under both recline angles. Coccygeal pressures increased in response to the four smallest (of six) combinations of tilt and recline, whereas they decreased in response to the largest two combinations.

Conclusions: Ischial pressures seemed to be redistributed to the coccyx in response to the four smallest angle combinations and redistributed to the back support in response to the two largest angle combinations. Future work should confirm this pressure redistribution to the back support and determine the back support locations of redistribution.

Key Words: Coccyx, Interface Pressure Mapping, Ischial Tuberosity, Pressure Ulcers, Recline, Spinal Cord Injury, Tilt-in-Space, Tilt, Recline, Wheelchairs