Fall 2017

Comparing seated pressures in daily wheelchair and sports equipment and investigating the skin protective effects of padded shorts.

Torey M. Anderson BA, SPT  
University of Puget Sound School of Physical Therapy

Kaitlynn L.C. McKirgan BS, SPT  
University of Puget Sound School of Physical Therapy

Dr. Jennifer Hastings PT, PhD, NCS  
University of Puget Sound School of Physical Therapy

Follow this and additional works at: https://soundideas.pugetsound.edu/ptsymposium

Part of the Physical Therapy Commons

Recommended Citation
Anderson, Torey M. BA, SPT; McKirgan, Kaitlynn L.C. BS, SPT; and Hastings, Dr. Jennifer PT, PhD, NCS, "Comparing seated pressures in daily wheelchair and sports equipment and investigating the skin protective effects of padded shorts." (2017). Physical Therapy Research Symposium. 35.  
https://soundideas.pugetsound.edu/ptsymposium/35

This Poster is brought to you for free and open access by the Physical Therapy, School of at Sound Ideas. It has been accepted for inclusion in Physical Therapy Research Symposium by an authorized administrator of Sound Ideas. For more information, please contact soundideas@pugetsound.edu.
Comparing Seated Pressures in Daily Wheelchair and Sports Equipment and Investigating the Skin Protective Effects of Padded Shorts

Torey Anderson SPT; Kaitlynn McKirgan SPT; Jennifer Hastings PT, PhD, NCS

Purpose
Participation in adaptive sports is beneficial for individuals with SCI as a way to prevent cardiometabolic diseases and improve quality of life. Currently, sport specific adaptive equipment (AE) lacks the skin protective cushioning of daily wheelchairs (DW), and may expose individuals to high seated pressures. This study compared average and peak seated pressures in multiple types of AE in both static and dynamic conditions, with and without the presence of a padded bicycle short. Hypothesis: Seated peak and average pressures will be greater in AE than DW, and a padded bicycle short will decrease seated pressures in AE.

Participants/Methods
Participants were a convenience sample of adaptive sport athletes without current skin breakdown or any ability to ambulate. A TekScan Pressure Mapping System recorded 60-second dynamic and static pressure readings in the following conditions: DW, AE without padded short, AE with padded short. The participants simulated sport-specific movements for dynamic readings. Eight athletes were tested in ten pieces of AE including: hand cycle, quad rugby chairs, basketball chairs and mountain hand cycle.

Results
AE showed significantly higher average and peak pressures in the static condition and significantly higher average pressures in the dynamic condition when compared to DW. No significant difference was found for dynamic peak pressures between AE and DW. The presence of a padded bicycle short had no significant effect (Fig. 1).

Follow-Up
Finding no benefit with the padded bicycle short, two other types of padded short were mapped on able bodied subjects in a hand cycle. Static readings were taken with a pull-on padded short, an impact short, and no short. The impact short showed increased peak and average pressures, while the pull-on padded short showed decreased average pressures when compared to no short (Fig 2). We then measured pressures with the pull-on padded short in one individual with TS SCI in static and dynamic conditions in a basketball wheelchair and a mountain hand cycle. The padded short increased peak and average pressures in the basketball chair and increased peak pressures in the mountain bike but decreased average pressures in the mountain bike. Thus, in one person with SCI these pull on padded shorts had similar effects as measured with our able bodied participants when in the hand cycle position. The positional difference between the legs forward in knee extension in the hand cycle, and the hip and knee flexion in the basketball chair, is likely significant in determining the effect of the shorts.

CLINICAL BOTTOM LINE:
Adaptive sport equipment exposes athletes to higher pressures than daily use wheelchairs. AE appears to be safer during dynamic use and athletes should avoid prolonged inactivity while in sport equipment. Pressure mapping is an imperative evaluation tool necessary to determining the effect of using padded shorts with sports equipment.

References

Acknowledgements: Authors would like to thank the University of Puget Sound Sound Enrichment Committee for funding.

Image 1. Mountain hand cycle (Left) and Basketball wheelchair (right) used in single subject follow up.