Shearing Reduction Technology

Applied Research Study Results

January 23, 2012

Executive Summary

A study was performed to determine the effectiveness of 5 Minds Mobility's seating and wheelchair cushions in reducing the effects of shear and friction on client's skin. Shearing and friction is a common cause of skin breakdown.

Testing on nine participants within our chosen inclusion criteria was done to establish evidence based practice. The response of the participants' skin condition and comfort to using the new cushion was assessed to determine the effectiveness of the cushion's ability to reducing shearing and friction.

Nine participants were assessed every Monday, Wednesday and Friday for the duration of six weeks for skin improvement or skin breakdown and comfort. Participants were assigned the same examiner for consistency of data collection whenever possible.

Project Team

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Outcomes/Methods

Primary Outcomes/Methods: To determine the effectiveness of the Shear Reduction Technology in seating and wheelchair cushions developed by 5 Minds Mobility in reducing the effects of friction and shear on skin breakdown.

Secondary Outcomes/Methods: To determine if there is a decreased incidence in skin breakdown and an increase in comfort when using the new SRT (Shear Reduction Technology) cushion.

Theoretical Principals

Friction and shear is a common cause of skin breakdown for chair-fast and bed-fast clients.

Friction is caused when skin is pulled or slides across a surface (bed linens, chair cushion, incontinent product) thereby rubbing the skin and causing skin breakdown.

Shear is caused when skin is stationary and underlying tissues shift causing capillaries to stretch and break, decreasing blood flow thereby resulting in skin breakdown.

Shear Reduction Technology (SRT) was designed by 5 Minds Mobility to reduce the effects of friction and shear in chair-fast clients. Its double-layered design allows the cushion to move with the client's movements, thereby reducing friction and shear.

Other factors associated with skin breakdown are poor nutrition, diabetes, anemia, incontinence and lack of mobility/repositioning. These factors lead to decreased skin integrity and poor healing causing skin irritation and breakdown.

Methodology

A quazi-experiment observational study was implemented on 9 chair-fast clients at a Long Term Care Facility commencing on December 5, 2011. A baseline head-to-toe assessment, health history and nutritional assessment were obtained on each participant. Photographs were taken of each participant's skin condition prior to commencing the cushion trial.

On December 5, 2011, each of 8 participant's existing chair cushion was replaced and fitted with the SRT cushion, all of which were 18" x 18" in size and equal in density. The 9th participant's chair was assessed to need a new base to fit the SRT cushion for the trial and parts were ordered.

On December 9, 2011, the 9th participant's existing chair cushion, which had a broken base, was replaced and fitted with a new base and SRT cushion, equal in size and density to the other cushions in the study.

All participants were assessed for the duration of 6 weeks for skin breakdown, comfort and nutritional changes and a Braden Score every Monday, Wednesday and Friday, which was completed on January 13, 2012.

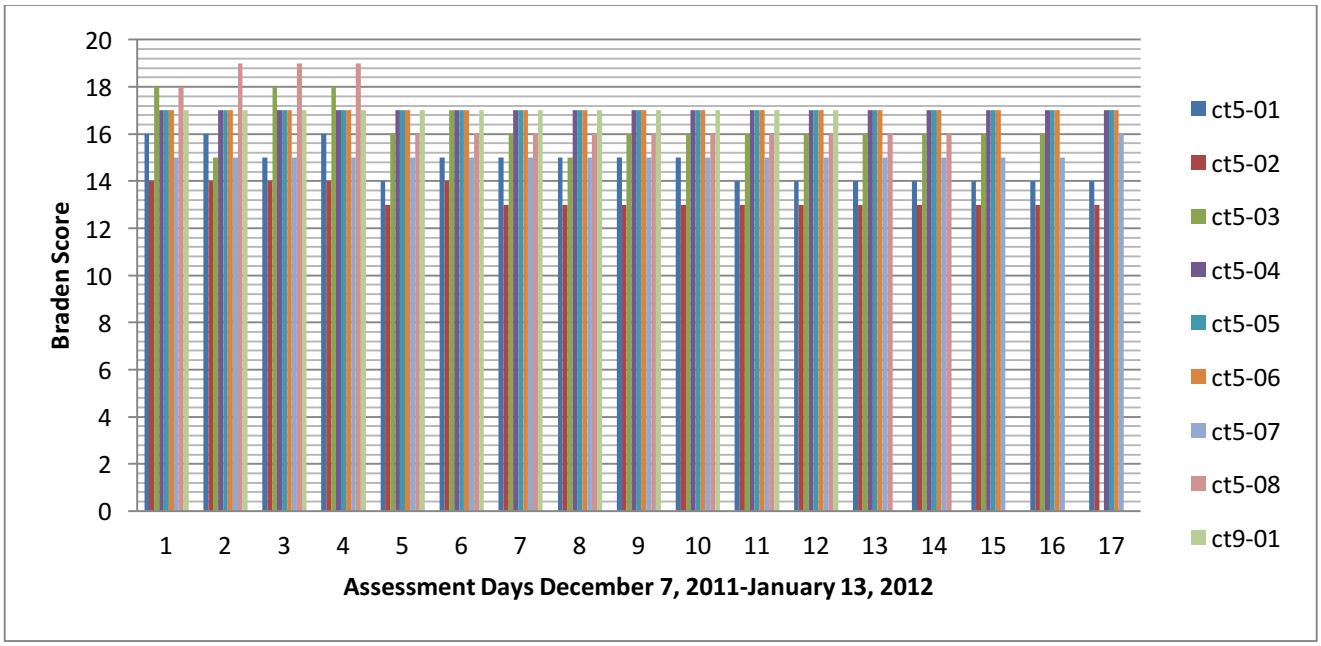
Results and Discussion

Braden Scale

The Braden Scale was the standard tool used to assess the participants' risk of skin breakdown. This assessment was completed every Monday, Wednesday and Friday for the duration of the 6 week study. The tool guides assessments in the sensory perception of the participant, the moisture of their skin, level of activity, type of mobility, nutritional status and exposure to friction and shear. Each category is given a score.

A Braden Score of 15-18 indicates the participant is at risk of developing skin breakdown. A score of 13-14 indicates the participant is at moderate risk of developing skin breakdown. A score of 10-12 indicates a high risk and a score equal to or less than 9 indicates a very high risk of developing skin breakdown.

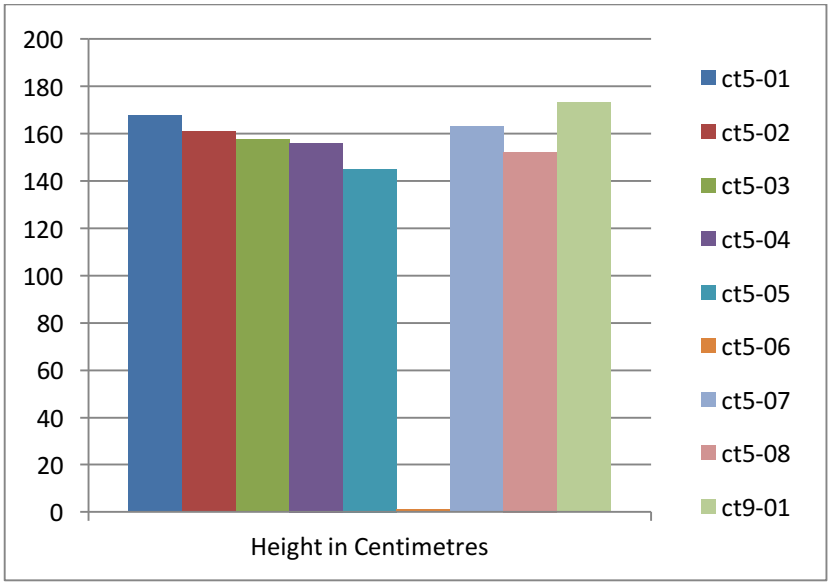
All participants remained within our criteria for the duration of the study, maintaining a score of 13 or greater.



Height and Weight

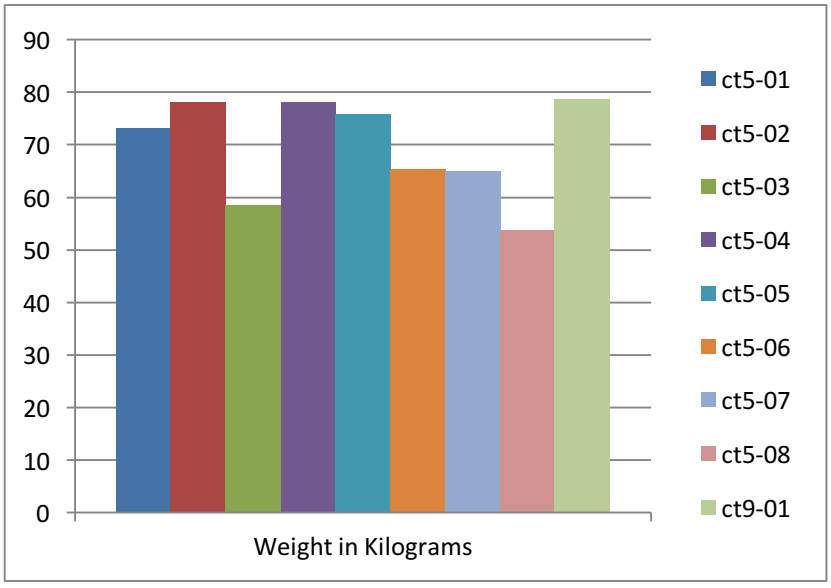
The participants varied in height and weight thereby exposing the SRT cushion to a variety of tolerances to test the capacity of the cushion.

Height in Centimetres



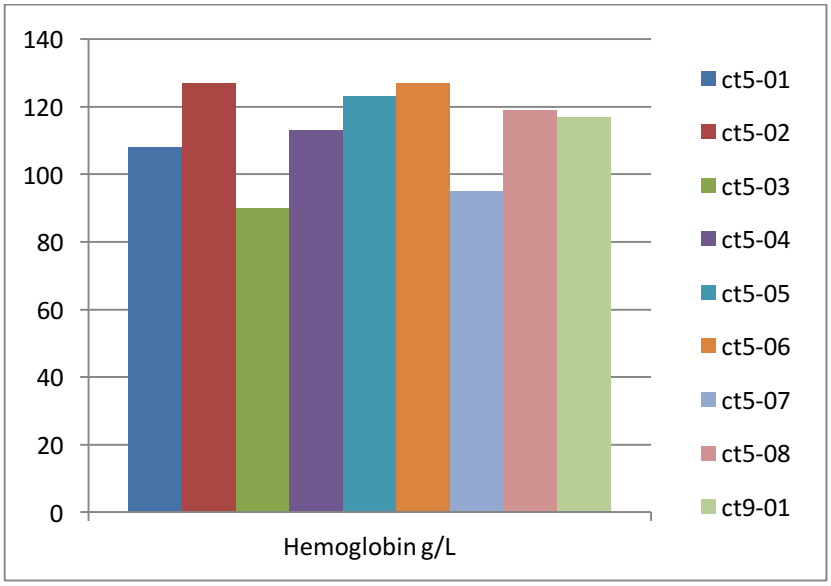
Height of participant ct5-06 not recorded in facility records.

Weight in Kilograms



Haemoglobin

Haemoglobin levels were noted to determine potential for anemia, a condition which can decrease the healing process and increase the risk of skin breakdown.



Skin Assessment

Skin areas of all participants were assessed every Monday, Wednesday and Friday for the duration of six weeks. Areas of skin assessment included arms, back, buttocks/coccyx/sacrum, legs and feet.

Participant ct5-01 developed small skin breakdown on left elbow during the study at the beginning of week 4 and was completely healed by the end of week 5. All other skin areas remained free from skin breakdown.

Participant ct5-02 prior to study was on a cushion size 20”x20” and replaced with the study cushion 18”x18” in size. During the first week of assessments, participant ct5-02 displayed a gradual increase in skin breakdown in coccyx area beginning at a stage 1 and noticing a small break in the skin by the end of week 1. By the first assessment day of week 2, the beginning of a stage 2 skin breakdown was noted. This participant was removed from the trial SRT cushion and replaced with prior cushion. Assessments continued throughout the six week study period which demonstrated improvement in participant ct5-02 skin condition.

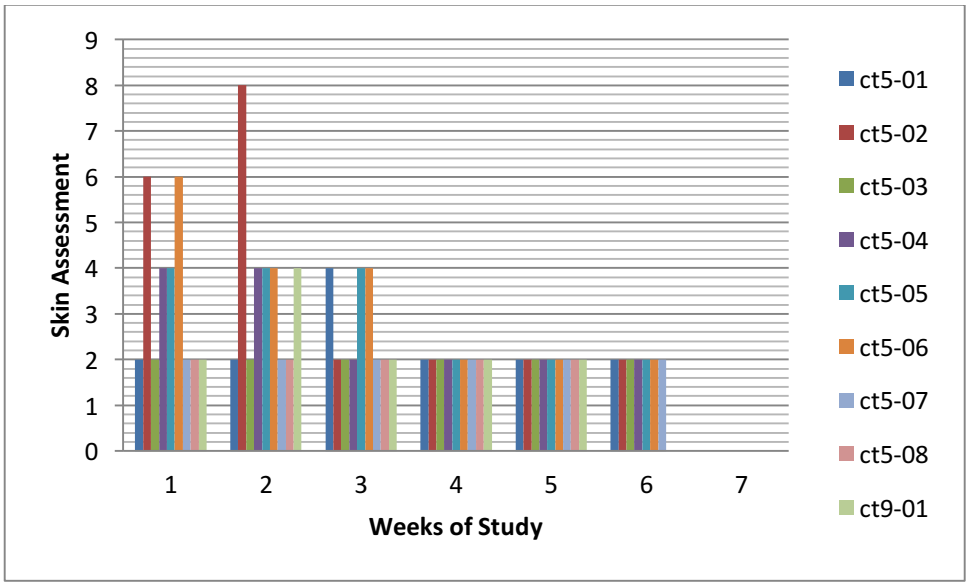
Participant ct5-04 began the study with slight skin redness in the buttocks area with gradual improvement over weeks 1 and 2, demonstrating no skin issues week 3 and throughout rest of study.

Participant ct5-05 began the study with skin redness in buttocks area with gradual improvement over weeks 1 and 2, demonstrating no skin issues week 4 and throughout rest of study.

Participant ct5-06 began the study with considerable skin redness and breakdown in the buttocks area. Each week of assessments demonstrated great skin improvement, starting from a stage 1 skin breakdown week 1, improving to skin redness week 2, slight skin redness week 3 and no skin issues by week 4.

Participant ct9-01 began the study with no issues. Week 2, redness behind the knees was noted. The wheelchair was adjusted to a proper fit for posture and leg movements. No issues with skin week 3 and throughout the rest of the study.

Participants ct5-03, ct5-07 and ct5-08 demonstrated no skin issues throughout entire study.



8= stage 2 skin breakdown with partial thickness loss of dermis
6= stage 1 skin breakdown with intact skin and non-blanchable redness
4= skin redness
2= no skin issues

Pain and Comfort

Participants were assessed and asked every Monday, Wednesday and Friday for the duration of 6 weeks regarding the comfort of the cushion and experience of pain. 6 out of 9 participants were able to verbalize their comfort level. 3 out of nine participants were assessed by visually assessing responses to pain or comfort, such as facial grimacing or moaning.

Participant ct5-01 stated no pain throughout study.
Participant ct5-02 was unable to verbalize pain. Demonstration of facial grimacing and moaning during assessments was noted on December 7, 2011 and December 9, 2011 when skin breakdown was assessed. Participant was removed from the SRT cushion December 12, 2011 due to skin breakdown. No signs of pain or discomfort throughout remainder of study.

Participant ct5-03 was unable to verbalize pain and demonstrated no signs of pain or discomfort throughout the 6 week study.
Participant ct5-04 verbalized no pain or discomfort throughout the 6 week study. Participant verbalized increased comfort using the SRT cushion compared to the previous cushion used.
Participant ct5-05 verbalized no pain or discomfort throughout the 6 week study. Participant verbalized comfort while using the SRT cushion.
Participant ct5-06 was unable to verbalize pain and demonstrated no signs of pain or discomfort throughout the 6 week study.
Participant ct5-07 verbalized no pain or discomfort throughout 6 week study.
Participant ct5-08 verbalized chronic lower lumbar pain prior to commencement of study. Participant verbalized improvement of lower lumbar pain after using the SRT cushion for 4 days. Participant verbalized no pain or discomfort throughout remainder of study. Participant's last assessment was January 6, 2011, due to admission into hospital with a respiratory medical diagnosis.
Participant ct9-01 verbalized irritation of back of knees on December 12, 2011 and December 14, 2011 due to legs rubbing on the cushion during pedalling of wheelchair. Wheelchair adjusted and verbalized no discomfort for the remainder of the study. Participant expressed cushion feeling too firm in density. Participant verbalized discomfort with having skin assessments done so frequently and opted to finish the study early having the last assessment performed on January 2, 2012.

Conclusion

The testing of the SRT cushion using human participants demonstrated 89% having no skin breakdown issues, 38% of those with improvement of skin issues. 1 of the 9 participants demonstrated increased skin breakdown. Overall comfort of the SRT cushion demonstrated the outcome of 1 participant stated the cushion was too firm, 56% verbalized comfort while using the SRT cushion and the other 33% were unable to verbally comment on comfort.

Results have demonstrated the SRT cushion's ability in reducing friction and shear in clients of appropriate weight and mobility for the 18" x 18" cushion. Recommendations for going forward would be to offer a variety of sizes and densities to be client specific.