Pressure Relieving Cushions in Developing Countries

Centre for the Rehabilitation of the Paralysed (CRP)
Bangladesh

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Introduction

1. A case study of a patient with repeated breakdown of pressure sore scars

- Design and trial of a pressure relieving cushion

2. A pilot study of 12 patients using an amended version of this cushion compared with the standard contoured foam cushion

Case Study

- Patient R - 30 year old male
- Date of Injury: May 2004
- Cause of Injury: fall from coconut tree
- Diagnosis: T12 ASIA A
- Mymensingh Medical College Hospital
- Length of stay: 22 days
- Discharged home
- Admitted to CRP 2 months later

Treatment & Condition

Grade 3 on admission Healed scar

Grade 4 on admission. Partial thickness skin graft. Repeated breakdown of scar line

No note on admission Healed scar

Partial thickness skin graft 30.01.05

Grade 4 on admission Partial thickness skin graft Healed scar Immobile

R above knee amputation 28.8.04

Cushion Considerations & Design

1. Current practice
2. Acceptable pressure distribution over bony prominences
3. Low cost
4. Easy to produce
5. Easy to use and maintain
6. Effects of temperature and humidity

→ What about water balloons?

→ Used saline bags refilled with water and sealed

Cushion design for Patient R

Changes to currently used cushion: insertion of saline bags.

- 2x 2" thickness foam Spaces made for saline bags in one layer
- 500ml saline bags under ischial tuberosities
- 800ml saline bags under right stump and left skin graft donor site
- Stronger EVA (plastic like material) on sides of cushion for support

Prone v Left Hip Flexion
17th October 2005

Gradually increasing time spent sitting in a wheelchair.

Remainder of the time was spent on a prone trolley.

Pressure sore and scar formation

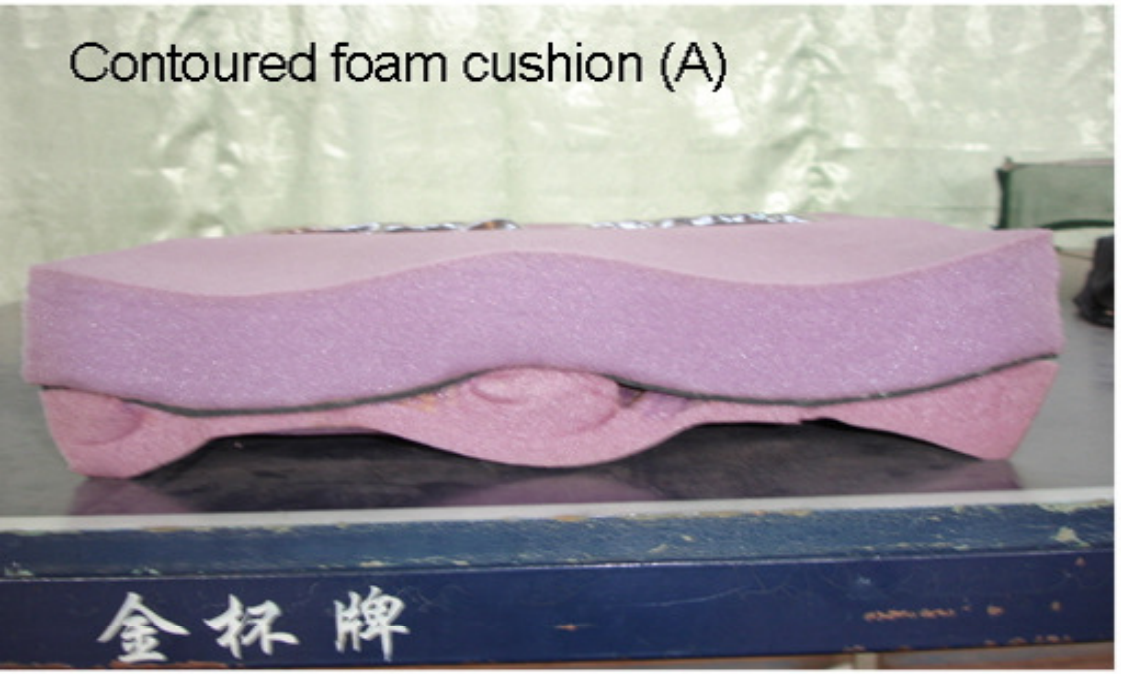
24/10/05

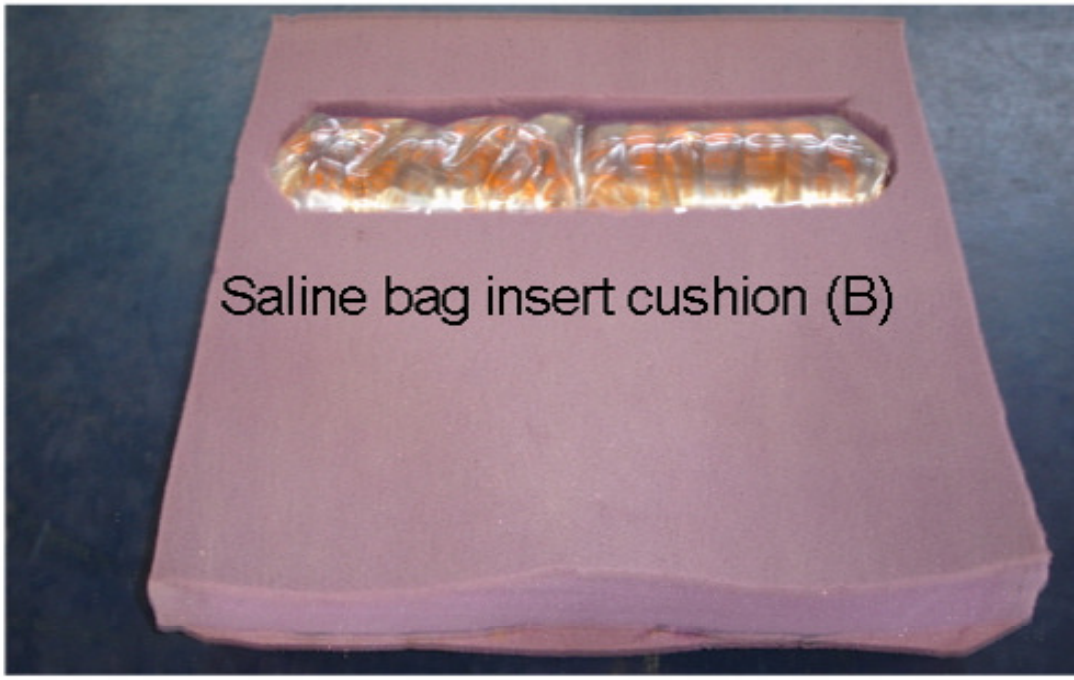
20/11/05

Despite tissue healing Nursing staff advised patient to stop sitting due to apparent 'break down' of scar line

Further suggestions

Pilot study: A Comparison of





- 12 ♂ subjects. Informed consent
- 2 phases, randomised groups, same subject design with cross-over
- Order effect counter balanced with wash-out period between
- Daily skin checks – no areas of redness noted

Study Design

- 4 areas of investigation:
  - Skin temperature
    - just lateral to both ischial tuberosities with a digital thermometer
  - Static stability
    - lean forwards and sideways
  - Pressure measurement
    - Device was a replication of a model designed by the Motivation Charity Trust
  - Subject questionnaire
    - Comfort, usability and preference

Study Results

- Skin temperature
  - Statistically significant
  - Cushion B *at least* 3.3°C cooler than cushion A
- Pressure measurements
  - Statistically significant
  - Pressure higher on cushion B (avg 27.7mmHg) than cushion A (avg 25.1mmHg)
  - Pressures on both were acceptable
- Stability
  - No statistical significance was found between the stability of the forward leaning test or sideways leaning test on the two cushions
- Questionnaire
  - Non-parametric data
  - 8/11 preferred B to A
  - All aware B was heavier than A but only 1 reported this was a problem
  - 8/11 commented that of B felt 'cooler' than A

Discussion

- Temperature
  - 1°C increase in temperature increases the metabolic demands of the cells and oxygen consumption by 10% (Fisher et al 1978)
- Pressure
  - Both cushions were within the safe range for optimal seating 25-55mmHg (Gitter et al 1995).
  - The low pressure readings may have been due to the size of the sensor pad used
- Questionnaire
  - The majority of the patients preferred cushion B (saline bags)

Recommendations

- Introduce sitting to enable healing of greater trochanteric sores in a lengthened position

- Introduce side lying with hip flexion and daily passive movements for all those with sores in the sacral region

Further areas of study

Assessment of:

- A larger cohort
- Use of the saline bag cushions in the community
- Use of saline bag cushions in the hospital
- Increasing the dimensions of the foam cavity for the saline bag inserts
- Longevity of the saline bags and seals

- All cushions made for the project were donated to the CRP

- Thank you

- Any questions?