Prevention of Heel Ulcers
Among Hip Fracture Patients

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PURPOSE
This study was conducted to determine if the introduction of the Foot WAFFLE® Air Cushion (EHOB, Inc., Indianapolis, IN) would reduce the incidence of heel ulcers in the fractured hip patients admitted to Greater Niagara General Hospital (GNGH).

CLINICAL PROBLEM
It is well known that patients with restricted mobility are at significant risk for pressure ulcer development. Patients with hip fractures or hip replacements are subjected to prolonged mobility restrictions during their hospital stay, making them highly susceptible to skin breakdown. A retrospective chart review of hip fracture patients at Greater Niagara General Hospital revealed a 53% incidence of heel ulcer development. The 30 charts reviewed included those patients between 71 and 96 years of age whose length of stay was 5 days or greater during the months of September through December 1996. Sixteen of the 30 developed heel ulcers. It was noted that there was no written preventive program in place at that time, however the data indicated that various heel protective devices were used on some of these patients. The products used were Heel-Free™ (AliMed Inc., Dedham, MA), SPENCO® Foot Pillow (Spenco Medical Corp., Waco, TX), Rolyan Elbow/Heel Protector with Aktion Padding (Smith & Nephew, Germantown, WI), Sheepskin Heel Pad (generic version made by GNGH), pillows, and IV bags.

CURRENT CLINICAL APPROACH
In an attempt to reduce the incidence of heel ulcer development and to standardize products for cost reduction as well, a prevention program was developed to include the implementation of the Foot WAFFLE® Air Cushion for each hip fracture patient. During the months of November 1997 through June 1998, 60 hip fracture patients were admitted. Each utilized the Foot WAFFLE® Air Cushion as per the new prevention program. The patients were between 61 and 92 years of age.

PATIENT OUTCOMES
Among the 60 patients utilizing the Foot WAFFLE® Air Cushion, 0 heel ulcers developed, reducing the incidence to 0%.

RELATED OUTCOMES
In addition to patients with hip fractures, the Foot WAFFLE® Air Cushion was also used during the study for 20 patients with other diagnoses. The Foot WAFFLE® Air Cushion was successful in preventing heel ulcers among various patients who were at high risk with diagnoses including bowel resection, sepsis, skin flap, total knee replacement, below the knee amputation and frail elderly. For those patients who had heel ulcers, (i.e. community acquired, hospital acquired, 2nd degree burns), the Foot WAFFLE® Air Cushion resulted in healed or improved heel pressure ulcers.

CONCLUSIONS
The Foot WAFFLE® Air Cushion was effective in preventing heel ulcers in 100% of hip fracture patients known to be at high risk in this study. A prevention program may eliminate the use of numerous products and increase consistency in usage among staff members, thus promoting better outcomes for the patient and decrease overall costs to the facility. Since the introduction of the Foot WAFFLE® Air Cushion within Greater Niagara General Hospital, it has been included as part of the Critical Path in the Fractured Hip population.

PATIENT AND STAFF COMMENTS

<table>
<thead>
<tr>
<th>POSITIVE</th>
<th>NEGATIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comfortable</td>
<td>Too hot</td>
</tr>
<tr>
<td>Easy to put on</td>
<td>Heel twists while in boot</td>
</tr>
<tr>
<td>(family member)</td>
<td></td>
</tr>
<tr>
<td>Better than the heel</td>
<td>Patients cannot</td>
</tr>
<tr>
<td>posey’s (staff)</td>
<td>turn onto side with</td>
</tr>
<tr>
<td></td>
<td>boots on</td>
</tr>
</tbody>
</table>

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### FRACTURED HIP CRITICAL PATH*

<table>
<thead>
<tr>
<th>DATE</th>
<th>PRE-OP</th>
<th>DAY OF SURGERY</th>
<th>POST OP - DAY 1</th>
<th>POST OP - DAY 2</th>
</tr>
</thead>
</table>
| Consult | • Internist  
• Anesthetist  
• Page QRT / Discharge Planner | • PT, OT, Discharge Planner, Dietician, Home Care Referral | • Hip x-ray today or tomorrow  
• CBC | • Hip x-ray today or tomorrow  
• CBC |
| Test | • Hip X-Ray  
?CXR  
?ECG  
CBC  
electrolytes  
blood sugar | | | |
| Treatment Interventions | • Bedrest  
• IV as ordered  
• Foot WAFFLE® Air Cushion (to be worn at all times while in bed throughout hospital stay)  
• ROHO® Mattress  
• Remove from stretcher board following x-ray | • Pillow between legs for turning  
• Encourage deep breathing and coughing  
• Intake & Output  
• IV as ordered  
• Vital signs as per protocol  
• Hemovac - assess q8h  
• TED’s as ordered  
• Remove q12h x 20 min. at ____ hr.  
• Check circulation q12h  
• Check dressing site | • Pillow between legs for turning  
• Encourage deep breathing and coughing  
• Intake & Output  
• IV as ordered  
• Vital signs as per protocol  
• Remove hemovac at ____ hr.  
• TED’s as ordered  
• Remove q12h x 20 min. at ____ hr.  
• Check circulation q12h  
• Dressing change at ____ hr. as ordered | • Pillow between legs for turning  
• Encourage deep breathing and coughing  
• Intake & Output  
• IV as ordered  
• Vital signs as per protocol  
• Remove hemovac at ____ hr.  
• TED’s as ordered  
• Remove q12h x 20 min. at ____ hr.  
• Check circulation q12h  
• Check suture site  
• Dressing change at ____ hr. as ordered |
| Medication | • Analgesic as ordered  
• Aspiration risk protocol | | | |
| Nutrition | • NPO - Adjust if OR delayed | | | |
| Elimination | • ?Foley | | | |
| Activity | • Bedrest | | | |
| Education | • NSG: Provide booklet to patient/family ("You and your fractured hip")  
☑ Yes ☐ No | | | |
| Discharge Planning | | | | |

*Note: this is an excerpt of the actual 10-day fractured hip critical path.*
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Prior to implementation of a standardized heel protection protocol, 16 out of 30 hip fracture patients developed heel ulcers.

After implementation of a standardized heel protection critical path utilizing the Foot WAFFLE® Air Cushion, 0 out of 60 hip fracture patients developed heel ulcers.