

CLINICAL EVALUATION OF A SELF-REGULATING RELIEF SURFACE

APPRAISAL OF THE ACCUMAX QUANTUM CONVERTIBLE

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ABSTRACT

This clinical evaluation was conducted in order to determine the pressure ulcer stages that can be treated by the AccuMax Quantum Convertible pressure relief surface, and to assess whether patients experienced favorable outcomes. The evaluation took place in several long-term care facilities and a continuing complex care unit in Toronto. 8 patients were placed on the pressure relief surface and monitored over a 1 to 2 month period. Results suggest that this surface can positively influence stages 1-3 pressure ulcers.

PURPOSE

The intent of this evaluation was to determine the treatment range capabilities of the AccuMax Quantum Convertible pressure relief surface and to evaluate whether the mattress can reduce the size and facilitate the healing of patients' pressure ulcers.

INTRODUCTION

In general, healthcare facilities currently use costly Low Air Loss (LAL) surfaces to treat pressure ulcers. Due to greater demands on diminishing health care dollars and the advent of simplified support surface technologies, there is a need to explore the capabilities of an alternate therapeutic relief surface.

Evidence suggests that pressure relieving, LAL treatment surfaces provide a clinical improvement in resolving or controlling pressure ulcers. Case studies also demonstrate faster healing rates and modified ulcer-related pain. These positive findings continue to influence both the decision to use and funding of these therapies in all sectors of health care delivery: Acute care, continuing complex care, long-term care and community care. Many acute and long-term care sites have experienced such positive outcomes that specialty mattresses are routinely rented and sometimes purchased with the aid of government-funded initiatives in certain care sectors.

Clinicians are sensitive to the need to efficiently use scarce health dollars while providing timely and efficient wound management. While LAL surfaces can be a notable factor in a per diem cost analysis, their true value is based on their efficiency in achieving positive outcomes. A significant or complex wound is best served by a proactive treatment approach by means of a low air loss surface with the best evidence to support its use. But, as overall health budgets remain strained, there is the concern that decisions may be refocused to short-term goals, such as dollars saved versus patient and wound outcomes.

As clinicians and facilities are forced to address the cost dilemma, the question also evolves as to whether one particular therapy, the LAL surface, is in fact required in order to facilitate healing of each and every wound. Are there other types of therapy that can achieve similar positive outcomes? Clinicians recognize that one topical treatment approach would not address the needs of every type of wound, or the changing needs of a single wound. The intensity or level of therapy required from a support surface will also vary depending on the wound intensity and the status of the patient.

Selections regarding the type of support surface are based on individual needs and matching the treatment goals to those needs. No single therapy level is needed for all situations, and therefore, a range of therapies should be accessible. Factors that may impact decisions include: the impractical use of LAL surfaces in unique care delivery settings, lack of patient acceptance to the therapy, changing treatment goals and needs, and cases when the wound care needs are moderate, that is, less demanding.

The fastest healing rate may not be the ultimate goal when looking at a chronically ill person. Instead, the provision of comfort, and consistent, effective wound care, with the prevention of reoccurrence, may be the primary goals. These considerations have driven the need to explore other potentially effective bed therapies; other mattress categories include an alternating pressure system with air cells at least 6 inches in height; air filled self-regulating mattresses, and a combination of both of the above. One example of a mattress containing both of these functions is the Accumax Quantum Convertible. The latter is a therapeutic support surface that combines self-regulation with an optional pump that applies alternating pressure technology. 6 zones of air cells are connected by controlled release valves, which allow air exchange and achieve very low interface pressures. The mattress is designed to accommodate patients' positional changes or cases when the head or foot of the bed is adjusted.

METHODOLOGY/STUDY DATA

The Accumax was scrutinized to determine its ability to meet wound needs. Questions considered for this evaluation included:

- Which levels of pressure ulcers could be managed on this self-regulating relief mattress?
- Are there situations that would advise against its use?
- Can it promote healing?
- What are the identifiable benefits of this mattress?

The AccuMax Quantum Convertible relief surface was evaluated in two long-term care facilities, as well as a continuing complex care unit in the Greater Toronto Area. Patients were monitored over a 1-2 month period. Eight patients were placed on the surface. Four patients initially started without the pump, while four began with the pump.

CASE 1

Patient Information:

- 80 year-old female diagnosed with paranoid disorder, anxiety and cognitive decrease

Initial Findings:

- Obese lady moved minimally (in keeping with Braden Scale) and possessed stage 2 and 3 sacral lesions; they were recurrent over a 2-month period
- Overall lesions were 14 cm. in height and width over both buttocks
- Braden Risk score of 12
- Inactivity and moisture scored low

Treatment/Management:

- Patient was placed on the AccuMax pressure relief mattress
- Pump was initially used
- Silicone gel chair cushion was replaced with an air filled variety and a catheter was inserted to control incontinence

Outcomes:

- After a 3-week period, lesions were reduced to 4.4 cm. x 1.5 cm. and fully healed within 5-6 weeks



Patient 1 - Start



Patient 1 - Progress

CASE 2

Patient Information:

- 89 year-old female diagnosed with diabetes and osteoarthritis

Initial Findings:

- Arterial flows were unknown, but considered to be lower, as pulses were faintly palpable
- Steady weight loss over the previous 6 months; dietician had recently began to follow patient.
- Shear and pressure forces affected her heels as she attempted to move herself
- Braden Risk score of 14
- Heel ulcer developed when bed bound in hospital for treatment of cognitive obstructive pulmonary disease and renal failure
- Stage 3 heel ulcer, 3.0 x 2.7 cm. in size with depth of 0.5 cm. after sharp debridement, with the base being white fibrin debris

Treatment/Management:

- Patient was placed on the AccuMax pressure relief mattress
- No pump was used during the trial since the mattress slopes (AccuMax patented Heel Pillow) at foot end.

Outcomes:

- By week 4, size of heel ulcer was 1.7 x 0.6 cm. with a depth of 0.2 cm.
- Base was mostly granulation tissue
- Patient's turning ability was not impaired by the mattress
- No other areas of friction were evident on feet
- Skin was more supple



Patient 2 - Week 4

CASE 3

Patient Information:

- Obese, 78 year-old female diagnosed with lymphedema, and osteoarthritis

Initial Findings:

- Braden Risk score of 14, incontinence moisture being a specially significant problem
- Air flotation mattress previously used
- Use of a special therapeutic cushion for her chair, which she sat on for a period of 6 hours per day
- 6 week history of Stage 2 and 3 sacral lesions, initially 9 x 9 cm. on her right buttock and 4 x 6 cm. on her left, as well as a 1.0 cm. surrounding area, and a 0.7 cm. stage 3 area in gluteal fold

Treatment/Management:

- Patient was placed on the AccuMax pressure relief mattress
- Pump was used for the first two and a half weeks

Outcomes:

- Lesions had essentially closed

Subsequent Situation:

- Admitted to hospital for treatment of cystitis. While at hospital, she had no special bed therapy and developed a new stage 3 lesion on her right buttock

Treatment/Management:

- Upon her return, she was placed, once again, on the AccuMax pressure relief mattress. The pump was once again used, and discontinued after 4 weeks

Outcomes:

- After a 4-week period, her right area, sized 1.6 x 1.5 cm., had granulated to skin level and her gluteal fold ulcer was 0.4 x 0.2 cm. in size



Patient 3 - Start

Patient 3 - Progress

CASE 4

Patient Information:

- 85 year-old female diagnosed with diabetes and vascular disease

Initial Findings:

- Medial aspect of her foot was necrotic with black and moist gangrene
- Minimally able to move on her own
- Use of a standard mattress
- High Braden Risk Score of 11

Treatment/Management:

- Placed on an Accumax mattress in order to prevent further breakdown
- No pump was used
- Patient remained in bed

Note: Intensive therapy (Surgery or IV antibiotic) was refused by her family.
Clinical goal became palliation.

Outcomes:

- No new lateral foot or trunk ulcers developed
 - Gangrenous areas were kept stable for 6 weeks prior to her death
 - Patient was kept comfortable
 - The mattress kept her stable and addressed the goals of care
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CASE 5

Patient Information:

- 70 year-old palliative patient diagnosed with cancer without skin breakdown

Initial Findings:

- Braden Risk score of 12

Treatment/Management:

- Facility protocol required initiation of a low air loss surface for preventive management; as an alternative, the Accumax mattress was introduced and maintained until patient was transferred
- Pump was used to increase comfort
- Remained on mattress over a 2 ½ week period

Outcomes:

- Patient felt comfortable
- The skin was kept intact

CASE 6

Patient Information:

- Very obese, 65 year-old woman, diagnosed with post-tuberculous meningitis
- Experienced complications following a nephrectomy
- Increased complexity of care needs

Initial Findings:

- Braden Risk score of 12
- Recurrent stage 4 ischial ulcer had been present for 1 year; 1.0 cm. externally in size with up to 3.0 cm deep tunneling

Treatment/Management:

- Patient was placed on the AccuMax pressure relief mattress
- No pump was used

Outcomes:

- Patient was withdrawn after 10 days and replaced on a low air loss surface due to increased wound and patient needs
 - Ulcer tunneling increased a further 1.5 cm.
 - Unresolved underlying issues of sinus and osteomyelitis believed to be factors
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CASE 7

Patient Information:

- Severely contracted 52 year-old man, diagnosed with a brain tumor and seizure disorder

Initial Findings:

- Friction and pressure due to severe limb contractures, spasticity and tremors were major care factors
- Braden Risk score of 14
- Pressure was aggravated by his cachexic frame
- Tunneling bilateral trochanteric ulcer was presented as clean

Treatment/Management:

- Patient was placed on the AccuMax pressure relief mattress
- No pump was used
- Mattress was used for 2 weeks

Outcomes:

- At time of initiation to the mattress, no pump was used, with a plan to introduce it later in care and compare responses between without and with pump therapy.
- Withdrawn from the evaluation; his wounds were too high a risk to be suitable for the mattress' pressure relieving capabilities
- Placed onto a low air loss surface
- General status continued to decline and patient died within a month

CASE 8

Patient Information:

- 80 year-old man waiting to be placed in a nursing home subsequent to rehydration and stabilization of renal complications in an acute care setting

Initial Findings:

- Immobility, multiple medical conditions, and poor nutritional intake
- Braden Risk score of 14
- Hospital criteria would have had him placed on a Low Air Loss surface

Treatment/Management:

- He was placed on an AccuMax mattress for 6 weeks while waiting for a low air loss surface to be available
- The pump was initiated at start of the mattress therapy, the decision being based on total immobility.

Outcomes:

- Skin remained intact
- The goal of prevention was achieved

FINDINGS AND CONCLUSION

After having examined each of these cases, results suggest that the AccuMax mattress could be used to treat minimal to moderate depths (stages 1 to 3) of pressure ulcers. As mentioned in the previous cases, three patients had to be withdrawn from the evaluation within the initial 2 weeks, since their medical conditions proved unsuitable for the therapy. These patients possessing moderately high Braden Risk levels had long histories of deep stage 4 wounds. Their statuses worsened, requiring upgrading of therapy to a LAL surface to meet the higher patient needs. One person was reclassified as palliative and died shortly after, one had a higher risk level and status than first determined, and the third person was found to have unresolved deep wound issues that included a sinus and probable osteomyelitis that needed correction.

Observations also indicate that this level of therapy succeeded in keeping skin intact, even in situations when the general patient status was poor. For example, patient #2 was kept free of further deterioration from pressure, even once her activity became fully bed bound. In all cases, the patients evidenced feeling secure by less restlessness when placed on the surface. 4 of the patients could verbalize increased comfort and had no impairment of their current level of mobility. Furthermore, staff found bed transfers to be unhampered and simpler, since no mattress preparation was required.

Rental costs of LAL surfaces represent hundreds of dollars per unit monthly. One facility estimated it had saved those costs during the evaluation and anticipated that the ongoing use of the surface could save significant dollars by eliminating the need to use an intense level of prevention therapy in low or moderate risk patients. Their palliative patients were kept comfortable and free of skin breakdowns, even though the facility's past experience had involved skin breakdown if a LAL surface was omitted.

When used, the pump remained quiet and vibration free at all times. Occasionally, it was beneficial to initiate treatment together with the use of the pump, discontinuing its use afterwards, in keeping with a step-down approach to therapy as healing progresses. This method allowed for a rapid evaluation of ongoing suitability of the surface. Once the pump was discontinued, no signs of deterioration emerged, and the healing was sustained. The pump is recommended as an adjunct to therapy when the patient is immobile or in situations when the stability of the patient or wound is unclear. Pump use can also be beneficial to increase patient comfort, in cases when the wound is not yet stabilized such as during debridement, in situations when the Braden risk level has changed, relative to a new extent or stage of the wound, and in cases of increased immobility and weakness due to other developing medical conditions. Ultimately, the decision as to whether to use the pump remains with the attending clinician who regularly assesses the patient. As a caregiver gains familiarity with the product, these selection decisions will be enhanced. Facilities may develop algorithms for use of the pump.

There was an insufficient number of people that took part in this evaluation to enable more conclusive findings on the effectiveness of the pump. It would be wise to look at larger numbers of participants in order to form definitive recommendations.

It is important that the clinician remain vigilant; the patient should be regularly evaluated for status changes that may indicate the need for treatment adjustments, which may involve the decision to alter the surface currently used for therapy.

In conclusion, the Accumax Quantum Convertible met performance requirements and should fill a viable place in the treatment and prevention of pressure ulcers from Stages 1 to 3 at a reasonable cost. It is a complement to the surfaces that a facility should have available to meet a variety of wound and patient needs.

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About the author:

Patti Barton works as an Enterostomal Therapy Nurse in the Greater Toronto Area. As a skin and wound consultant, her practice focus includes a number of long term care facilities, acute care and the community. This gives her a unique breadth of knowledge of issues regarding the health care delivery system.

In addition to her clinical and educational role, her involvements have included being an advisor on hospital skin care committees and participating in regional and facility skin care committees.

Patti has co-authored two widely referenced management guideline books on pressure and leg ulcers, oncology wounds, and a chapter in the 3rd edition of Chronic Wound Care. She has also been a co-developer alongside 3 Expert Panels of RNAO Best Practice Guidelines publications: Pressure ulcer prevention, pressure ulcer management, and venous ulcer management. Furthermore, she has lectured extensively locally, nationally and internationally.

Patti is a strong champion for best practices and nursing development. She works extensively with all members of the interdisciplinary team for best patient outcomes. Other professional activities include CAET on Professional Standards Committee, contributor to CAWC, WCET and as a board member CAET and a Community Health Centre.

Patti strongly believes that preventive management plays a major role in helping to transform health care delivery outcomes.