



## **Evaluation of Pressure Reducing Support Surfaces for the Treatment and Prevention of Pressure Ulcers and Promoting Comfort**

Summary of 2009 study by:  
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### **Executive Summary**

KAP MEDICAL KAP & OEM products, K-0 Overlay, K-1 Mattress, K-2 Mattress, K-3 Mattress, and K-4 Mattress were used with 32 patients in 228 bed skilled nursing facility. The study results demonstrated that the KAP & OEM pressure relieving surfaces help in achieving skin care goals, whether they be preventative, healing or palliative depending on the patient's current medical status.

### **Background:**

#### Wounds: Different types, different causes, common goals

Wounds and pressure ulcers are painful and potentially life-threatening complications in persons of altered states of health. They can be surgical, complicating (pressure ulcers), or traumatic. Their affects are well-known and documented throughout the world, causing discomfort and slowing or preventing a patient in returning to his or her baseline state of health.

Wound treatments are as varied as the wound causes. Utilization of a Pressure Reducing Support Surface should reduce pressure, friction, shearing while promoting comfort, dryness, and cooling. Pressure ulcer prevention was one of Joint Commission's 2008 National Patient Safety Goals and continues as a prominent focus among healthcare issues.

All healthcare facilities and providers are faced with the same challenge: provide the best possible outcome for their clients for the best economic value. A quality PRSS, along with knowledgeable application and timely service can be a major contributor in wound prevention, wound healing, and patient comfort.

#### Purpose of Study

Did the KAP MEDICAL KAP & OEM Power Therapeutic Support Surfaces utilized on the patient promote the desired outcomes of wound healing, wound prevention, and patient comfort?

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Data collection and analysis can be easily biased or skewed based upon inadequate measurements that are not individualized for a patient's unique situation. Many case studies of this type measure few parameters, reporting data that may not always be relevant in light of individual patient circumstances and therefore, not necessarily reflective of the effectiveness of a product in achieving a particular outcome. Utilizing a higher number of parameters, along with more deeply researched, detailed, and individualized assessments will allow for a more valid and realistic evaluation of KAP MEDICAL KAP & OEM Therapeutic Pressure Reducing Support Surfaces in this study.

### Relevancy of Data

Often data noted in case studies, when analyzed without the benefit of a patient's individual context, can be misinterpreted and therefore be misleading in either a positive or negative way.

Outcomes are often derived from absolute numbers which can be significant in some patients and insignificant in others. For example, whether or not weight loss is significant depends on evaluating multiple pieces of data, involving several disciplines, within the medical record. Weight loss in an obese patient, due to increased physical activity and food intake control while in the facility can be beneficial to their overall health. In other words, a "10% wt. loss indicator over the previous 60 days" from a facility's MDS sheet can be misinterpreted to be a negative nutritional outcome, when actually it is a *positive* one.

Another example may be the development of a Stage 2 wound to their leg while in the facility. The patient may have obtained the wound while trying to push their own wheelchair, an activity they now have the strength to do since their sleep and thus their nutrition and protein intake improved once placed on the Pressure Reducing Support Surface. The wound development was not as a result of the ineffectiveness of the Pressure Reducing Support Surface, but rather a consequence and accident due to the *effectiveness* of it.

Correctly collecting and interpreting the data involves assessing the patient as a whole. One must analyze the patient's individual health status and their responses to interventions in order to determine whether or not the product assisted towards the primary goals of wound prevention, healing, and patient comfort

### Risk Factors in Pressure Ulcer Healing

Risk factors for skin breakdown are commonly described using a Braden Scale Score. This scale measures impairment in mobility, elimination, nutrition, sensory perception, skin moisture, activity level, and the potential for friction and shear. Even mild impairment in any of these areas usually indicates the need for a Pressure Reducing Support Surface to assist in the prevention of skin breakdown or to facilitate wound healing and to promote comfort.

Abnormal lab values are significant components in determining impaired nutrition which increases the likelihood of skin breakdown and delays wound healing. Low protein status is a major factor, and indicates malnutrition. It is sometimes a very difficult factor to correct. A patient may not be capable of sufficient protein intake to promote new cell growth for healing. Insufficient intake is frequently seen in patients with swallowing problems, refusal to eat or very poor intake. The higher the Stage (Pressure Ulcer Stages 3 and 4, for example), the more protein per kilogram of weight is required. This can mean almost double normal protein requirements are needed. Elevated blood glucose, a sign of poorly -controlled diabetes, is another culprit in the delayed healing or non-healing scenario. Bacteria feed off the extra sugar and circulation to all parts of the body is decreased due to blood vessel damage caused by elevated blood sugars.

To correct the myriad patient conditions that complicate healing takes time. Sometimes, the conditions can only be partially corrected, and sometimes, not at all. A Pressure Relieving Support Surface is an easy and economical intervention in promoting comfort in the patient with high risk for skin breakdown. The costs of treating a wound or other complication caused by increased friction, pressure, or discomfort is easily outweighed by the cost of prevention.

### Hospice Environment

Challenges in today's skilled nursing facilities are complex, diverse, and a direct result of the level of care and intervention desired by the patient and/or family. A patient's care plan is developed, implemented, and evaluated by a team comprised of the patient (if capable), and the family (if able and interested), as well as healthcare providers involved in the patient's care.

The patient and/or family may elect to limit or discontinue any interventions at anytime. The most influential of these interventions to this case study were discontinuation of laboratory monitoring, antibiotic therapies, surgical wound debridements, and dietary supplementations. Mostly, these changes were made as patients or their families decided to move the plan of care to "comfort measures only" as medical interventions became progressively unsuccessful in light of patients' deteriorating conditions. Numerous complicating factors from multiple disease processes combine to produce unrecoverable states of health. Under these circumstances, it may no longer be realistic to prevent skin breakdown or heal a wound. Importantly in this situation, the pressure relieving support surface can still achieve a desirable purpose in promoting comfort at the end of life.

### Specific Nursing Home Concerns

Speed of healing can also be a misleading comparison. Not all patients heal at a predictable or steady rate. This is especially prevalent in the population of a nursing home. Nursing home patient health varies widely. There are those that are in relatively

good health for their age or condition, but need short-term rehab for recovery from a fracture, major acute illness, or surgery. There are other patients who have been very debilitated for quite some time, or were residents of another facility, or are being discharged from the hospital for further treatment to the nursing home or rehab facility.

A patient's slow rate of healing may be perfectly acceptable given their particular low protein levels, infection, or high blood sugar levels.

### **Methodology**

#### **Study Duration:**

Six months

#### **Study Setting:**

228 bed skilled nursing facility with onsite ARNP under physician supervision providing and directing all wound care.

#### **Population:**

All patients placed on a *KAP MEDICAL KAP & OEM* pressure reducing support surfaces during the study time period were included.

36 patients (13% of facility residents) were evaluated for inclusion in this case study. 32 (89%) out of the 36 patients were included; 4 were not included related to lack of access to the medical records due to re-hospitalization or death shortly after admission.

The case study included 11 males and 21 females, ranging in age from 62 years to 102 years. Major diagnoses included cardiovascular disease, CHF (congestive heart failure), HTN (hypertension), cerebral vascular accidents (stroke), dysphagia (swallowing difficulties), diabetes, pneumonia, COPD, anemia, peripheral vascular disease, pressure ulcers, amputations, MRSA, cellulites, advanced dementia or Alzheimer's disease, psychosis, osteoporosis, degenerative joint disease, hip fractures, Parkinson's disease, cataracts, blindness, kidney disease, and bladder or bowel incontinence.

All wounds Stages I-IV were included since Stage I wounds have a significant likelihood of progression to a higher stage in the compromised, debilitated patient. Utilization of pressure relieving support surface therapy early in wound management can speed wound healing and minimize wound progression. Therefore, assessing all wounds is a more useful indication of the effectiveness of the pressure relieving support surface. In a 2004 Resident Survey for Nursing Home Abuse and Neglect Report, 14% of this facility's population experienced pressure ulcers

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Equipment Tested:

KAP MEDICAL KAP & OEM Pressure Reducing Support Surfaces utilized were:

- 25 (79%) K-4 True Low Air Loss with Alternating Pressure mattress replacement systems (22) and (3) K-3 True Low Air Loss mattress replacement systems.
- 2 (6%) K-0, 8” Alternating Pressure Mattress replacement system with On-Demand Low Air Loss.
- 3 (9%) K-2 10” mattress 50 LPM power unit Alternating Pressure with On-Demand Low Air Loss mattress replacement systems
- 2 (6%) K-1 10” mattress 50 LPM power unit Alternating Pressure mattress replacement systems.

The length of time on the KAP MEDICAL KAP & OEM products ranged from 7 days to 6 months. Some patients had been on the same brand medical support surface before the study time period.

Control Group:

Traditional control groups (patients identified as high risk for skin breakdown that were not placed on a pressure reducing support surface) were also not practical for the purpose of this study since all patients in this facility that were identified as a high risk for skin breakdown were placed on a pressure relieving support surface by the nurse practitioner.

Patients who had been on a pressure relieving support surface, but were no longer using the surface and remained in the facility were followed for the duration of the study to monitor for wound re-emergence or development of new wounds.

Data Acquisition

Complete facility medical records reviewed on all study patients including: all H&Ps (History & Physical), physician orders and progress notes, nurses notes, aide notes, Physical, Occupational, & Speech Therapy notes, Dietician assessments and notes, laboratory reports, wound care notes, and recent medical records from other facilities (hospitals, wound care centers, etc.), MDS (Material Data Set) and RAP (Resident Assessment Profile) sheets, MARs (Medication Administration Records), and weight flowsheets.

Parameters Measured and Assessed:

A higher number of parameters were measured in this study in order to gain a more realistic, individualized measurement of KAP MEDICAL KAP & OEM support surface effectiveness.

- Patient age, sex
- Major diagnoses, secondary diagnoses
- All physician orders, changes in levels of care, initiation of comfort measures only care, hospice care, withdrawals of care, ineligibility for additional wound care treatment due to co-morbidities
- Wound(s) absence/presence, hospital/outside current facility acquired, facility acquired, wound (s) type, location, stage, description
- Wound treatments, changes in wound treatments
- Wound healing progression or deterioration
- Medications relevant to wound healing or impacting Braden Scale risk factors
- Medication allergies (relevant to wound healing/risk factor treatments)
- Weight. gain/loss amount, %, positive or negative influence to wound healing, diet, and average % intake.
- Vital signs as monitored.
- Laboratory results relevant to wound healing or impacting Braden Scale risk factors; monitoring frequency of key laboratory studies relevant to wounds
- Date of KAP MEDICAL KAP & OEM initiation, make and model used, initial settings, and dates of setting adjustments
- Documentation of patient comfort/discomfort/pain, either verbal and/or non-verbal
- Hospital readmission dates, diagnoses
- DNR status

## **Findings and Conclusions**

### **Documentation**

Medical record reviews demonstrated 96% completeness in documentation of study parameters. Some documentation, such as patient comfort levels, frequently required verification from a variety of sources.

Diagnoses, both major and secondary, were identified in all records. Wound identification, assessment, treatment, and progression documentation were determined to be timely and appropriate for the needs of the patient in all reviewed records. The ARNP wound care documentation was thorough and contained sufficient information to determine if a wound was improving or deteriorating.

Medications and med allergies were documented and antibiotics, supplements, and meds impacting Braden Scale criteria met standards of care and were adjusted as the patients' needs changed.

Weights were measured on admission and then on a monthly basis. Weight flow sheets were occasionally marked as "resident refused". Nutritional evaluations were made by Registered Dietitians, and diet adjustments according to patients' needs, wishes, and

tolerances were well documented. Dietary supplements of protein, vitamins, and minerals were addressed as well.

Laboratory values relevant to protein status, infection, and healing, such as serum albumin levels, serum protein levels, Vitamin B levels, CBC (complete blood cell count reflective of infection, anemia, etc.), and glucose levels were timely and consistently measured in accordance with the level of care ordered or intervention desired by the patient and/or family.

Additional diagnostic testing such chest x-rays, and Doppler blood flow studies in affected extremities were also performed on a timely basis, with appropriate interventions ordered based upon those results.

Admission mental states and reassessments were documented in accordance with Medicaid/Medicare guidelines. Mild confusion, various levels of dementia, including disruptive behavior, memory deficits, self-care deficits, and poor safety awareness often contributed to a breakdown in skin integrity and contributed to or complicated wound care in this study population as well.

Medical records documentation demonstrated medical and nursing efforts to mediate or diminish the impact of the varied mental states to the extent possible and reflected realistic goals for the patients' evolving states of health. Sometimes these goals were not to return to baseline health, but to return to an increased level of participation in their care.

Some patients opted for comfort measures only. They refused advanced treatments, re-hospitalizations, and sometimes refused antibiotic therapies. However, these patients still needed and desired skilled nursing and comfort measures in their end-of-life care.

## **Results**

Thirty two (32) patients were placed on KAP MEDICAL KAP & OEM Pressure Relieving Support Surface mattresses due to their high risk for skin breakdown.

- 11 patients of the study group (34%) had Stage I-IV wounds.
- 3 of the 11 patients (27%) experienced study facility-acquired wounds (9% of study population), 1 of which was not pressure related.

Of the 11 patients with wounds on the KAP MEDICAL KAP & OEM pressure relieving support surfaces,

- 8 ( 74 %) maintained at a Stage I-II level with no wound progression and subsequently healed without re-emergence.
- 3 (27%) had Stage III-IV ulcers.

- One of the 3 had his wound reduced to a minimal size and was discharged home.
- Two of the 3 had ongoing ulcers at the end of the study time period.
  - They also had significant and multiple co-morbidities such as advanced dementia, resistance to care, bowel and bladder incontinence, very low protein levels, and ineligibility for surgical wound debridement due cardiac conditions.

Of the 11 study patients with resolved wounds, 8 or 72% healed within a 7 day to 40 day time frame, the average length of wound healing time being 18 days.

30 out of the 32 study patients had documentation of patient comfort and lack of verbal and non-verbal pain indicators. During the 6 month study timeframe, 29 (90%) of the study group experienced no weight loss or actual (desired) weight gain. The other 3 residents lost no more than 5 lbs. while on an KAP MEDICAL KAP & OEM Pressure Relieving Support Surface.

Of the 32 study population, only 2 patients (6%) of the study group on an KAP MEDICAL KAP & OEM pressure relieving support surface showed no wound resolution at the end of the study.

In conclusion, wound care involving the use of an KAP MEDICAL KAP & OEM Pressure Relieving Support Surface can be preventative, healing, and palliative. An effective Pressure Relieving Support Surface can promote healing and a return to baseline health status. For some, it can support the needs of the dying by focusing on alleviating symptoms.

Many skilled nursing facility residents have multiple disease processes in various states of progression. Natural degenerative processes often speed up in the presence of these co-morbidities, and predispose the patient to wounds and discomfort. Rapidly advancing technology can prolong a patient's journey through increased complex chronic disease processes. The more complex and debilitating the experience is, the more likely a patient is to develop complications such as wounds.

The KAP MEDICAL KAP & OEM pressure Relieving Support Surfaces utilized in this study demonstrated the ability to facilitate progress and achievement of skin care goals of the clients they served, be it prevention, healing, comfort or all three.

My documents/Evaluation of Pressure Reducing Support Surfaces for the Treatment and Prevention of Pressure Ulcers and Promoting Comfort

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