

Reducing Nasal Pressure Ulcers With an Alternative Taping Device

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Patients admitted to the hospital are vulnerable to untoward events such as mechanical pressure ulcers. The National Pressure Ulcer Advisory Panel (NPUAP, 2009) determined pressure ulcers on mucous membranes cannot be staged because the tissue does not allow distinction. Medical devices linked to pressure ulcer development include endotracheal tubes, noninvasive positive pressure ventilation masks, cervical collars, clip-on pulse oximetry, nasal cannulas, and nasogastric tubes (NGTs). A retrospective study by Black and co-authors (2010) examined prevalence of pressure ulcers in 2,178 patients; persons with a medical device were two to four times more likely to develop a pressure ulcer of any kind, thereby causing potential for increased pain, infection, length of stay, and the need for medical intervention. Numerous risk factors for pressure ulcer formation were identified; however, no differentiation was made between risks for mechanical device-related (MDR) and traditional pressure ulcers.

Literature Review

Keywords searched were *nasal* and *nare pressure ulcers*. CINAHL and MEDLINE were the databases searched from 1995 to 2010 internationally. Very little data have been reported in the literature regarding nasal pressure ulcers (NPU) due to NGTs. Only one animal study involving pigs (Huang, Tseng, Lee, Yeh, & Lai, 2009) examined nasotracheal intubation's effects on the nares. The researchers found dermal pads prevent pressure ulcers on the nare. An animal model clinical application of nasotracheal intubation for

Mucosal tissues are vulnerable to nasal pressure ulcers (NPU) secondary to nasogastric tubes, and can cause hospital-associated complications and increased length of stay. The findings of this study suggest a commercially available device significantly reduces NPU and is more adherent compared to conventional adhesive taping.

ventilator management for maxillofacial surgery studied the incidence of nasal pressure sores. Four pigs received nasotracheal intubation. The protective efficacy of the cushioning materials prevented pressure ulcers on the protected side whereas there was severe tissue necrosis documented on the control side.

Two procedural references described proper care of patients with a NGT (Best, 2007; McHale-Wiegard, 2011). A human study examined MDR pressure ulcers (Black et al., 2010). These authors found mechanical pressure ulcers in adults are responsible for over one-third of the incidence of pressure ulcers. Numerous risk factors were identified that predispose a patient to development of mechanical pressure ulcers, but none differentiated the mechanical pressure ulcer over traditional pressure ulcers. This is clinically relevant for two reasons. Begin-

ning in October 2008, the Centers for Medicare & Medicaid Services no longer reimbursed health care facilities for eight "reasonably preventable" conditions; one of these is hospital-acquired pressure ulcers (U.S. Department of Health and Human Services, 2008). In addition, concern exists about the number of noticeable scabs and NPUs that are hospital acquired. This is a significant problem considering hospitals need to maintain certain outcomes to be satisfactorily reimbursed and maintain patient outcomes. Although hospitals currently are reimbursed for NPUs because they are mucosal, this may not be the case in the future (McHugh, Van Dyke, Osei-Anto, & Haque, 2011). Cost is not the only issue of concern. Standard of care is to promote skin integrity. If a patient develops any pressure ulcers while in the hospital, the skin integrity is compromised.

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Background

Mechanical pressure ulcers are a health care problem that has been underreported in the literature. In particular, mucosal tissues are vulnerable to nasal pressure ulcers (NPU) secondary to nasogastric tubes (NGTs), and can cause hospital-associated complications and increased length of stay.

Purpose

The purpose of this study was to compare a commercially available device to the conventional adhesive taping for NGTs and incidence of NPUs.

Methods

A convenience sample of medical and surgical patients was enrolled to determine whether a commercially available device holds the NGT securely and reduces the incidence of NPU compared to conventional adhesive tape. Patients were excluded if they had oily skin, excessive diaphoresis, or oral gastric tubes. Descriptive statistics and chi-square analyses were used to identify differences between the commercially available device and the conventional adhesive tape groups.

Results

Among the 205 patients enrolled, significantly fewer NPUs were found using the commercially available device compared to the conventional adhesive tape ($p=0.0001$). With respect to adhesiveness, the commercially available device was 96% adherent compared to the conventional adhesive tape at 91%. Although results were not statistically different, they are clinically meaningful.

Conclusion

Findings suggested the commercially available device significantly reduces NPUs and is more adherent compared to conventional adhesive taping in the study population.

tric tube stabilization located during the literature review. The focus of the article was three methods of securement of the nasogastric tube. A convenience sample of 103 patients with nasogastric tubes taped with pink tape, clear tape, and a butterfly showed superior securement of 100 hours with the pink tape.

Research Question and Purpose

Data from the electronic medical records of two surgical units in a 676-bed Midwestern university medical center identified 43 NPUs in a 15-month period. Nursing staff members expressed concern about the frequency of visible scabs and ulcers on patients' nares, often noticeable days after the NGT had been removed. Staff posed the following research question: "How can pressure ulcers on the nares of adult patients with NGTs be prevented?" Therefore, the purpose of this study was to determine if a commercially available device would reduce the incidence of NPUs compared to traditional adhesive tape. Adhesiveness and ease of use also were evaluated.

Methods**Design**

This descriptive study used a non-randomized convenience sample to determine the incidence of NPUs when securing the NGT with a commercially available device compared to conventional adhesive tape. The study received institutional review board (IRB) approval at the study site.

Sample and Setting

A convenience sample of medical-surgical patients with NGTs was eligible for inclusion in the study. Many patients receive NGTs, so a convenience sample was used to either have the commercial device or adhesive tape applied. Patients were enrolled at the time of NGT insertion either in the operating room or on the unit. Any patient with an NGT without exclusion criteria was enrolled. Patients were excluded if

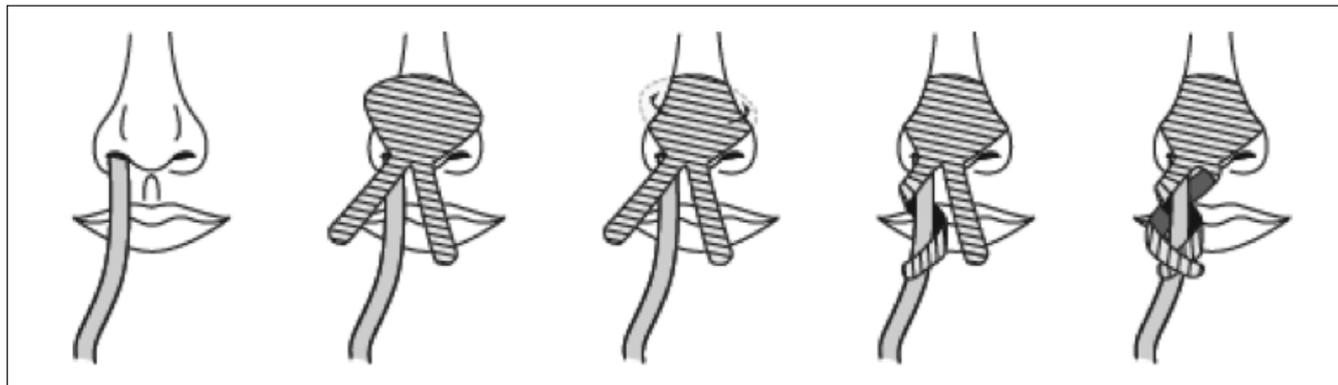
The NPUAP (2010) has a position statement regarding mucosal pressure ulcers. This information is vital to the assessment and documentation of nasal pressure ulcers by nurses. Mucosal pressure ulcers are ulcers found on the mucous membranes with a history of a medical device use at the ulcer location. The NPUs, which are considered mucosal ulcers, are not staged like other pressure ulcers and therefore are labeled as mucosal pressure ulcers without a stage identified (NPUAP, 2010). Regardless of reimbursement issues, nurses need to be proactive in preventing pressure ulcers.

Baharestani and colleagues (2007) noted little research is available on which to base guidelines for pediatric and neonatal clinical practice. Most practice guidelines for the neonatal and pediatric populations

are based on adult practice. They addressed existing gaps in the literature so appropriate guidelines can be established. Among neonatal and pediatric patients, more than 50% of pressure ulcers were related to equipment and devices (Baharestani, 2007). Frequent assessment of the skin under these devices was recommended to help identify the incidence of pressure ulcers in the neonatal and pediatric population. According to the Glamorgan Scale, equipment, objects, or a hard surface pressing or rubbing on skin were risk factors that contributed to pressure ulcers among neonatal and pediatric patients.

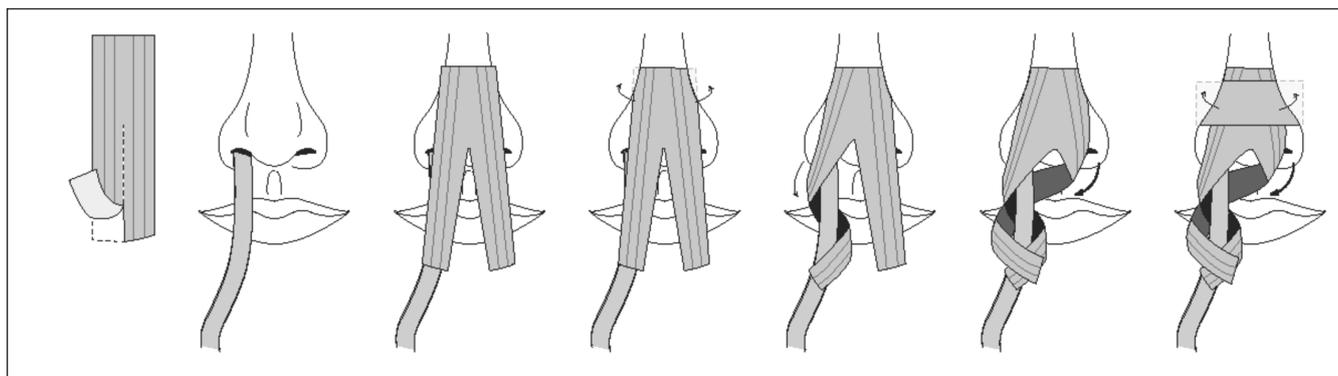
Nasogastric tube stabilization in adults was studied by Burns and associates (1995). Although this study is dated, it represents the only other reference concerning nasogas-

FIGURE 1.
Dale Nasogastric Tube Holder®



Graphic Illustration by Kristina Burokas

FIGURE 2.
Adhesive Tape



Graphic Illustration by Kristina Burokas

they had oily skin, excessive diaphoresis, or had oral gastric tubes. A written patient consent was waived by the IRB because the commercially available holder is a device approved by the U.S. Food and Drug Administration (2000) and is used commonly as part of standard care. However, this device had not been used widely within the study facility because adhesive tape was the standard for many years.

Procedures

Selection of Commercially Available Device

Although many commercial NGT holders are available, the device used

in this study was the Dale Nasogastric Tube Holder® (2010) (Dale Medical Products, Inc.; Plainville, MA). This device, which is shaped like the nose, is made of woven beige fabric that stretches to conform to any shape (see Figure 1). A starter tab wraps around the NGT to allow easy removal from the tube when the NGT is discontinued. No residue remains on the nose or tube when the device is removed.

Conventional Adhesive Tape

The standard method used in the study hospital was conventional adhesive tape that is split vertically and spiraled around the NGT, with one strip left over right and the other right over left. Another piece of

adhesive tape was placed over the bridge of the nose to secure the spirals additionally (see Figure 2).

Protocol

Patients were placed either in the Dale nasogastric tube holder group (comparison) or conventional adhesive group (control) based on the method used to secure the device during tube placement. For the post-operative population studied, the standard was to use adhesive tape in the operating room. The Dale holder devices were placed on the research board in the hall outside the operating rooms, and were readily available on the general medical-surgical units if an NGT was inserted. A data collection form was placed on patient

charts for staff to indicate method of securement, when the securement device was discontinued, if a pressure ulcer formed, and overall adhesiveness. Adhesiveness was determined by adherence to the NGT and nose. The tube was secured at the time of insertion. The forms were purple so they would not be mistaken as part of the medical record. Nurses were educated by the principal investigator (PI) concerning data collection form completion, and the PI's telephone number was on the form in the event of questions. Nurses were reminded regularly to complete forms to avoid missing data; graduate nursing students who also assisted with the process were educated by the PI.

If the NGT was inserted in the operating room, the purple data collection form accompanied the patient to the nursing unit. The PI examined the patient directly for pressure ulcer formation and, if the patient was discharged, reviewed documentation in the medical record. Daily attention to the study patients was most helpful to ensure reliability of data. Direct-care nurses were the link to the PI.

Sample Size and Statistical Considerations

To determine the sample size, the investigator considered confidence intervals for estimated pressure ulcer rates. A sample size of 200 was identified because it allowed detection of a 2% change in the rate of pressure ulcers; this is the lowest rate of improvement with a perceptible impact on patient satisfaction (Moore, Johanssen, & van Etten, 2013). Demographic variables were tabulated using descriptive statistics or frequency distributions where appropriate. Chi-square tests were used for categorical data, and the *t*-test was used for continuous data to identify differences between the Dale adhesive and conventional adhesive tape groups. All analyses were performed using SPSS version 16.0 (SPSS, Chicago, IL).

Results

Sample Characteristics

The sample of 205 patients was

TABLE 1.
Sample Characteristics
(N=185)

	Adhesive Tape	Dale Holder
Female	44 (56%)	63 (59%)
Age	61 ± 13.9	59 ± 16.1
Surgical Unit	82	105
Medical Unit	1	10

Notes:

Values expressed as Mean ± SD or %
t-test and chi-square showed no significant differences between groups.
20 participants were missing these data.

TABLE 2.
Incidence of Pressure Ulcer

	Yes	No	Total	<i>p</i> Value*
Adhesive Tape	19 (23%)	64 (77%)	83	
Dale Holder	5 (4%)	107 (96%)	112	
	24	171	195	<i>p</i> <0.0001

Note: Number (%); * chi-square test

TABLE 3.
Adhesiveness of Dale Holder vs. Adhesive Tape

	Adherent	Nonadherent	Total	<i>p</i> Value*
Adhesive Tape	73 (91%)	7 (8%)	80	
Dale Holder	107 (96%)	5 (4%)	112	
	180	12	192	<i>p</i> =0.227

Note: Number (%); * chi-square test

primarily female. Average age was 59.9 and the majority of the sample was surgical patients (see Table 1). All patients had a 14 or 16 French Salem sump nasogastric tube inserted by an anesthesiology staff member or surgical or medical resident. The tube was secured at the time of insertion.

Pressure Ulcers and Adhesiveness

Significantly fewer NPUs occurred in patients using the Dale holder (4%, *n*=5) compared to those using the conventional adhesive tape (23%, *n*=19; *p*<0.0001) (see Table 2). With respect to adhesiveness, the Dale holder was 96% (*n*=107) adherent compared to the adhesive tape at 91% (*n*=73) (see Table 3). Although

this difference was not statistically significant, it is clinically meaningful. Adhesiveness is specific to patient conditions and wear time, and an important consideration for a nurse to evaluate.

Study Limitations

In this study, researchers evaluated only one commercial product; use of other products also should be studied. Adhesiveness was a secondary consideration in setting a standard wear time for the Dale Nasogastric Tube Holder, but adhesive tape is not the only method for NGT securement. Consideration of alternative methods should be made. In addition, further investiga-

tion is warranted using a randomized design and expanding to other patient populations.

Recommendations for Future Research

Further research needs to identify other strategies to decrease the incidence of nasal pressure ulcers from NGTs. Although elimination of nares pressure ulcers was not achieved in this study, hydrocolloid should be studied in humans as in the animal model (Huang et al., 2009).

Nursing Implications

Adhesion and pressure ulcer incidence were improved with the Dale device. This challenged the current standard of practice in the study facility. Prior to the study, pressure ulcers on nares were not reported as unusual occurrences. A scab seen on the nose where the NGT was placed was not correlated to the NGT. Daily assessment of the nares tissue adjacent to the NGT is necessary. The Dale holder allows the nurse to untape the tube and assess the skin under the tape. In addition, this holder, when taped slightly off center, allows the nurse to center the NGT in the nares. Conventional adhesive tape is not removed easily to allow the nurse to assess the patient's underlying skin. The Dale device was designed to last 3 days before replacement; in the study hospital, the tube often is removed by that time or a few days later. Judicious nursing skin assessment and centering of the tube in the nares can prevent pressure ulcers from occurring (Jaul, 2011).

Conclusion

Significantly fewer pressure ulcers occurred when using a commercially available device compared to traditional adhesive tape. These preliminary data suggest the Dale Nasogastric Tube Holder offers an alternative approach for securing NGTs and reducing NPUs in medical-surgical patients. Nursing assessment and intervention are keys to recognition of a potential nasal pressure ulcer,

and prompt treatment is needed to avert potentially serious consequences for the patient. **MSN**

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