

# Cost Effective Care without Clinical Compromise: Incorporating the Dolphin Fluid Immersion Simulation® Mattress System into the Postoperative Care of Patients undergoing Myocutaneous Flaps

Keum-Lee Mayes, RN, WCC, Supervisor, Wound/Dialysis Services, Sparrow Specialty Hospital, Lansing, MI  
Julia Melendez, RN, BSN, JD, CWOCN, National Clinical Director, Joerns Healthcare

## Problem

Myocutaneous flaps are the treatment of choice in full thickness pressure ulcers on the trunk or pelvis that have not healed with prior treatment. A comprehensive postoperative care plan is critical in rehabilitation of these patients and ultimate flap healing.

Patients undergoing myocutaneous flap surgery are at risk of flap failure if pressure or shearing forces are endured at the flap site. Therapeutic support surfaces are an important part of the patient's care plan in the immediate post-operative period, when the flap is most vulnerable for failure.

To avoid the injurious effects of pressure and shear, the pre-intervention flap care protocol at Sparrow Specialty Hospital provided that the patient be flat in an air-fluidized bed system for six weeks, with minimal increase in head of bed (HOB) elevation, to provide optimal pressure redistribution and prevent tissue ischemia that could negatively impact the new flap. Although clinical outcomes achieved in the post-surgical flap patients were excellent with this bed system, it was expensive for the facility to rent, and had a number of other logistical drawbacks, including the need to move and store the usual hospital bed frame and mattress during the course of the patient's stay in the facility.

## Objective and Methods

In an effort to decrease the facility's costs without compromising clinical outcomes for these patients, the facility introduced the Dolphin Fluid Immersion Simulation (FIS) mattress system into the postoperative flap protocol. Under the Dolphin FIS protocol, the flap incision is assessed daily, and the HOB elevated 10 - 20° for meals post-operatively as soon as 24 - 48 hours. The HOB is gradually increased to 30° after 48 hours post-op if the incision is free of complications. After two weeks at 30° is tolerated, and flap healing continues to progress, the HOB can then be raised to 45° in week 3. By week 4 post-op, the patient is placed in a sitting position for meals, and is out of bed for 15 minute increments by week five. Discharge planning occurs during week six, with the patient advancing to being out of bed for 1 - 2 hour increments. All other components of the protocol, including nutritional support, were unchanged.

Clinical outcomes for these patients and costs of this new therapy were tracked over the next year to determine if the Dolphin FIS system would become a permanent intervention in the postoperative care plan for surgical flap patients.

## Outcomes

As evidenced by the photographs below, which are examples of 2 of the patients followed in the study, the post-flap incisions continued to heal well and excellent outcomes were achieved under the Dolphin FIS protocol.

The facility has also experienced additional positive clinical effects related to replacing the air fluidized system with the Dolphin FIS in post-flap patients. Prior to using the Dolphin FIS system with these patients, acquired pneumonia was a concern due to the need for prolonged immobility in a recumbent position. Since implementing the Dolphin, there have been no occurrences of acquired pneumonia in these patients. With the air fluidized system, patients expressed complaints that the system made them feel uncomfortably warm, but the patients experienced no such discomfort with the Dolphin FIS.

In summary, patients achieved equivalent flap outcomes under the new protocol as previously, and did not suffer adverse post-operative complications related to changing to the new Dolphin FIS mattress system.



## Cost Savings

Provision of the essential technology to support the needs of clinically complex patients can significantly burden the facility's bottom line. Use of the air fluidized bed system with post-operative flap patients, while viewed as necessary to achieve the desired clinical goals for these patients, placed a financial burden on the facility. Storage of the usual hospital bed system while the air-fluidized system was in use was also a challenge.

The total costs experienced with the Dolphin FIS mattress during the study period were \$26,249, while using the air fluidized system over the same time period would have cost \$58,900. With introduction of the Dolphin FIS to the post-operative protocol, the patients continued to achieve comparable clinical outcomes to the air-fluidized system, while the facility saved over 50% in costs.

Although not measured in actual dollars, there were other costs associated with using the air fluidized system, which were eliminated with the Dolphin FIS mattress system. The Dolphin FIS mattress is used directly on the facility's standard hospital bed frame, so there was no need to move the frame out of the patient room and store it during the course of treatment. The mattress control unit was easy to use and the clinician's ability to provide direct care to the patient was enhanced over the prior system.

## Conclusions

Implementation of the Dolphin FIS mattress system into the post-operative care protocol for patients in the facility status post myocutaneous flap procedures led to incisional healing, successful flap closure, and improved patient comfort post-operatively during the study period.

Based on the clinical outcomes and ease of clinician use, as well as the significant cost savings documented, the Dolphin FIS mattress system has become the surface of choice in the facility's postoperative flap protocol. The plan is to move toward expanding use of the Dolphin FIS into other facilities in the system.



Dolphin FIS Mattress System

## About Sparrow Specialty Hospital

Sparrow Specialty Hospital is a 36-bed long-term acute care hospital that specializes in patients requiring a 25-day or longer length of stay in a hospital setting. Sparrow Specialty Hospital is fully accredited by the Healthcare Facilities Accreditation Program, an independent body that accredits and certifies health care organizations and programs.

Long-term acute care hospitals are designed for patients who need intense, extended care following treatment at a traditional acute care facility, outpatient care setting or home setting. These patients usually have medically complex or multiple medical conditions.



Sparrow is proud to be selected as Michigan's first Mayo Clinic Care Network member.

## References

Body interface point pressure point testing conducted on a Microsolo 900T (Biologics™ Dolphin) low airloss mattress and wheelchair cushion. February 12, 1997. Testing conducted by: Maxim Technologies, Twin City Testing, St. Paul, MN.

Economides, N.G., Skoutakis, V.A., Carter, C.A., and Smith, V.H. (1995). Evaluation of the effectiveness of two support surfaces following myocutaneous flap surgery. *Advances in Wound Care*. 8(1): 49-53.

Evers, L.H., Bhavsar, D., Broder, K., Breithaupt, A., and Bodor, R. (2009). Preserving skin microcirculation with "Dolphin" bed technology. *Journal of Plastic, Reconstructive & Aesthetic Surgery*. 62(6): 831S-832S.

Kohanzadeh, S., Breithaupt, A., Bondarchuk, A., Bhavsar, D., Evers, L., Broder, K., Dobke, M., and Bodor, R. (2009). Effectiveness of the Biologics™ Dolphin bed as a tool to improve tissue perfusion in points of compression. Division of Plastic Surgery, V.A. LaJolla Medical Center, and University of California, San Diego, CA.

Ochs, R.F., Horn, S.D., van Rijswijk, L., Pietsch, C., and Smout, R.J. (2005). Comparison of air-fluidized therapy with other support surfaces used to treat pressure ulcers in nursing home residents. *Ostomy-Wound Management*. 51(2): 38-68.

Safeguarding against nursing never events: best practices for preventing pressure ulcers and patient falls. September 25, 2009. Author: The Advisory Board Company, Nursing Executive Center, Washington, DC.

Poster presented at Wild on Wounds National Conference, September 12 - 15, 2012, Las Vegas, NV.  
Correspondence: Keum-Lee.Mayes@sparrowspecialty.org.

Dolphin Fluid Immersion Simulation Mattress System is a trademark of Joerns Healthcare, LLC.

This poster was supported by a grant from Joerns Healthcare and Universal Hospital Services, Inc.