

Dolphin Fluid Immersion Therapy Provided Improved Pain Management & Significant Analgesia Reduction, Key to a Patient's Recovery

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CASE STUDY INTRODUCTION

Patient D, a 79-year-old female, was admitted to hospital with acute kidney injury, hyperkalaemia and infected pressure ulcers. Her past medical history included:

- ❗ Atrial Fibrillation
- ❗ Gout
- ❗ Osteoarthritis
- ❗ Type 2 diabetes mellitus
- ❗ Congestive cardiac failure
- ❗ L4-L5 spinal stenosis

CLINICAL CHALLENGES

Patient D had infected pressure ulcers on admission, which were extremely vulnerable to further breakdown. Other areas, particularly bony prominences which were intact or had moisture-associated skin damage (MASD), were also at risk. These risks were compounded by both her acute and long-term medical conditions.

A PURPOSE-T risk assessment scored RED (high risk), and the following skin damage was noted:

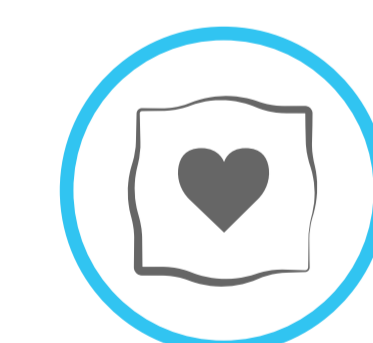
- **Category IV pressure ulcer to left calf, requiring daily dressings.**
- **Category III pressure ulcer to right calf, requiring daily dressings.**
- **Category I pressure ulcer to sacrum.**
- **MASD to sacrum and natal cleft.**

Patient D was bedbound and in a lot of pain during dressing changes and repositioning. Analgesia was given to try to reduce this, but its effects were limited, with regular dosing and top-ups required. Her reluctance to reposition, due to actual and anticipated pain and discomfort, added further risk to her skin integrity. It also increased the risks of further complications of immobility and deconditioning. Pain and discomfort were also affecting Patient D's ability to sleep, with detrimental physical and psychological consequences.

'STEP UP' TO DOLPHIN THERAPY – RATIONALE AND PATIENT OBJECTIVES

Dolphin Therapy (**Figure 1**) is a unique reactive support surface that simulates a fluid environment. Currently, immersion (fluid simulation/air fluidised) is one of the only viable 'step up' options from a dynamic air mattress. Originally developed by the United States Navy to keep dolphins buoyant and healthy during extended periods out-of-water, it provides immersion and envelopment of the patient. This helps to maximise the contact surface area and minimise pressure, which in turn minimises vascular occlusion¹ and helps to prevent tissue ischaemia.²

On admission, Patient D was placed on a traditional dynamic alternating pressure mattress, but after TVN assessment, a decision was made to 'step up' to Dolphin Therapy for two main reasons:



Improve pain management, comfort, and sleep:

The movement of the dynamic mattress, repositioning and dressing changes were all causing pain and discomfort, which in turn was affecting sleep



Pressure offloading:

The patient had several highly vulnerable areas of skin, in particular her mid calves. There was also concern that the dynamic mattress cells could potentially cause further skin damage through pressure when they were at the most inflated part of the alternating pressure cycle. Dolphin Therapy was utilised with the aims of both treating existing and preventing new skin damage.



Figure 1. Dolphin Fluid Immersion Simulation Therapy

- REFERENCES**
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 2. Mayes KL et al (2012). Cost effective care without clinical compromise: Incorporating the Dolphin Fluid Immersion Simulation Mattress System into the postoperative care of patients undergoing myocutaneous flaps. Poster presented at Wild on Wounds National Conference, September 12 - 15, 2012, Las Vegas, NV.
 3. Medstrom (2023). The effectiveness of Dolphin Therapy fluid immersion simulation support surface. Outcomes for over 3,000 highly complex patients. Available at: <https://www.medstrom.com/wp-content/uploads/2023/03/SM1153-Dolphin-Therapy-3000-Patient-Outcomes-Report-Rev1-Mar-2023-1.pdf> (Accessed online 12/06/2023).

*By Day 4, Oramorph was only needed for dressing changes, so the frequency had reduced from six times per day to once a day.

**By Day 7, the Codeine dose was halved.

OUTCOMES

Patient D was nursed on the Dolphin Therapy immersion surface for 47 days. Over that time, the outcomes described below were achieved.

Pain Management, Comfort and Sleep:

Patient D found Dolphin Therapy a much more comfortable surface to lie and move on than her previous dynamic mattress. As a result, her analgesia was able to be reduced considerably (**Figure 2**):

Drug	Dose – Day 1	Dose – Day 4	Dose – Day 7
Codeine	30mg QDS	30mg QDS	15mg QDS**
Oramorph	5–10mg 4 hourly	PRN*	PRN*
Paracetamol	1g QDS	1g QDS	1g QDS

Figure 2. Analgesia reduction following Dolphin Therapy commencement

Pressure Offloading:

At the end of Dolphin Therapy placement, Patient D's skin had shown significant improvement:



The Category III and IV pressure ulcers to the calves had improved significantly, with the dressing frequency reduced from daily to twice weekly.



The Category I pressure ulcer to the sacrum, and MASD to the sacrum and natal cleft had resolved.



No new areas of skin damage had developed.

All objectives for Patient D were achieved; her skin had improved overall, with improving and healed areas, and no further/new breakdown. Her pain management had improved quickly and significantly, evidenced by the reduction in analgesia requirements within the first week of immersion therapy. This all allowed her to sleep better, which would ultimately help with healing and recovery. **At the end of Dolphin Therapy placement for Patient D, the TVN stated:**



“Dolphin Therapy helped to achieve a significant and fast reduction in pain, which in turn allowed Patient D's analgesia prescription to be decreased. This gave her a better quality of sleep, which I believe contributed to skin healing.”

DISCUSSION

Stepping up to immersion therapy was the best clinical solution for Patient D. Given how vulnerable she was, the outcomes achieved were excellent. In addition to Patient D confirming **she was more comfortable**, this was also clearly demonstrated by 50% and 83% reductions in Codeine and Oramorph requirements respectively, within the first week of immersion therapy.

A reduction in analgesia, particularly opioids, has a number of benefits. In Patient D's case, she ceased to need Oramorph during the night, which, combined with an overall reduction in pain, allowed her to sleep better with fewer interruptions. She got into a more normal sleep pattern and was less drowsy during the day, which staff believed helped with healing and recovery. Also, from a healthcare economics perspective, a decrease in opioid analgesia can deliver potentially substantial cost savings.

Pain management was a key objective for Patient D, as it played a pivotal role in achieving the rest of her objectives. In many patients, mitigating pain involves increasing analgesia, but for Patient D, immersion therapy decreased her pain to a level where pain medication was able to be significantly reduced. **Patient D stated:**



“I feel like my outlook for the future has got better because I'm more comfortable and sleeping better. I can see my skin improving now, and that has helped me feel better in myself.”