

LUMEX® 900 S SERIES – DEEP BREATHING EXERCISE (DBE) THERAPY

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Clinical Education Paper/ Evidence-informed clinical article: Lumex® 900 S Series – Deep Breathing Exercise (DBE) Therapy

Overview

Patients confined to bed for prolonged periods are at increased risk of reduced lung expansion, impaired circulation, and pressure-related tissue injury. The Lumex® 900 S Series Low Air Loss Mattress incorporates Deep Breathing Exercise (DBE) therapy to support respiratory mechanics, tissue perfusion, and pressure redistribution.

How DBE Therapy Works

In standard mode, the mattress allows immersion to redistribute pressure. During DBE mode, the system temporarily inflates for approximately 90 seconds, gently elevating the patient and improving posture. This change supports chest expansion and deeper breathing before returning to a low-pressure therapeutic state.

Clinical Evidence and Physiologic Rationale

Pressure injury formation is strongly associated with sustained interface pressures that exceed capillary perfusion thresholds, leading to reduced blood flow and tissue ischemia.

Clinical research has shown:

- Tissue damage risk increases as sustained pressures approach approximately **50–60 mmHg**
- Pressure redistribution is essential to maintain adequate tissue perfusion

Support surfaces are therefore designed to:

- Redistribute pressure across a larger surface area
- Reduce peak interface pressures
- Prevent capillary occlusion and tissue breakdown

Clinical Evidence and Physiologic Rationale

Body position influences pulmonary mechanics by affecting diaphragm excursion, lung volumes, and chest wall expansion. Clinical studies have demonstrated that more upright or supported postures can improve respiratory efficiency, inspiratory capacity, and overall lung expansion, particularly in patients with limited mobility. Deep breathing further supports normal physiologic circulation through the respiratory pump mechanism, whereby decreases in

intrathoracic pressure during inspiration

facilitate venous return to the heart.

Pressure mapping demonstrates significant reductions in interface pressure.

Results are based on manufacturer testing conducted under controlled conditions and may vary based on patient characteristics and clinical use.

Pressure Redistribution and Supporting Data (Figure 1).

Body Area	Foam Pressure (mmHg)	Reduction (%)
Head	100	63%
Shoulders	92	66%
Buttocks	82	45–57%

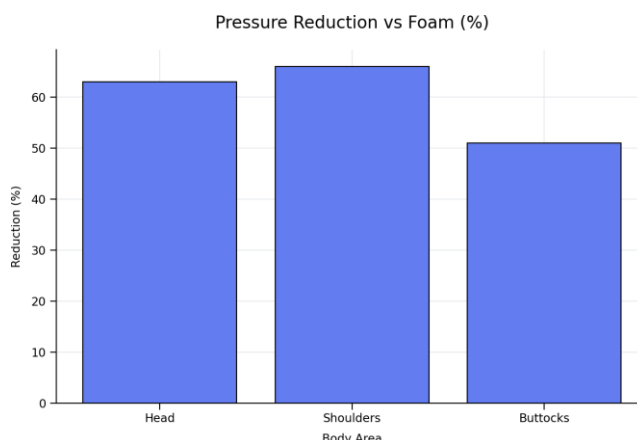
Figure 1. Pressure reduction compared to standard foam surfaces. Data adapted from Graham-Field product testing documentation.

Reducing interface pressure helps prevent capillary occlusion and supports tissue perfusion, which is essential for maintaining tissue viability and preventing pressure injuries.

DBE Therapy Flow

NORMAL → DBE ACTIVATED → INFLATE (~90 sec) → POSTURE CHANGE → DEEP BREATHING → RETURN TO THERAPY

Pressure Reduction Visualization



Integration of DBE and Pressure Redistribution

The Lumex® 900 S Series combines pressure redistribution with dynamic DBE therapy. While pressure management supports localized perfusion, DBE contributes to improved breathing mechanics and may indirectly support circulation. Together, these effects provide a more comprehensive physiological support system.

Clinical Benefits

- Supports deeper breathing and lung expansion
- Enhances oxygen delivery to tissues
- Improves tissue perfusion and circulation
- Supports pressure injury prevention strategies
- Reduces complications associated with prolonged immobility

Conclusion

DBE therapy is not a replacement for respiratory interventions but serves as a complementary support feature within the patient support surface environment. By integrating pressure redistribution with controlled positional changes, the Lumex® 900 S Series supports both tissue protection and respiratory function in immobile patients. While DBE therapy is not intended to diagnose, treat, or cure respiratory conditions, it

may help promote lung expansion, encourage deeper breathing, and support overall patient comfort as part of a comprehensive care plan. DBE can improve overall circulation by enhancing oxygen delivery to tissues which can indirectly benefit the healing of pressure sores and support respiratory health for patients that have reduced mobility. These features provide an evidence-informed approach to addressing the challenges associated with prolonged bed rest and immobility

References

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Manufacturer Technical Documentation

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