Statement of the problem
Poor support surface choices can be clinically and financially devastating to both patient and facility, yet the variety of surfaces available can make the process overwhelming. This educational piece will identify endothelial damage as the true culprit in tissue necrosis and show how to choose support surfaces that prevent endothelial damage and facilitate homeostasis.

Rationale
Support surfaces are key factors in pressure ulcer management and prevention. Unfortunately surface choices are often based upon prior experience, verbal suggestion, or written materials, rather than a true understanding of the therapy or its effect on the soft tissue. Understanding the pathophysiology behind pressure ulcer development will assist caregivers in choosing support surfaces that facilitate the body's ability to maintain a stable internal environment (homeostasis).

Methodology
A literature review was performed to examine the key mechanical and physiologic factors relating to tissue necrosis and pressure ulcer development. The sources studied were internationally renowned textbooks of medical physiology, pathophysiology, chemistry, and physics.

Results
Homeostasis is significantly impaired when blood vessels are crimped by gradient pressure and shear. This mechanical stress causes a change in blood flow from laminar to turbulent, which increases the risk for endothelial damage. Endothelial damage is the key factor leading to tissue necrosis. The laws of physics show that flotation therapy provides volumetric support (non-gradient pressure) of soft tissue.

Terminology
**Homeostasis**- The body’s ability to maintain relatively stable internal conditions even though the outside world changes continuously.

**Autoregulation**- The ability of tissue to regulate its own blood flow.

**Automaticity**- The reciprocal interplay of the 75-100 trillion cells of the body working for the benefit of all.

**Endothelium**- Simple squamous epithelial cells that line the blood vessels.

**EFFECTS OF A SUPPORT SURFACE ON HOMEOSTASIS**
*Keep It Simply Scientific*

James G. Spahn, MD, FACS; EHOB, Inc., Indianapolis, IN;
Christie Duncan, BSN, RN, CWOCN; EHOB, Inc., Indianapolis, IN.

References
EFFECTS OF A SUPPORT SURFACE ON HOMEOSTASIS

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Pressure Ulcer Development Cascade

Gradient Pressure & Shear (Mechanical Stress)
Soft Tissue Distortion (Strain)
Change in capillary flow (Decreased Velocity, Laminar to Turbulent)
Endothelial Damage (Microtrauma secondary to pelting by platelets and neutrophils)
Cells activated (Endothelium, platelets and neutrophils)
Oxygen Free Radicals and enzymes released
Endothelial Cell Injury
Increased Capillary Permeability (due to damage)
Fluids leak out of vessel
Stasis
Coagulation
Ischemia
Decreased oxygen causes anaerobic metabolism
Anoxia (Too much lactic acid)
Cell Injury/Death
Chamotaxis
Margination
Diapedesis
Extravasation
Phagocytosis
Interstitial Edema
Decreased Perfusion

Inflammatory Response

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