BIOTECHmedical LLC™

PRODUCT BACKGROUND

Viscoelastic Expanded Urethane vs. Conventional Foam Mattresses

The Tempur-Med® Bed, takes viscoelastic to new levels for better reduction of pressure-related medical problems

Tempur-Med materials are constructed of viscoelastic expanded urethane (VE), which combine both the elastic and viscous support properties of solid and fluid bedding materials. Viscoelastic describes the property of a substance to both resist flow or change of shape (viscous) and to return to its original shape after being forced to change (elastic). While other more conventional foams boast the same properties, studies[1] have shown that pressure reduction obtained with the TEMPUR® material was more than *four times* as much as that achieved with conventional foam. TEMPUR VE is denser at 5.34 lbs/ft^3 than other foam surfaces. Memory foam tops out at 4 lbs/ft^3, while typical quality foam lists at only 1.89 lbs/ft^3.

Increasing Contact Area Reduces Pressure

Contact pressure is determined by measuring at the point where the patient's body touches the support surface. Two factors affect pressure: the portion of the patient's weight involved at this location and the area of contact. Since the patient's weight cannot easily be altered, increasing the area of contact is the most effective method of reducing pressure and thus pressure-related medical problems.

Types of Deformation

Two types of mattress deformation exist, elastic and fluid. Elastic solids deform like traditional bedspring mattresses. Weight is applied, the spring is compressed until sufficient return pressure develops, and the deformation stops. The elastic solid remains compressed until the weight is removed, at which point the material resumes its original shape. These materials have excellent shape retention and return pressure properties. However, elastic solids do not conform to body shape, increasing pressure on a few select points of the body.

The second type of deformation is viscous deformation, based on the physics of fluids. Viscous materials have the consistency of common fluids like honey. These materials have excellent conforming qualities, but offer inadequate support and zero shape retention. When pressure is removed, the material remains compressed.

A Combination Approach

Tempur-Med uses a combination of elastic and fluid deformations to work in tandem in a single solid mattress. To be effective, the mattress needs to be sufficiently elastic to develop return pressure to be supportive while reducing contact pressure by increasing the contact area. Studies have shown that the viscoelastic expanded urethane found in Tempur-Med products provides better support, increases contact area, maintains original shape, and reduces return pressure on the body better than conventional foam.

The VE Advantage

The higher density TEMPUR viscoelastic allows for a 14 percent increase in contact area when compared to conventional foam, which reduces pressure points on sensitive body parts and bony prominences. Both mattresses take advantage of elastic and fluid deformation, but the difference lies in the deformation. The elastic behavior of both VE and conventional foam are similar. However, once deformation begins it is the viscous behavior of VE that separates it from conventional foam. VE allows the prominent body part to sink deeper, reducing the lateral stretching or "hammock effect," and reducing the level pressure. VE cushions by increasing contact area. Conventional foam creates a hammock in the material, decreasing contact area and increasing pressure on sensitive body vulnerabilities.

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[1]Flam, E. PhD, PE, & Raab, L. RPh, CCP. (2005). Support Surfaces: Viscoelastic Expanded Urethane versus Conventional Foam. *Extended Care Product News, 97*(1), 29 – 34.