medstrom solo®

Umbilical Height

What height should a bed achieve to reduce back injuries?

Impact of torso posture on lower back injuries

- Tasks involving flexed torso postures have a high incidence of low back injuries.[1]
- Maduri and Wilson's study found that "extreme curvatures may occur not only at extreme torso flexion (typically greater than 90° of torso flexion), but also throughout the range of torso motion. The sensory mechanisms at these extreme lumbar angles can be thought of as the safety catch of the lumbar stabilisation system.
- When the lumbar spine reaches the extremes of lumbar angle, the spinal ligaments, intervertebral discs and facet joints not only experience greater loading but could also be damaged by such loading".
- Changes in lumbosacral angles may be influential in increasing the risk of lower back pain.[2]

Pheasant's study on human dimensions

Dimension	Male (measurements in mm)			Female (measurements in mm)		
	5th %ile	50th %ile	95th %ile	5th %ile	50th %ile	95th %ile
1. Stature	1625	1740	1855	1505	1610	1710
2. Eye height	1515	1630	1745	1405	1505	1610
3. Shoulder height	1315	1425	1535	1215	1310	1405
4. Elbow height	1005	1090	1180	930	1005	1085
5. Hip height	**840**	**920**	**1000**	**740**	**810**	**885**

Using Pheasant's average hip/umbilical height for the male and female population, we are able to ascertain that:

- A bed that has a high height of **70cm (+ 14cm mattress = 84cm)** will allow **a little over 50% of the female nursing population** to work at a height that will reduce repetitive risk of back injury to them while providing nursing interventions to patients in that bed.
- A bed that has a high height of over **83cm (+14cm mattress = 97cm)** it will protect **100% of the female nursing population** and reduce repetitive risk of back injury to them while providing nursing interventions to patients in that bed.

1) Maduri A, Wilson S E.2009. Lumbar position sense with extreme lumbar angle. Journal of electromyography and kinesiology : official journal of the International Society of Electrophysiological Kinesiology, 19(4), 607–613. doi:10.1016/j.jelekin.2008.03.004

2) Caglayan et al (2014). Effects of Lumbosacral Angles on Development of Low Back Pain. Journal of Musculoskeletal Pain. 22. 10.3109/10582452.2014.907855.

3) Pheasant S, Haslegrave C M. 2005. Bodyspace: Anthropometry, Ergonomics and the Design of Work

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