Safety Flooring Has the Potential to Reduce Injuries from Falls

Falls are the most common – and costliest – cause of injury in elderly people.

Around 10% of falls will result in a fracture, 1-2% in a hip fracture. Whereas we have proven strategies to prevent falls in older community dwellers (exercise programmes, home safety assessment and modification, multifactorial approaches) [1], preventing falls and consequent injuries in residential care and in hospitals is proving more difficult [2]. Recently, impact absorbent flooring has been suggested as a long term approach to preventing the injuries resulting from falls, particularly in rest homes and hospitals.

In a UK study, carpeted floors were associated with the lowest number of hip fractures resulting from a fall by older people in residential care [3], however softer surfaces increase body sway [4]. We investigated the impact attenuation, and explored stability and gait patterns in older women when standing and walking on three different types of flooring.

We used a force transducer to compare impact attenuation of 1) vinyl, 2) carpet with a commercial grade underlay, and 3) newly invented Kradal™, a thin panel of composite polyurethane materials [5]. Kradal™ is designed to absorb energy on impact; to be soft when you fall onto it, yet firm for standing and walking. Mean peak acceleration on impact with Kradal™ was 71.5% lower than a concrete surface, 64.2% lower than vinyl, and 36.2% lower than carpet with underlay. That is, Kradal™ absorbed a further 36.2% more energy on impact than carpet with underlay.

We also measured the balance of 40 women aged 75 and older standing on the three types of flooring using a force platform, and their gait patterns when walking on the three surfaces using a 12-camera motion analysis system [5]. There were no differences in standing balance measures on the three surfaces or in gait patterns when walking on the three materials.

In other words, older women were as stable when standing and walking on Kradal™ flooring compared with the two standard flooring materials. We concluded that this exciting new technology has the potential to reduce fractures in elderly people without affecting balance.

Impact absorbing flooring has the advantage of eliminating the problem of individual compliance [6], and standards can be set in legislation. It is non-intrusive and requires one time installation. A cost effectiveness evaluation of Kradal™ suggested it is more cost effective than supplying hip protectors and has the potential to be cost saving [7]. Field trials are required to investigate this new approach to preventing injury further.

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