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Title: Ease of walking on low impact flooring

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Introduction:
Falls are a common occurrence in hospital within the elderly population. Between 35-42% result in injury, however only 1-2% result in fractures. Current fall protection strategies are limited in their effectiveness therefore injury minimisation is what is commonly used. Hip protectors are one solution for patients with a high falls risk, however compliance is an issue, along with only protecting when the patient falls onto their side. A second option is the Low Impact Flooring (LIF) as it targets the whole population and can minimise the risk of injury by absorbing the impact. Current research on low impact flooring has been done in healthy elderly patients so this study looked at the ease of walking in patients with motor or proprioceptive deficits.

Aim:
The aim of this study is to explore differences in gait (walking) on these floors in patients with stroke, with Parkinson's, and a control group. We hypothesise that older patients with stroke or Parkinson's disease will not have any differences in their walking on the low impact floors compared to standard hospital flooring.

Method:
Each participant underwent a total of six "timed up and go" tests (TUG test), twice on each of three flooring surfaces, two low impact flooring options (Omnisports Excel and SmartCells) and standard vinyl control. The TUG test involves the patient sitting in a chair, standing, walking 3m and returning back and sitting down in the chair while being timed. Patients were randomised to the order the floors were tested and to minimise fatigue were given rest between trials and different floors. Patients were video recorded for more in-depth gait analysis. Participants were also asked to comment on how stable and comfortable they found the different surfaces using a visual analogue scale.

Results:
14 patients participated. 11 of these were stroke and 3 were Parkinson's patients (9 male, 5 female). We had a response rate of 37.8% of patients approached. This does not include those patients who were discharged before they could be approached. The average "Timed Up and Go" test for all patients were Omnisports Excel floor (19.1 seconds (range 9.2-32.7 seconds)), SmartCells floor (18.2 seconds (range 8.7-28. 7 seconds)) and the control vinyl floor was 18.6 seconds (range 9.1-32.0 seconds). Differences between the LIFs and the control were non-significant. Patients were also asked about their perceived comfort and stability on each floor.

The comfort rating was highest on the Omnisports Excel, but differences between both LIF's and the standard vinyl were not statistically significant. Stability was also highest for the Omnisports Excel but again was not statistically significant.

Conclusion:

There is no difference in walking (gait) between the low impact floors and standard vinyl so far when looking at the average "Timed Up and Go" results. Patient comfort and stability are also acceptable on the low impact floors, which along with no statistically significant difference in walking seem to be an appropriate alternative to the current standard vinyl flooring. If the low impact floors are shown to reduce injury in studies currently under way, then it is likely that they would be appropriate to help minimise fall related injuries in a hospital setting. This neutral result can be interpreted positively, as it shows that patients with pre-existing gait difficulties manage on LIFs equally well as on standard flooring. However due to low participation numbers the clinical impact of these results are limited. More participants are needed (and will continue being recruited) to fully be able to determine if the low impact floors are any more difficult to walk on than vinyl.

The low numbers of participants was due to multiple factors. Firstly there were restrictions on when the floors could be used for testing as they were in patient rooms. As a result of this testing was not possible during scheduled ward rounds, and rest periods. This combined with trying to fit the testing into the participants' rehabilitation schedule posed a challenge. Secondly, due to our mobility criteria stating that patients' had to be either independently mobile or mobile with supervision meant that some patients' were discharged before they could be invited to participant. On many occasions patients' were discharged home once their mobility was sufficient which meant they were unable to be tested. Finally the other main obstacle faced was a lack of mobile Parkinson's patients. This is partly due to the Parkinson's patient who were admitted being the more frail Parkinson's disease patients. Due to this we began recruiting Parkinson's patients from outpatient clinics. As a result, future Parkinson's participants will be periodically recruited from outpatient clinics to get the desired 20 participants.