Oslo Hip Protector Study in Long Term Care

Hege Bentzen
PhD/physiotherapist

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Prevention of hip fractures in nursing homes

A comparative study of the adherence with and effect of soft-shelled and hard-shelled hip protectors

PhD-teses
2009
Hege Bentzen
University of Oslo


• Bentzen H, Bergland A and Forsén: Diagnostic accuracy of three different fall risk assessments for predicting falls in nursing home residents Accepted for publication
Results presented today


Background

• Hip fractures represent a major burden to the individual and a major socioeconomic burden on the health care system.

• Residents in long term care have a very high risk for falls and fractures.

• Hip protectors have been recommended as a means to prevent hip fractures.
• Over the years several studies have investigated the effect of hip protectors on hip fractures

• However, those studies have given conflicting results
Cochrane review (2005):
15 studies included

• "accumulating evidence casts some doubt on the effectiveness of the provision of hip protectors in reducing the incidence of hip fractures in older people"

• "acceptance and adherence by users of the protectors remain poor due to discomfort and practicality"
Cochrane review continued

• ”pooled data from individually-randomised studies and appropriately analysed cluster-randomised studies indicate a marginally significant effectiveness of hip protectors in frail older people in institutional care”

• “but provision of hip protectors does not reduce the incidence of fractures in older people who remain ambulant in the community”
Sawka et al. 
*(Osteoporosis International 2005)* (review):

- Hip protectors do not appear to decrease the risk of hip fractures significantly in relatively low-risk community-dwelling population, but hip protectors seem to have a significant positive treatment effect on hip fractures in nursing homes.
What has to be fulfilled

• The hip protectors must have a high force attenuation capacity

• High risk individuals have to be captured

• High risk individuals have to use the hip protectors
Soft shelled hip protectors

• Has been developed to be more comfortable and acceptable to users

• The effect of the improved design on uptake and adherence has not previously been studied in a randomised study

• Their ability to reduce the risk of a hip fracture in a fall has not previously been studied
Aims of the study

• To investigate the effect on uptake and adherence by offering a soft-shelled hip protector as compared to a hard-shelled hip protector

• To investigate whether a soft-shelled hip protector protects against hip fractures in a fall at the same level as a hard-shelled hip protector
Our hypothesis

• We hypothesised that the soft-shelled hip protector would be assessed and perceived as more comfortable, and we expected higher uptake and adherence with the soft-shelled hip protector compared with the hard-shelled one.

• From a previously published study we expected a reduction in hip fracture risk in hard protected falls compared with unprotected falls, and we expected the soft-shelled hip protector to be equally or even more effective in reducing the risk of a hip fracture in a fall.
Study design

• The study was designed according to the first primary outcome as a cluster randomised study.

• Each nursing home was defined as a cluster.

• The randomisation was according to whether each nursing home should offer a hard-shelled or a soft-shelled hip protector.
Participants

• 18 nursing homes (9 soft and 9 hard)

• 1236 residents participated in the study

• 18 months follow up (May 2005 – November 2006)
Intervention

- Hip protectors were accessible to all residents, but participants who were assessed by staff judgement to be at high risk of falling were particularly encouraged to take up the offer

- SAFEHIP® hard and SAFEHIP® soft
## Residents characteristics

<table>
<thead>
<tr>
<th></th>
<th>N=1236</th>
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<tbody>
<tr>
<td>Age (mean, SD)</td>
<td>84,5 (7,94)</td>
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<tr>
<td>Osteoporosis medication (yes %)</td>
<td>4,4</td>
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<tr>
<td>Gender (female %)</td>
<td>72,2</td>
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<tr>
<td>Visual impairments (yes %)</td>
<td>21,6</td>
</tr>
<tr>
<td>Memory 0-4 (mean, SD)</td>
<td>1,7 (1,33)</td>
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<tr>
<td>Frequent toileting (yes %)</td>
<td>17,6</td>
</tr>
<tr>
<td>Communication 0-4 (mean, SD)</td>
<td>2,5 (1,35)</td>
</tr>
<tr>
<td>Agitated (yes %)</td>
<td>26,1</td>
</tr>
<tr>
<td>Walking aid (yes %)</td>
<td>76,8</td>
</tr>
<tr>
<td>Fractures within 6 months (yes %)</td>
<td>10,4</td>
</tr>
<tr>
<td>Barthel ADL Skår 0-20 (mean, SD)</td>
<td>9,9 (5,85)</td>
</tr>
<tr>
<td>Fall within 3 months (yes %)</td>
<td>31,4</td>
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<tr>
<td>Vit D (yes %)</td>
<td>13,3</td>
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<tr>
<td>Calsium (yes %)</td>
<td>7,4</td>
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</table>
Uptake and adherence with soft and hard hip protectors in Norwegian nursing homes: a cluster randomised trial

Aims of the study:

- To investigate the effect on uptake and adherence with the use of hip protectors by offering soft-shelled hip protectors compared to hard-shelled ones
1236 residents included

- 660 in nursing homes offering soft-shelled hip protectors
  - 361 (55%) non-users
  - 297 (45%) users

- 576 in nursing homes offering hard-shelled hip protectors
  - 303 (53%) non-users
  - 272 (47%) users
## Uptake
(adjusted analysis, logistic regression)

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<thead>
<tr>
<th></th>
<th>Odds ratio</th>
<th>P-verdi</th>
<th>95%CI</th>
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<tbody>
<tr>
<td>Participants included from the beginning (N=836) (ref: soft hip protectors)</td>
<td>0.86</td>
<td>0.388</td>
<td>0.61 - 1.21</td>
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<td>Participants included continuously (N=400) (ref: soft hip protectors)</td>
<td>0.91</td>
<td>0.719</td>
<td>0.53 – 1.55</td>
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Adherence
(probability of ending hip protector use)
### Adherence

Cox regression

<table>
<thead>
<tr>
<th>Ref: soft-shelled hip protectors</th>
<th>Hazard Rate</th>
<th>P-value</th>
<th>95% CI</th>
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</thead>
<tbody>
<tr>
<td>Unadjusted model</td>
<td>1.28</td>
<td>0.102</td>
<td>0.951-1.734</td>
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<tr>
<td>Adjusted model</td>
<td>1.38</td>
<td>0.048</td>
<td>1.002-1.902</td>
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24-hours use

%  All users  Recommended 24 hours use

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Conclusions

• No statistically significant difference in uptake between soft-shelled and hard-shelled hip protectors

• A small, but statistically significant difference in adherence between soft-and hard-shelled hip protectors

• A higher number of 24-hour users among users of the soft-shelled hip protector
Risk of hip fractures in soft protected, hard protected and unprotected falls

The aim:

• To compare hip fracture risk in soft- and hard protected falls to the risk in unprotected falls
A fall was defined as:

- Any event where the resident unintentionally and regardless of cause comes to rest on the floor
Falls

• All falls were recorded on a fall registration form on a daily basis

• The nursing staff carried out the registration
Falls

Each fall was classified as either:

- Soft protected fall
- Hard protected fall
- Unprotected fall
Hip fractures

• A hip fracture was defined according to the International Classification of Diseases as a:
  
  - fracture of the neck of femur
  - trochanteric fracture

• Fractures were confirmed in the residents medical records
Flow-chart

2926 falls among 607 fallers (607/1236)

96 falls excluded

590 soft protected falls (8 hip fractures)

1,35 hip fractures per 100 soft protected falls

852 hard protected falls (11 hip fractures)

1,29 hip fractures per 100 hard protected falls

1388 unprotected falls (45 hip fractures)

3.24 hip fractures per 100 unprotected falls
## Risk of hip fractures in soft-and hard protected falls compared to unprotected falls

Logistic regression-adjusted model

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<th></th>
<th>Odds Ratio</th>
<th>P-value</th>
<th>95% CI</th>
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<tbody>
<tr>
<td>Soft protected falls</td>
<td>0.36</td>
<td>0.009</td>
<td>0.17 – 0.77</td>
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<tr>
<td>Hard protected falls</td>
<td>0.41</td>
<td>0.022</td>
<td>0.19 – 0.89</td>
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</table>
Conclusion

• Both types of hip protectors have the potential to reduce the risk of hip fracture in falls by nearly 60%.
Take home message

• Both soft and hard-shelled hip protectors are capable of reducing the risk of a hip fracture by nearly 60% when used correctly during a fall.

• Hip protectors may be very effective in nursing home residents at high risk of falls and fractures who both accept and actually wear the device.

• For those who are in need of 24-hours use a soft-shelled hip protector is recommended.

• Uptake and adherence seems to be a challenge for both types of hip protectors.
Thank You for Your attention!