Geriatric rehabilitation – How to organise it?

David J Stott

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Organisation and planning

[Image: Cartoon of a disaster plan with phases]

- Phase One: Bark
- Phase Two: Bite
How to organise geriatric rehabilitation?

• Why it is important
• What happens in Scotland / UK
• What is geriatric rehabilitation?
  – Coping strategies
  – Physical / psychological adaptation
• Selecting patients
• The evidence for benefit
  – Hospital, community
• Alternative systems (intermediate care)
• Barriers to implementation
Why is rehabilitation such an important issue for older people?
Older people are at high risk of disability

- Reduced homeostatic / physiological reserve
  - ‘Intrinsic’ ageing
  - Physical inactivity / detraining
- Increased prevalence of chronic disabling disease (overt and covert)
- ‘Crash’ in function with acute illness
Prevalence of severe disability (OPCS 1988)

- < 50 yrs
- 60-70 yrs
- > 80 yrs

Severe Disability / 1000
The bio-psycho-social model of disability

• A general model or approach
  – Biological
  – Psychological
    • thoughts, emotions, and behaviors
  – Social factors

• All play a significant role in human functioning in the context of disease or illness

• All should be addressed in rehabilitation
Geriatric services UK

• Marjory Warren.
  – Care of the chronic aged sick. Lancet 1946;2:841-3

• Aubrey Lewis
The present – Geriatric medicine in Scotland and the UK

- Many well-developed geriatric services offering healthcare to frail older people
- The largest single ‘general medical’ speciality
- Undergraduate exposure
- 5 year training program – pre-consultant
- Increasing recognition of the importance of evidence based practice
- Variability regionally and nationally
  - Age-based or problem-related services
  - Hospital / community rehabilitation
  - Integration with acute / community services, psychogeriatrics
  - Sub-specialisation within geriatrics
Sub-specialisation in geriatric medicine versus comprehensive assessment / wholistic care
Comprehensive geriatric assessment (CGA)

- Multi-morbidity
- Cognition + language
  - Delirium, dementia, dysphasia
- Mood
- Vision
- Hearing
- Swallowing and the mouth
- Nutritional state
- Sarcopenia
- Basic activities of daily living and physical function
- Extended activities of daily living
- Risk assessment
  - Falls
  - Pressure sores
- Home environment
- Social circumstances / network
- Caregiver stress
CGA – effective implementation requires ‘ownership’ of patient care

- Control – who is in charge?
- Advisory role – difficult to change long-established behaviours
The importance of the multi- or interdisciplinary case conference

- Key component of proven systems of CGA in hospital
- Medical involvement (leadership?)
- Minimum weekly face-face meetings

"And as soon as he's on the mend, we'll get the physiotherapist in here with a ball of twine."
Which older people should get CGA and rehabilitation?

- General geriatric issues
  - Physical disability
  - Geriatric giants
    - Immobility
    - Instability
    - Incontinence
    - Impaired cognition (delirium / dementia)
  - Frailty
  - Multi-morbidity

- Age threshold eg >80yrs
- Specific diseases
  - Stroke
  - Myocardial infarction
  - Chronic obstructive pulmonary disease
  - Amputation
  - General surgery
  - Depression
Where you ‘draw the line’ in defining selection criteria for patients for CGA?

- **Patient characteristics**
  - Those most likely to benefit
- **Local resources**
  - If limited only those at highest need
  - Large resource allows for more inclusive approach
What are the key components of rehabilitation?

- **Coping strategies**
  - Appropriate for everyone with disability, including dementia
  - Often can be introduced quickly
  - Carer role critical

- **Psychological and physical adaptation**
  - Tailored for patient ability to cope / personal motivation
  - Not appropriate for everyone with disability
  - Needs time
  - Carer role important
Key issues with physical therapy

- Very frail / disabled subjects get most benefit
- You need to give adequate dose and duration of exercise to get physiological adaptation
- Short-medium term benefits are difficult to sustain
Physical therapy and adaptation – what is the practice in your unit?

- Functional activities e.g. walking
- Training specific muscle groups
- Aerobic training
- Schools or techniques
  - Bobath
  - Proprioceptive neuromuscular facilitation
Exercise training in chronically frail, very elderly people

- 100 nursing home residents mean age 87 years
- RCT progressive resistance exercise training hip and knee extensors, 3 times weekly for 10 weeks
- Muscle strength increased by >100%
- Increased gait speed and stair climbing power
Measurement of leg extensor power after hip fracture
‘The lack of appreciable objective benefits from low-intensity exercise (as commonly prescribed to older or frailer adults) should dissuade healthcare professionals from using doses and modalities of exercise that are below the threshold required for physiological adaptation or therapeutic efficacy’
What is the evidence for benefit from comprehensive geriatric assessment / rehabilitation?

"...just as a matter of interest, just what the heck are we looking for anyway?"
Effects of comprehensive in-patient geriatric medical care

- Geriatric versus general care, OR
  - Death: 0.65 (0.46, 0.91)
  - Physical improvement: 1.63 (1.00, 2.65)
  - Cognitive increase: 2.00 (1.13, 3.55)

Stuck, Lancet 1993;342:1032
Comprehensive geriatric rehabilitation for older patients; Fig 1 Flow of papers through study.

Articles identified by search of titles and abstracts (n=932):
- Embase and Medline (n=689)
- Cochrane (n=204)
- Additional references from reference lists (n=39)

Full text articles retained for assessment of eligibility (n=119)

Articles rejected (n=92):
- Not randomised controlled trial (n=25)
- Age <55 (n=17)
- Not inpatient programme (n=20)
- Acute care programme (n=9)
- Consultation service (n=3)
- Non-comprehensive multidisciplinary rehabilitation (n=3)
- No outcome data (n=7)
- Control group did not receive usual care (n=8)

Articles included in meta-analysis (n=27)
(27 articles reporting on 17 randomised controlled trials)

Bachmann S et al. BMJ 2010;340:bmj.c1718

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Effect of inpatient rehabilitation specifically designed for geriatric patients on functional improvement at hospital discharge

**Effects at hospital discharge**

**General geriatric rehabilitation**

- Cohn 2002
- White 1994
- Young 2007

Subtotal: $I^2=0.0\%, P=0.821$

**Orthopaedic geriatric rehabilitation**

- Kennie 1988
- Shyu 2005
- Stenval 2007
- Swanson 1998
- Vidan 2005

Subtotal: $I^2=0.0\%, P=0.428$

Overall: $I^2=38.4\%, P=0.123$

**Odds ratio (95% CI)**

- Cohn 2002: 1.35 (1.11 to 1.63)
- White 1994: 1.82 (0.59 to 5.65)
- Young 2007: 1.22 (0.71 to 2.11)
- Kennie 1988: 1.34 (1.12 to 1.60)
- Shyu 2005: 4.39 (1.57 to 12.27)
- Stenval 2007: 2.25 (1.21 to 4.19)
- Swanson 1998: 1.60 (0.83 to 3.05)
- Vidan 2005: 3.57 (1.46 to 8.76)
- Overall: 1.75 (1.31 to 2.35)

**Favours control**

**Favours intervention**

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Effect of inpatient rehabilitation specifically designed for geriatric patients on admissions to nursing homes at hospital discharge

<table>
<thead>
<tr>
<th>Effects at hospital discharge</th>
<th>Treatment</th>
<th>Control</th>
<th>Relative risk (95% CI)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>General geriatric rehabilitation</td>
<td></td>
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</tr>
<tr>
<td>Applegate 1990</td>
<td>6/78</td>
<td>17/77</td>
<td>0.35 (0.15 to 0.84)</td>
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<tr>
<td>Rubenstein 1984</td>
<td>8/63</td>
<td>18/60</td>
<td>0.42 (0.20 to 0.90)</td>
<td></td>
</tr>
<tr>
<td>Saltvedt 2002</td>
<td>15/127</td>
<td>15/127</td>
<td>1.00 (0.51 to 1.96)</td>
<td></td>
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<tr>
<td>White 1994</td>
<td>6/20</td>
<td>13/20</td>
<td>0.46 (0.22 to 0.97)</td>
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</tr>
<tr>
<td>Subtotal: $\chi^2=37.0%, P=0.190$</td>
<td>35/288</td>
<td>63/284</td>
<td>0.53 (0.33 to 0.86)</td>
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</tr>
<tr>
<td>Orthopaedic geriatric rehabilitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Gilchrist 1988</td>
<td>26/97</td>
<td>33/103</td>
<td>0.84 (0.54 to 1.29)</td>
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</tr>
<tr>
<td>Kennie 1988</td>
<td>5/54</td>
<td>16/54</td>
<td>0.31 (0.12 to 0.79)</td>
<td></td>
</tr>
<tr>
<td>Naglie 2002</td>
<td>38/141</td>
<td>48/138</td>
<td>0.77 (0.54 to 1.11)</td>
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<tr>
<td>Shyu 2005</td>
<td>1/72</td>
<td>3/87</td>
<td>0.40 (0.04 to 3.79)</td>
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<tr>
<td>Stenvall 2007</td>
<td>15/102</td>
<td>22/97</td>
<td>0.65 (0.36 to 1.17)</td>
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</tr>
<tr>
<td>Swanson 1998</td>
<td>1/38</td>
<td>2/33</td>
<td>0.43 (0.04 to 4.57)</td>
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</tr>
<tr>
<td>Subtotal: $\chi^2=0.0%, P=0.502$</td>
<td>86/504</td>
<td>124/512</td>
<td>0.72 (0.56 to 0.91)</td>
<td></td>
</tr>
<tr>
<td>Overall: $\chi^2=14.6%, P=0.309$</td>
<td>121/792</td>
<td>187/796</td>
<td>0.64 (0.51 to 0.81)</td>
<td></td>
</tr>
</tbody>
</table>

Favours intervention       Favours control

Bachmann S et al. BMJ 2010;340:bmj.c1718
Effect of inpatient rehabilitation specifically designed for geriatric patients on mortality at hospital discharge

<table>
<thead>
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<th>Relative risk (95% CI)</th>
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<tr>
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<td></td>
</tr>
<tr>
<td>Rubenstein 1984</td>
<td>9/63</td>
<td>9/60</td>
<td>0.95 (0.41 to 2.24)</td>
</tr>
<tr>
<td>Saltvedt 2002</td>
<td>8/127</td>
<td>17/127</td>
<td>0.47 (0.21 to 1.05)</td>
</tr>
<tr>
<td>Young 2007</td>
<td>38/280</td>
<td>35/210</td>
<td>0.81 (0.53 to 1.24)</td>
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<tr>
<td>White 1994</td>
<td>0/20</td>
<td>0/20</td>
<td>Excluded</td>
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<tr>
<td>Subtotal: $I^2=0.0%$, $P=0.418$</td>
<td>55/490</td>
<td>61/417</td>
<td>0.76 (0.54 to 1.06)</td>
</tr>
<tr>
<td>Orthopaedic geriatric rehabilitation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gilchrist 1988</td>
<td>4/97</td>
<td>13/125</td>
<td>0.40 (0.13 to 1.18)</td>
</tr>
<tr>
<td>Huusko 2002</td>
<td>5/120</td>
<td>5/123</td>
<td>1.02 (0.30 to 3.45)</td>
</tr>
<tr>
<td>Kennie 1988</td>
<td>5/54</td>
<td>4/54</td>
<td>1.25 (0.35 to 4.40)</td>
</tr>
<tr>
<td>Naglie 2002</td>
<td>7/141</td>
<td>13/138</td>
<td>0.53 (0.22 to 1.28)</td>
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<tr>
<td>Shyu 2005</td>
<td>1/72</td>
<td>0/87</td>
<td>3.62 (0.15 to 87.45)</td>
</tr>
<tr>
<td>Stenvall 2007</td>
<td>6/102</td>
<td>7/97</td>
<td>0.82 (0.28 to 2.34)</td>
</tr>
<tr>
<td>Swanson 1998</td>
<td>2/38</td>
<td>2/33</td>
<td>0.87 (0.13 to 5.83)</td>
</tr>
<tr>
<td>Vidan 2005</td>
<td>1/155</td>
<td>9/164</td>
<td>0.12 (0.02 to 0.92)</td>
</tr>
<tr>
<td>Subtotal: $I^2=0.0%$, $P=0.458$</td>
<td>31/779</td>
<td>53/821</td>
<td>0.66 (0.42 to 1.04)</td>
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<tr>
<td>Overall: $I^2=0.0%$, $P=0.563$</td>
<td>86/1269</td>
<td>114/1238</td>
<td>0.72 (0.55 to 0.95)</td>
</tr>
</tbody>
</table>

Favours treatment        Favours control

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Comprehensive geriatric assessment; Acute in-patient care

- Systematic review and meta-analysis; 5 RCTS
- Frail older people acute medical disorders
- Acute geriatric units versus conventional care
  - lower risk of functional decline at discharge
    - OR 0.82 (0.68 to 0.99)
  - more likely at home after discharge
    - OR 1.30 (1.11 to 1.52)
  - no differences in case fatality
    - OR 0.83 (0.60 to 1.14)
Community-based multidisciplinary care

- Randomised controlled trials of community-based multifactorial interventions
- 89 trials including 97,984 people
- Reduced nursing home admissions
  \[ \text{RR} = 0.87 \ (95\% \text{CI} \ 0.83, 0.90) \]
- Death \[ \text{RR} = 1.00 \ (95\% \text{CI} \ 0.97, 1.02) \]

Beswick, Lancet 2008; 371: 725
Beswick, Lancet 2008;371:425

- 5529 total articles
- 5326 articles identified by search and title/abstract screened
- 203 additional articles 2005-06

- 225 total articles
- 203 possibly relevant and acquired for detailed evaluation
- 22 additional articles 2005-06

- 109 excluded from review:
  - 39 not complex intervention
  - 14 not randomised controlled trial
  - 1 mean age <65 years
  - 2 acute setting
  - 23 not community based
  - 27 review
  - 3 in progress

- Included in review
  - 87 studies (116 articles)
  - 89 interventions

- 28 general elderly people
- 24 frail elderly people
- 21 community-based care after hospital discharge
- 13 fall prevention
- 3 group education and counselling
### Study context

<table>
<thead>
<tr>
<th>Study context</th>
<th>Death N=93754</th>
<th>Nursing home admission N=79575</th>
<th>Hospital admission N=20047</th>
<th>People with falls N=15607</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geriatric assessment of general elderly people</td>
<td>1.00 (0.98 to 1.03)</td>
<td>0.86 (0.83 to 0.90)</td>
<td>0.98 (0.92 to 1.03)</td>
<td>0.76 (0.67 to 0.86)</td>
</tr>
<tr>
<td>$I^2$</td>
<td>39.7%</td>
<td>47.5%</td>
<td>61.4%</td>
<td>0</td>
</tr>
<tr>
<td>Geriatric assessment of elderly people selected as frail</td>
<td>1.03 (0.89 to 1.19)</td>
<td>1.01 (0.83 to 1.23)</td>
<td>0.90 (0.84 to 0.98)</td>
<td>0.99 (0.89 to 1.10)</td>
</tr>
<tr>
<td>$I^2$</td>
<td>0</td>
<td>28.8%</td>
<td>11.0%</td>
<td>0</td>
</tr>
<tr>
<td>Community-based care after hospital discharge</td>
<td>0.97 (0.89 to 1.05)</td>
<td>0.77 (0.64 to 0.91)</td>
<td>0.95 (0.90 to 0.99)</td>
<td>0.82 (0.61 to 1.08)</td>
</tr>
<tr>
<td>$I^2$</td>
<td>5.2%</td>
<td>0</td>
<td>57.0%</td>
<td>40.3%</td>
</tr>
<tr>
<td>Fall prevention</td>
<td>0.79 (0.66 to 0.96)</td>
<td>1.26 (0.70 to 2.27)</td>
<td>0.84 (0.61 to 1.16)</td>
<td>0.92 (0.87 to 0.97)</td>
</tr>
<tr>
<td>$I^2$</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>65.8%</td>
</tr>
<tr>
<td>All complex interventions</td>
<td>1.00 (0.97 to 1.02)</td>
<td>0.87 (0.83 to 0.90)</td>
<td>0.94 (0.91 to 0.97)</td>
<td>0.90 (0.86 to 0.95)</td>
</tr>
<tr>
<td>$I^2$</td>
<td>10.6%</td>
<td>29.0%</td>
<td>43.0%</td>
<td>52.8%</td>
</tr>
</tbody>
</table>
Conclusions – CGA and rehabilitation

In-hospital dedicated geriatric units
• Reduce disability / improve physical function
• Reduce nursing home placement
• Reduce mortality

In community
• Reduce falls
• Reduce nursing home placement
• Reduce hospital admissions
• No effect on mortality
Comprehensive geriatric assessment works – so what’s the problem?

- Increasing numbers of elderly hospital admissions
- Recurrent admissions at end of life
- Pressure to reduce number of hospital beds
- Avoid admission, earlier discharges
- Provide alternatives including care in the community – intermediate care
- Assumption that intermediate care will reduce costs
Intermediate care

Potential role
• Alternative to hospital
• Facilitating discharge
• Post-discharge

System / structure
• Outreach services
• Evercare / case management
• Care homes
• Community hospitals
Nurse-led intermediate care

- 238 post-acute medical inpatients
- Nurse-led intermediate care vs standard hospital care
- Nurse-led care more expensive: per-patient difference £3082, 95% CI £1161-5002
- Nurse-led care in acute hospital not cost-effective
Whole system study of intermediate care services

• Case-control study
• 1648 elderly emergency admissions
• Falls, confusion, incontinence, immobility
• Post-discharge care management team
  – Nursing, therapists, social support (no medical review)
• Intermediate care increased hospital utilisation over 1 year; mean +8 days (95% CI 3,13)
Intermediate skier – enthusiastic but results not great!
Early supported discharge

- 104 elderly inpatients requiring rehabilitation
- RCT Hospital at home vs rehabilitation ward
- MDT included medical review
- Home care
  - reduced risk of delirium (OR 0.17, 95% CI 0.03, 0.65)
  - no difference FIM / MMSE
  - improved satisfaction
  - reduced length of stay (20 vs 40 days)
  - reduced cost (£7,680 vs £10,598)
Summary - intermediate care for frail older people

- Should be based on principles of comprehensive geriatric assessment / rehabilitation
- Requires an expert team, including medical input
- Nurse-led inpatient units likely to increase costs
- Supported discharge with domiciliary rehabilitation and medical review may improve outcome / reduce costs
- No evidence that intermediate care is a safe alternative to acute hospital admission
Knowledge is of no value unless you put it into practice

Anton Chekhov
System barriers to effective rehabilitation

*BGS position paper 2005*

- Lack of comprehensive geriatric assessment in the community
- Lack of training in primary care in health needs of older people
- Pressure to discharge from the acute sector
- Lack of will on the part of primary care organisations to develop rehabilitation services in hospital
- Divided responsibilities between primary care, secondary care and community based services
- Divided managerial leadership for therapists in multidisciplinary teams
BGS position paper on rehabilitation, 2005

• Comprehensive assessment approach required for older frail people
• Should start at admission and continue beyond discharge
• Necessary to restore daily living skills and mobility in older people recovering from acute illness
• Essential to aid recovery from planned or emergency surgery
• Important component of chronic disease management
• Must include a medical contribution to ensure treatable illness is not missed
• Needs to be multidisciplinary and evidence based
Thank-you for your attention!

THE END IS NIGHT

Therefore do your important paperwork now, this morning, because if you leave it until this afternoon you might find that it is too late, thereby leaving you in a bit of a pickle.