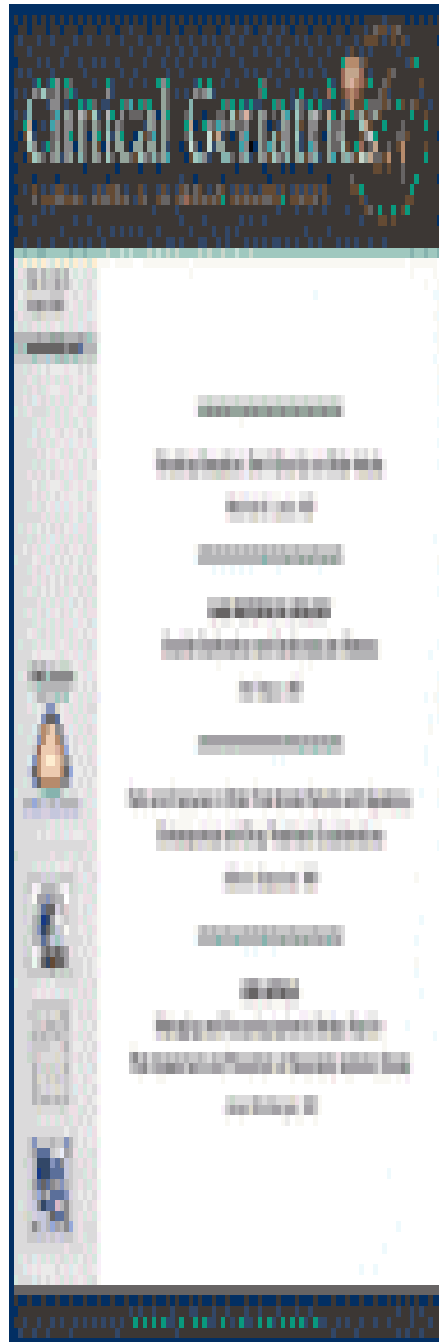
Gruppo di ricerca geriatrica

ecm

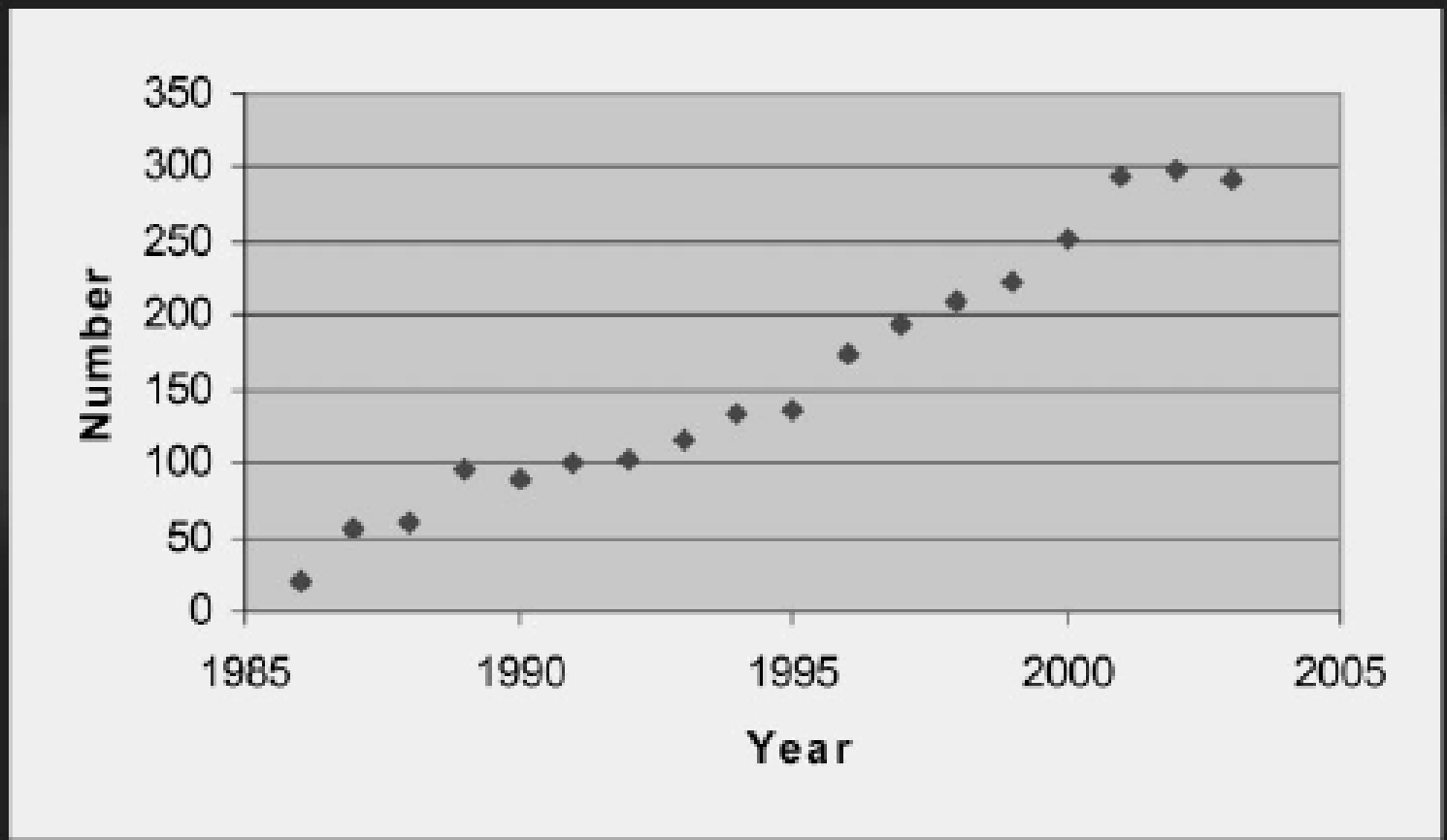
Journal Club, 28 ottobre 2005

Revisione della letteratura recente sulle cadute

Simone Franzoni



Published articles on falls in older people



Source – Medline

Overview: cadute in ultra 65enni

0ttobre 2004 – ottobre 2005

- 6 editoriali
- 5 review
- 17 RCT
- 0 metanalisi
- 0 practice guideline

Topics

- Prevalence and clinical importance
- Risk factors
- Evaluation
- Prevention and rehabilitative interventions
- Restraint use

Geriatrics
Falls

ASSESSMENT RISCHIO DI CADUTA

Anamnesi cadute,
comorbilità, farmaci,
sicurezza deambulazione (test),
vista,
funzionamento estremità articolari, forza muscolare,
sensibilità propriocettiva, ROT, segni piramidali,
extrapiramidali e cerebellari,
stato cognitivo,
freq.cardiaca, pres.arteriosa,
test ipotensione ortostatica, test stimolazione carotidea.

Intensità dipende da caratteristiche paziente
(mai caduto, multifaller)

QUESTIONARIO IP

a) Paziente a letto

Altezza del letto è adeguata per il paziente?

Riesce ad utilizzare campanello di chiamata?

Ha imparato dove sono interruttori luce?

Comodino è facilmente raggiungibile?

E' confuso?

Vanno applicate le spondine al letto o è necessaria la presenza continua dei parenti?

Spondine sono sufficientemente alte?

QUESTIONARIO IP

b) Paziente in movimento

Usa correttamente il bastone o il tripode?

Ci vede bene da lontano?

Calzature e vestiario (cintura) sono idonei?

E' necessario l'intervento del callista?

Catetere vescicale e sacchetto ostacolano cammino?

QUESTIONARIO IP

c) Monitoraggio infermieristico

Dopo assunzione psicofarmaci ha variazioni coscienza o sicurezza cammino?

E’ monitorato sufficientemente nelle ore successive all'assunzione diuretici?

In caso di ipotensione ortostatica ha capito necessità assumere posizione eretta gradualmente?

In caso di nicturia è sufficiente monitoraggio notturno ?

VALUTAZIONE DELLA CADUTA

Data caduta ____/____/____

1) **Testimone oculare**

0. dato non disponibile
1. si
2. no

2) **Orario**

0. dato non disponibile
1. 07-11 h
2. 11-17 h
3. 17-07 h

3) **Sede** (* solo per soggetti immobilizzati)

0. dato non disponibile
1. letto*
2. poltrona*
3. camera da letto
4. bagno
5. scale
6. giardino
7. altro
8. spazi di attività comune (atrio, sala TV, mensa)

VALUTAZIONE DELLA CADUTA

4) **Attività**

0. dato non disponibile
1. era fermo in piedi
2. era seduto
3. si alzava dal letto
4. si sdraiava nel letto
5. si alzava dalla poltrona
6. si sedeva in poltrona
7. saliva le scale
8. scendeva le scale
9. camminava al piano

5) **Fattori associati alla caduta**

0. dato non disponibile
1. inciampare
2. scivolare
3. alzarsi rapidamente
4. tossire
5. urinare
6. defecare
7. girare la testa velocemente
8. mangiare un lauto pasto
9. altro _____
10. nessuno

VALUTAZIONE DELLA CADUTA

6) **Direzione della caduta**

0. dato non disponibile
1. avanti
2. indietro
3. di lato
4. su se stesso

7) E**ra capace di alzarsi in piedi da solo**

0. dato non disponibile
1. si
2. no

8) **Ha avuto incontinenza urinaria o fecale**

0. dato non disponibile
1. sI
2. no
3. incontinenza cronica

9) **Complicazioni della caduta**

0. dato non disponibile
1. ematoma,lesione dolorosa
2. frattura _____
3. ematoma subdurale
4. diminuita mobilità per lesioni
5. diminuita mobilità per paura di cadere, restrizione coatta
6. ricovero in Ospedale
7. morte
8. altro _____
9. nessuna

VALUTAZIONE DELLA CADUTA

10) Ostacoli ambientali

0. dato non disponibile
1. scale sconnesse
2. pavimento sconnesso
3. pavimento scivoloso
4. tappeti non fissati
5. tappetino scivoloso vasca
6. luminosità inadeguata
7. luci notturne insufficienti
8. h non corretta sedie,poltrone
9. h non corretta water
10. h non corretta letto
11. sponde letto inadeguate
12. ausili movim.inadeguati
13. marciapiedi irregolari
14. ghiaia nel giardino
15. altro _____
16. nessuno

11) Sapeva che stava cadendo

0. dato non disponibile 1. si 2. no

VALUTAZIONE DELLA CADUTA

12) Appena prima di cadere ha provato qualche disturbo

0. dato non disponibile
1. stordimento
2. vertigine
3. palpitazioni
4. dolore al petto
5. respiro superficiale
6. visione punti neri
7. odori strani
8. parola impacciata
9. difficoltà ad esprimersi
10. debolezza parte del corpo
11. improvvisa debolezza gambe
12. altro _____
13. nessuno

13) Ha perso conoscenza

0. dato non disponibile 1. si 2. no

14) Dopo la caduta, sapeva che cosa era accaduto

0. dato non disponibile 1. si 2. no

15) Caduta volontaria

0. dato non disponibile 1. si 2. no

16) Caduta da sovrastima delle proprie capacità fisiche

0. dato non disponibile 1. si 2. no

VALUTAZIONE DELLA CADUTA

17) Caduta in un momento di confusione

0. dato non disponibile 1. si 2. No

18) E' avvenuto qualche evento acuto nell'ultima settimana?

(febbre, stato confusionale, cambiamento di stanza, nuovi farmaci, sedativi, etc.)

0. dato non disponibile 1. si 2. no

19) Motivo

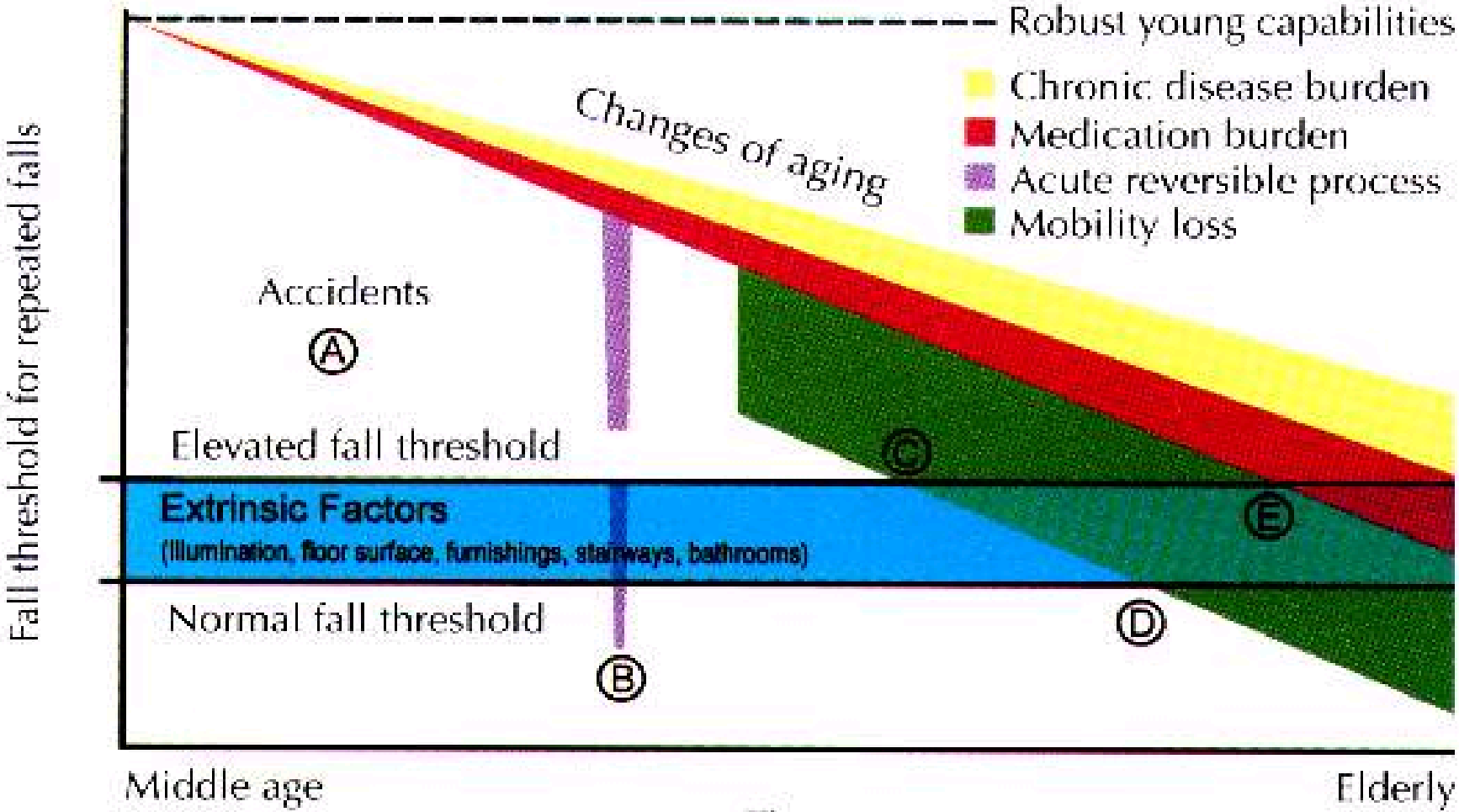
0. dato non disponibile

1. incidente vero

2. incidente dovuto alla coesistenza di un ostacolo ambientale e di una malattia del paziente

3. malattia del paziente

The changing approach to falls in the elderly



American family Physician, 2000

CLASSIFICAZIONE RISCHIO DI CADUTA

1) A rischio cronico per deambulazione insicura

(artrosi, emiplegia, parkinson, s.cerebellare, s.vestibolare, s.immobilità prolungata)

Monitoraggio variabile secondo grado deterioramento cognitivo

(assistenza solo per movimento vs continua)

2) A rischio acuto <u>prevedibile e prevenibile</u>

(cadute dal letto) (delirium, febbre, ipotensione ortostatica, diuretici, antipertensivi, triciclici, sedativi, antipsicotici, ipoglicemizzanti)

Monitoraggio immediato, intensivo, fino risoluzione evento acuto

3) A rischio <u>non prevedibile</u>

(ipotensione ortostatica autonomica, sincope, stenosi aortica, aritmie, TIA, ictus)

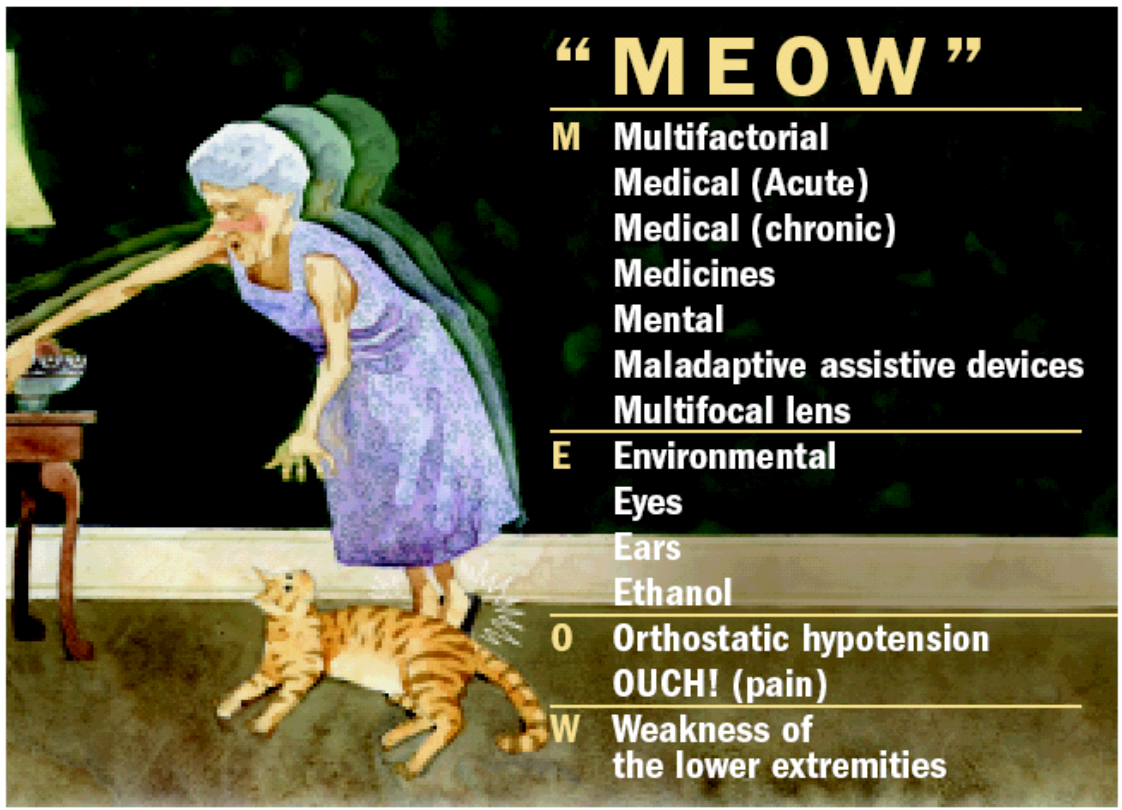
Intervento: prevenzione generale (antiaggregante, pace-maker)

Assessing falls in older adults

A comprehensive fall evaluation to reduce fall risk in older adults

Joseph O. Nnodim, MD, PhD • Neil B. Alexander, MD

Geriatrics October 2005 Volume 60, Number 10



A comparative study of the use of four fall risk assessment tools on acute medical wards.

M.Vassallo JAGS 53:1034-8, 2005

OBJECTIVES: To compare the effectiveness of four falls risk assessment tools (STRATIFY, Downton, Tullamore, and Tinetti) by using them simultaneously in the same environment.

DESIGN: Prospective, open, observational study.

SETTING: Two acute medical wards admitting predominantly older patients.

PARTICIPANTS: One hundred thirty-five patients, 86 female, mean age ± standard deviation 83.8 ± 8.01 (range 56–100).

	Downton Fall risk tool 1993	STRATIFY 1997	Tullamore 2003	Tinetti 1986
History of falls	+		+	
Medication	+		+	+
Sensory deficits	+	+ visual	+	+ distance vision, hearing
Limb abnormality	hemiparesis			
Confusion	+	+ agitation		
Presenting with fall or having a fall on the ward		+		
Frequent toileting		+		
Unsafe gait	+	+	+	+ Tinetti scale
Other			Age, sex	ADL, Mental-morale status
Other				Postural blood pressure drop

Risk Factors for Falls – Tinetti 1988

Risk factor	OR
Sedative use	28
Cognitive impairment	5
Lower extremity problem	4
Pathologic Reflex	3
Foot problems	2
>3 balance/gait problems	1.4
>5 balance/gait problems	1.9

MEASUREMENTS: A single clinician prospectively completed the four falls risk assessment tools. The extent of completion and time to complete each tool was recorded. Patients were followed until discharge, noting the occurrence of falls. The sensitivity, specificity, negative predictive accuracy, positive predictive accuracy, and total predictive accuracy were calculated.

M.Vassallo JAGS 53:1034-8, 2005

	Downton	STRATIFY	Tullamore	Tinetti
Sensibilità	82%	68%	91%	77%
Specificità	25%	66%	41%	31%
Predittività totale	34%	67%	49%	39%
Esecuzione minuti	6	4	6	7
Test completi	95%	100%	95%	13%

Validità di ogni strumento di valutazione del rischio di caduta dipende da tipologia pazienti, staff, setting.

Accuratezza predittiva totale è bassa (max 67%)

- Specificità (condizionata da intervento e permanenza a letto)
- Sensibilità (strumento ideale = elevata; determinata da storia cadute, confusione, andatura instabile)

M.Vassallo JAGS 53:1034-8, 2005

CONCLUSION: Significant differences were identified in the performance and complexity between the four risk assessment tools studied. The STRATIFY tool was the shortest and easiest to complete and had the highest predictive value but the lowest sensitivity

M.Vassallo JAGS 53:1034-8, 2005

INTERVENTI

Efficaci:

- razionalizzazione neurolettici (Peterson 2005)
- esercizio fisico (+/-)

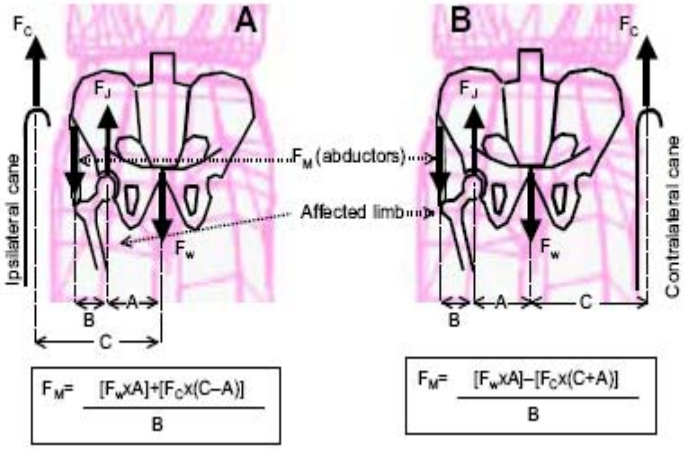
Non efficaci:

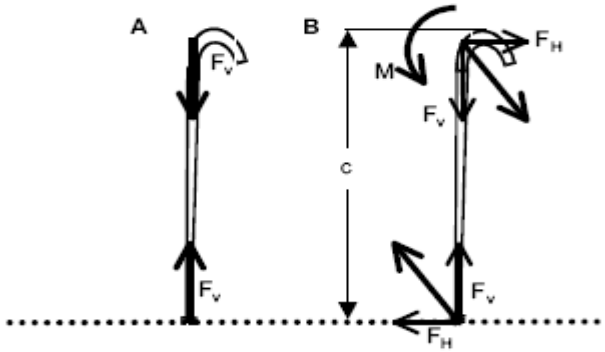
- contenzione fisica
- allarmi al letto o braccialetti

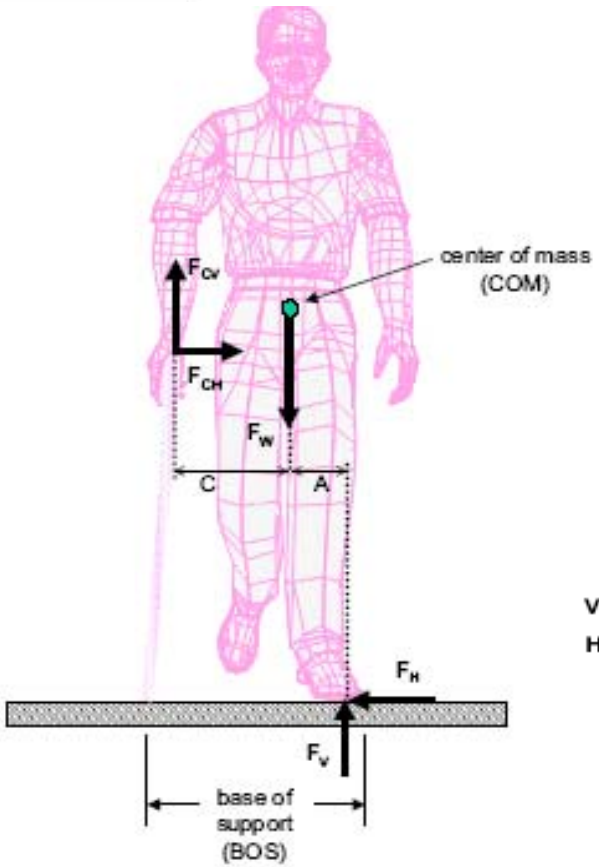
Dubbia efficacia:

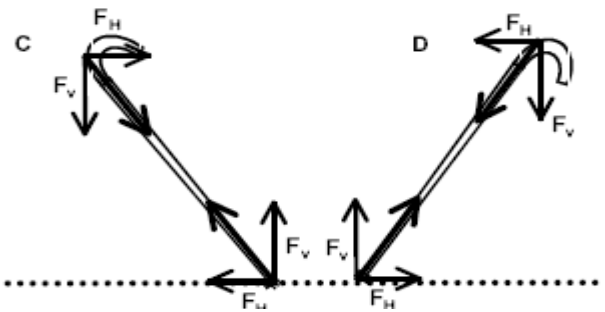
- protettori femorali
- monitoraggio intensivo e multidisciplinare

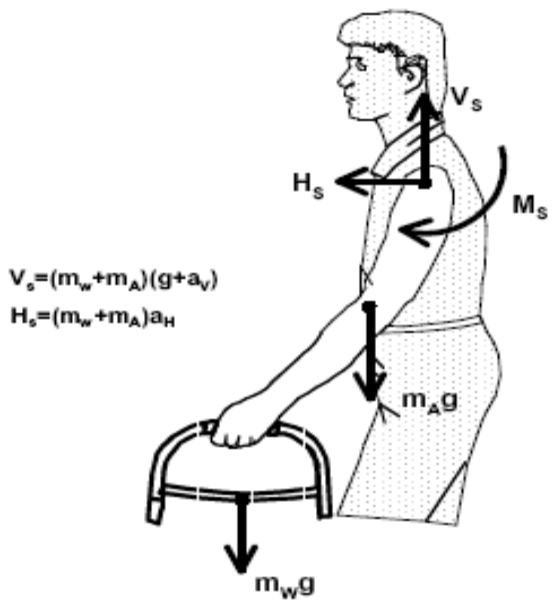
(Vassallo 2004, Capezuti 2004)


A
B
F_C
F_J
F_M (abductors)
Affected limb
F_w
Ipsilateral cane
Contralateral cane
B
A
C
$F_M = \frac{[F_w x A] + [F_C x (C - A)]}{B}$
$F_M = \frac{[F_w x A] - [F_C x (C + A)]}{B}$


A
B
F_V
F_H
M
C


F_{CV}
F_{CH}
F_W
center of mass
(COM)
C
A
F_H
F_V
base of
support
(BOS)


C
D
F_H
F_V


V_S
H_S
M_S
$V_s=(m_w+m_A)(g+a_V)$
$H_s=(m_w+m_A)a_H$
$m_A g$
$m_w g$

REVIEW ARTICLE

Assistive Devices for Balance and Mobility: Benefits, Demands, and Adverse Consequences

Arch Phys Med Rehabil Vol 86, January 2005

Hamid Bateni, PhD, Brian E. Maki, PhD

Data Synthesis: Findings were synthesized by considering their relation to basic biomechanic principles. Some biomechanic findings appear to support the clinical view that canes and walkers can improve balance and mobility for older adults and people with other clinical conditions. However, a large proportion of users experience difficulties, and the use of such devices is associated with increased risk of falling. A small number of studies have characterized some of the specific demands and problems associated with using mobility aids.

Conclusions: Clinical and biomechanic evaluations of canes and walkers confirm that these devices can improve balance and mobility. However, they can also interfere with one's ability to maintain balance in certain situations, and the strength and metabolic demands can be excessive. More research is needed to identify and solve specific problems. Such research may lead to improved designs and guidelines for safer use of canes and walkers.

Prevention of falls and consequent injuries in elderly people

Pekka Kannus, Harri Sievänen, Mika Palvanen, Teppo Järvinen, Jari Parkkari

www.thelancet.com Published online October 25, 2005

Prevention of falls and injuries is not easy, however, because they are complex events caused by a combination of intrinsic impairments and disabilities (ie, increased liability to fall) with or without accompanying environmental hazards (ie, increased opportunity to fall)

risk factors for falls and for serious injuries caused by falls are similar and correctable,

Prevalence

- 30% community-living fall every year
- 50% in nursing home fall every year
- 50% repeat fallers
- Number of falls increases progressively with age in both sexes and all racial and ethnic groups

Impact of Hip Fractures

20% need medical attention

5% hip fracture

5-10% serious injuries (head injuries, joint distorsions and dislocations, soft-tissue bruises)

25% die within 6 months

25% remain functionally more dependent

60% have restricted mobility

(doubled in F)

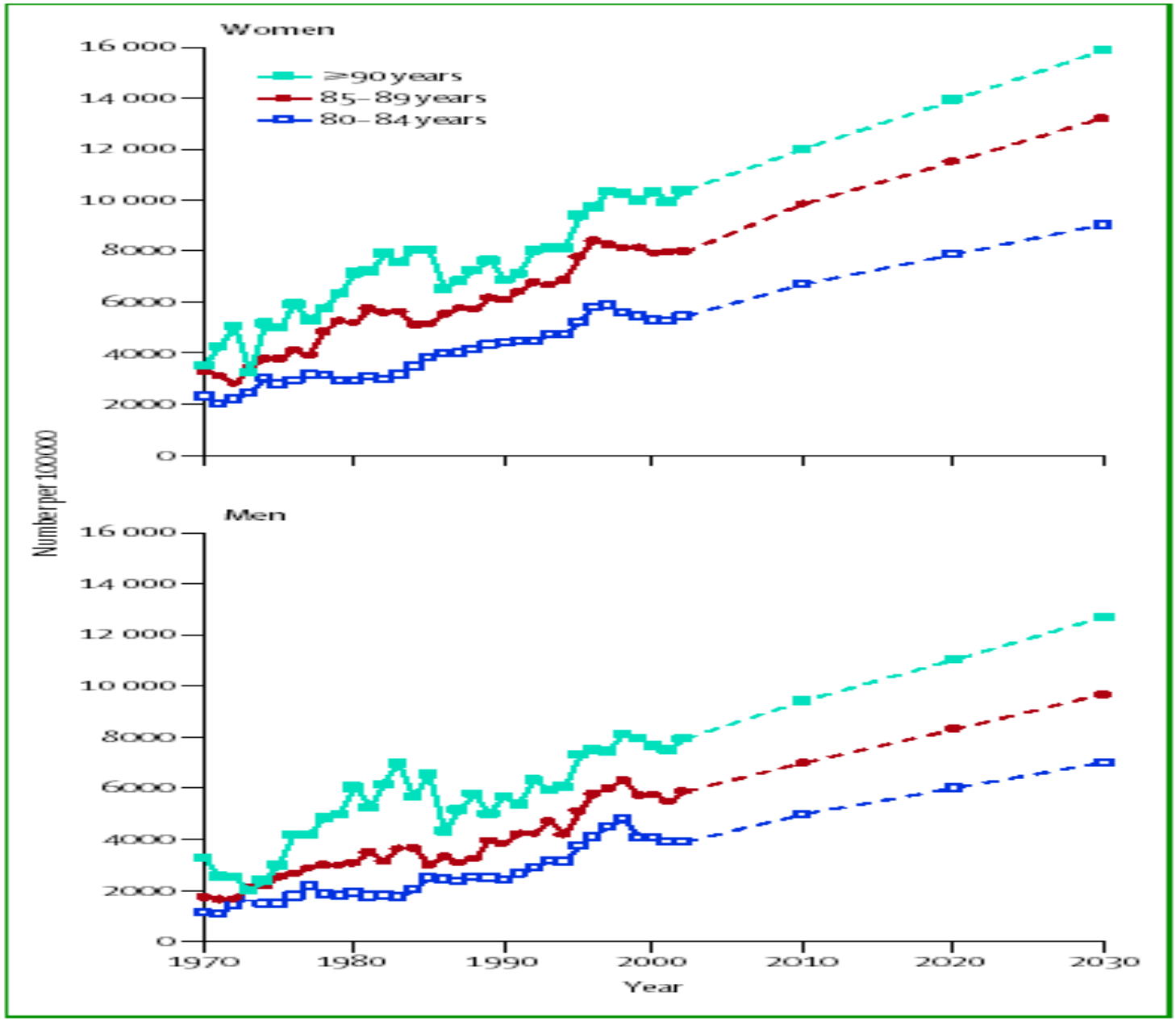


Figure 1: Incidence of hospital-treated fall-induced injuries in Finnish people aged 80 years or older in 1970–2002
Broken lines– incidence prediction until the year 2030. Prediction was calculated with linear regression model based on data for 1970–2002.

Interventions have used two different approaches: a single-intervention strategy (such as exercise, vitamin D, or withdrawal of psychotropic drugs); or more multifactorial preventive programmes, including simultaneous assessment and reduction of many of the individual's predisposing and situational risk factors. In prevention of injury despite falling, an approach of injury-site protection (hip protectors) has been used. Additionally, a traditional approach for one specific injury group or bone fracture has been prevention and treatment of osteoporosis.

Theoretically, a multifactorial intervention for elderly people should be more effective than its single-intervention counterpart since causes and risk factors of falling are usually multiple with striking intraindividual (fall to fall) and interindividual variation.[39] On the other hand, a single-factor intervention such as exercise could also reduce many impairments and disabilities and more distant risk factors for falling simultaneously

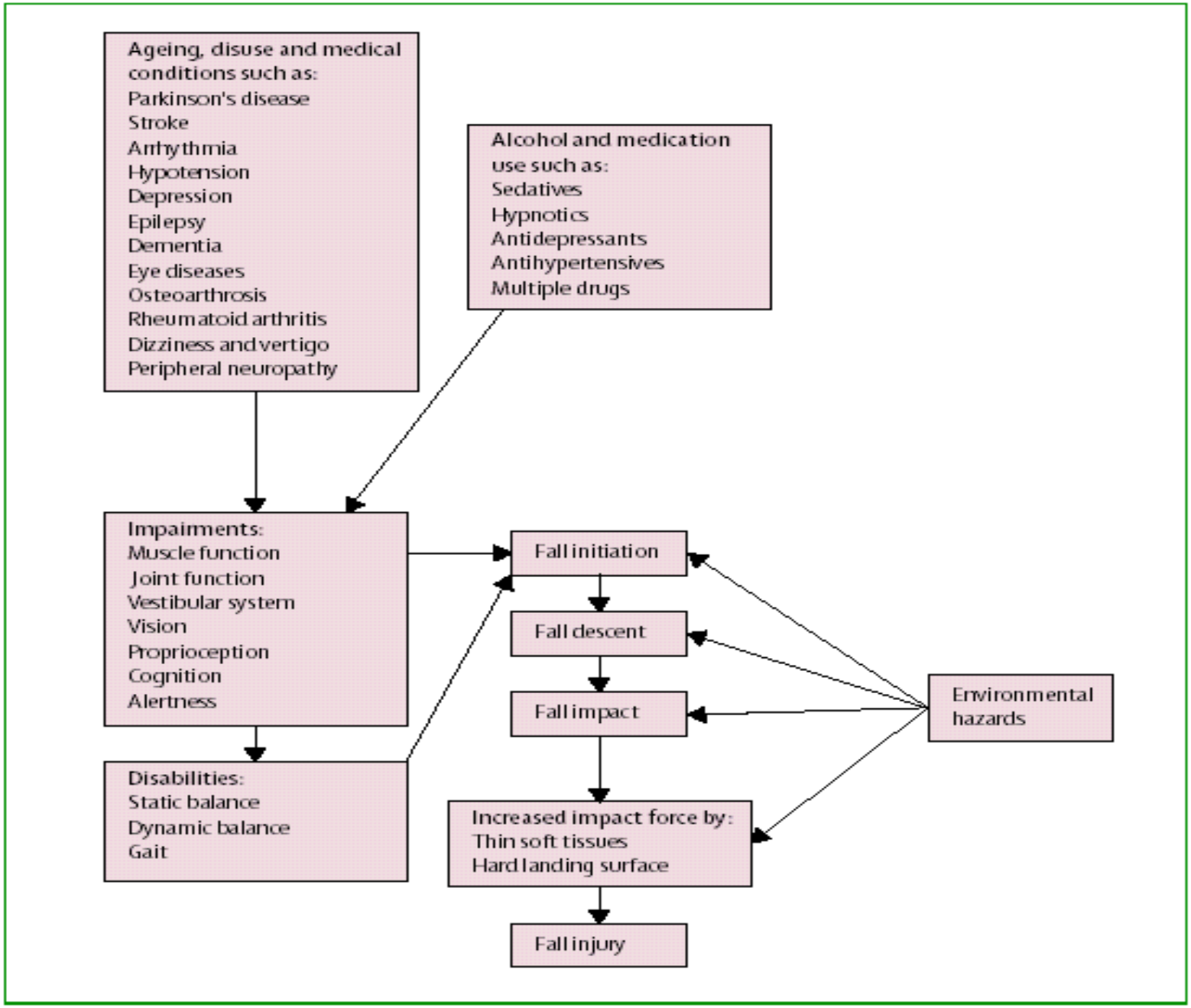


Figure 2: Flow diagram showing the determinants of falls and injuries
Adapted from Carter N, Kannus P, Khan KM.[43]

Fall prevention: single intervention strategy

- Strength and balance training
- Vitamin D and calcium
- Reduction of psychotropic medication
- Expedited cataract surgery
- Cardiac pacing
- Home hazard assessment and modification

Strength and balance training

N.17 RCT + meta-analyses + systematic reviews confirmed
strength and balance training
for elderly adults living in community
can reduce 15-50%
the risk of both non- injurious and injurious falls.

N.4 RCT suggested
not only individually tailored training but also more
untargeted group exercise programmes
are effective in preventing falls (balance).

Strength and balance training

Improve many risk factors of falling (muscle strength, flexibility, balance, coordination, proprioception, reaction time and gait)

even in very old and frail elderly.

Optimum type, frequency, duration, intensity of exercise ?

High cost !

Thus, with respect to fall and injury prevention, regular strength and balance exercises can be recommended for elderly people. This view is reinforced by the fact that regular physical activity provides substantial other health related benefits and is cheap, safe, readily available, and a largely acceptable way of maintaining musculoskeletal health and reducing the propensity to fall.[43,71–75]

Vitamin D and calcium

Vit.D has a role in alleviation muscle atrophy, improving muscle function and dynamic muscoloskeletal performance.

Effects could be pronounced with calcium supplementation (>500mg/d)

Reduction of risk of falling:

50% in women with vit.D deficiency or after surgery for hip fractures

20% in ambulatory or institutionalised elderly with stable health.

2003-5 n.2 RCT + 2 review: negative results in fall prevention

> Although many important issues, such as optimum type and dose of vitamin D and calcium, and the true fall and fracture preventing effects of these supplementations are unresolved, vitamin D with calcium could reasonably be recommended for most elderly individuals—at least those known to be at high risk for deficiency of these substances (ie, frail elderly adults living in institutions).

Reduction psychotropic medication

Psychotropic medication increases the risk of falling.[3,54,94] One randomised trial only has been done, and it showed that gradual withdrawal of psychotropic drugs reduced the risk of falling by 66%.[95] This type of strategy is of utmost importance in our modern pharmaceutically oriented health care, and further investigation is needed.

(Campbell 1999)

Atypical Antipsychotic Medications and Risk of Falls in Residents of Aged Care Facilities

Le T. T. Hien, BS,[*] Robert G. Cumming, MB, BS, MPH, PhD,[§] Ian D. Cameron, MB, BS, PhD,[†] Jian S. Chen, MD,[‡] Stephen R. Lord, PhD,[‖] Lyn M. March, MB, BS, PhD,[‡] Jennifer Schwarz, RN,[‡] David G. Le Couteur, MB, BS, PhD,[§] and Philip N. Sambrook, MD[§]*

J Am Geriatr Soc 53:1290–1295, 2005.

Aim: to determine whether use of atypical antipsychotics is associated with lower risk of falls than use of typical antipsychotics

Design: prospective cohort study with 1 mo follow-up

Setting: NH

Subjects: n.2005 patients (86 y)

RESULTS: One thousand one hundred seven subjects (55%) used at least one type of psychotropic medication, with 289 (14%) using an antipsychotic. There were 82 olanzapine users, 38 risperidone users, and 181 users of typical antipsychotics. Eleven percent of subjects (n = 226) had at least one fall during follow-up. After adjusting for a comprehensive range of falls risk factors, hazard ratios (HRs) for falls were 1.35 (95% confidence interval (CI) = 0.87–2.09) for typical antipsychotics, 1.32 (95% CI = 0.57–3.06) for risperidone, and 1.74 (95% CI = 1.04–2.90) for olanzapine. Antidepressants were also associated with falls (adjusted HR = 1.45, 95% CI = 1.09–1.93).

Table 3. Associations Between Use of Psychotropic Medications and Risk of Falls, Adjusted for Potential Confounders (N = 1,845; n = 204 Fallers)

Medication	Univariate Analyses* (Hazard Ratio 95% Confidence Interval)	Multivariable-Adjusted Analysis† (Hazard Ratio 95% Confidence Interval)	*P*-value
Olanzapine (yes/no)	2.35 (1.43–3.87)	1.74 (1.04–2.90)	.04
Risperidone (yes/no)	1.70 (0.75–3.82)	1.32 (0.57–3.06)	.52
Typical antipsychotics (yes/no)	1.48 (0.96–2.26)	1.35 (0.87–2.09)	.19
Antidepressants (yes/no)	1.56 (1.19–2.04)	1.45 (1.09–1.93)	.01
Sedatives/anxiolytics (yes/no)	1.37 (1.10–1.72)	1.19 (0.94–1.50)	.15

* Univariate analyses produced crude hazard ratios for each medication without adjusting for any other variable.

† Adjusted for other psychotropics in the model, age, sex, type of residential care facility, length of stay (log), Residential Classification Scale score, Implicit Illness Severity Scale score, Mini-Mental State Examination score, Parkinson's disease, previous falls, and static balance score. One hundred sixty subjects were missing from analysis because of missing data on one or more variables.

CONCLUSION: Despite fewer extrapyramidal side effects, atypical antipsychotic medications are not associated with fewer falls than the older, more-established antipsychotics. J Am Geriatr Soc 53:1290–1295, 2005.

Expedited cataract surgery

We do not know whether visual corrections with glasses would reduce risk of falling, although a recent randomised trial in elderly women indicated that, compared with surgery-waiting controls, expedited surgery for first cataract reduced the rate of falling by 34% in the intervention group.[99]

(Harwood 2005)

Cardiac pacing

Some elderly adults have cardioinhibitory carotid sinus hypersensitivity and could develop hypotension, bradykardia, paroxysmal asystole, syncope, and subsequent falls. In the SAFE PACE I study,[101] reductions of 58% in falls and 70% in fall-induced injuries were seen after cardiac pacing of elderly adults with this syndrome. However, findings have not been so clear cut in the pacemaker group of the frailer and cognitively impaired patients of the SAFE PACE II study.[102]

Home hazard assessment and modification

According to the most recent Cochrane review[16] with three randomised trials as the database, home hazard assessment and modification that is professionally prescribed for elderly people with a history of falling is likely to reduce the risk of falling by about a third. Pure home visits or home hazard reduction in lower-risk elderly populations seem ineffective.[40,53,59,103–105]

Fall prevention: multiple intervention strategy

- Effectiveness
- Components
- Limitations

Effectiveness of multiple-intervention

Many randomised trials have shown, and meta-analyses and systematic reviews corroborated, that multiple-intervention strategies can prevent falls in elderly adults by 20–45% by simultaneously affecting many intrinsic and extrinsic risk factors.[9,10,16,22,40,46,50,53,54,106–113] The number of people falling is also reduced. On the other hand, less favourable results have been reported in care or nursing home residents.[114–116]

Effectiveness of multiple-intervention

Systematic reviews of inpatients have shown no consistent evidence so far for prevention of falls.[22,50,118] Two additional randomised trials have shed light on this issue. Healey and colleagues[119] examined the effect of a simple core-care plan targeting risk factor reduction in elderly care wards of a general hospital and showed, compared with the control wards, a 30% relative risk reduction in falls in the intervention wards. Haines and co-workers[111] also reported that a targeted falls prevention programme in a subacute hospital setting resulted in 30% reduction in falls.

Age and Ageing 2004; **33:** 390–395
DOI: 10.1093/ageing/afh130

Age and Ageing Vol. 33 No. 4 © British Geriatrics Society 2004; all rights reserved
Published electronically 19 May 2004

Using targeted risk factor reduction to prevent falls in older in-patients: a randomised controlled trial

FRANCES HEALEY[1], ANDREW MONRO[2], ANGELA COCKRAM[3], VICKI ADAMS[4], DAVID HESELTINE[3]

Aim: to test the efficacy of a targered risk factor reduction core care plan in reducing risk of falling while in hospital

Design: RCT

Setting: n.8 geriatric wards, LOS 20 day

Subjects: n.3386 patients (over 75 y)

Table 1. Components of the core care plan and guidelines

Health screening checklist	Targeted intervention
Eyesight – able to recognise pen/key/watch from two meters distance	If unable to recognise, optician visit if lost glasses, ophthalmology referral if no known reason for poor eyesight
Medication – check for sedatives, anti-depressants, diuretics, polypharmacy, etc.	Medical review of prescription benefit related to falls risk
Lying and standing blood pressure	Refer any deficit to medical staff. Advise patient on changing position slowly
Ward test urine	Send mid-stream urine sample if positive for nitrites, blood or protein
Difficulty with mobility	Refer to physiotherapist
Environmental check	
Review risk/benefit of bedrails for individual	Documentation of risk/benefit in nursing notes and removal or addition of bedrails as appropriate
Footwear safety	Advise relatives on replacement
Bed height	Keep at lowest height
Position in ward	Nurse patient with history of falls as close to nurses' station as possible (considering other patients' needs)
Simple environmental cause of falls (e.g. loose cable, wet floor)	Act to correct it
Nurse call bell	Explained and within reach

Results: after introduction of the care plan there was a significant reduction in the relative risk of recorded falls on intervention wards (relative risk 0.79, 95% CI 0.65–0.95) but not on control wards (RR 1.12, 95% CI 0.96–1.31). The difference in change between the intervention wards and control wards was highly significant (RR 0.71, 95% CI 0.55–0.90, $P = 0.006$). There was no significant reduction in the incidence of falls-related injuries.

Conclusion: the use of a core care plan targeting risk factor reduction in older hospital in-patients was associated with a reduction in the relative risk of recorded falls.

Age and Ageing 2004; **33:** 390–395

with a reduction in the relative risk of recorded falls in the intervention wards and was introduced without additional cost. Utilising existing systems of documentation, such as core care plans and accident reporting forms, may be effective in concentrating the minds of staff on the existence of fall risk factors and promoting action to remove or ameliorate them where possible.

Age and Ageing 2004; **33:** 390–395

Effectiveness of targeted falls prevention programme in subacute hospital setting: randomised controlled trial

Terry P Haines, Kim L Bennell, Richard H Osborne, Keith D Hill

BMJ VOLUME 328 20 MARCH 2004

Objective To assess the effectiveness of a targeted, multiple intervention falls prevention programme in reducing falls and injuries related to falls in a subacute hospital.

Design Randomised controlled trial of a targeted multiple intervention programme implemented in addition to usual care compared with usual care alone.

Setting Three subacute wards in a metropolitan hospital specialising in rehabilitation and care of elderly patients.

Participants 626 men and women aged 38 to 99 years (average 80 years) were recruited from consecutive admissions to subacute hospital wards.

Intervention Falls risk alert card with information brochure, exercise programme, education programme, and hip protectors.

Main outcome measures Incidence rate of falls, injuries related to falls, and proportion of participants who experienced one or more falls during their stay in hospital.

Table 1 Four interventions and referring disciplines of targeted falls prevention programme

Intervention	Description	Referring discipline
Falls risk alert card	Falls risk alert symbol on A4 size card placed above participant bed head. Information brochure targeted at family members/carers to discuss with participant nature of hospital falls and ways of preventing them	Nursing staff
Exercise programme*	Three 45 minute sessions per week conducted by research physiotherapists in location away from view of hospital physiotherapists. Exercises incorporated therapeutic principles of t'ai chi[22] combined with functional activities such as transferring from chair to chair, stepping, reaching, and weight shifting. Exercises tailored to meet individual abilities of participants	Physiotherapy staff
Education programme†	Twice weekly individual sessions of up to 30 minutes conducted by research occupational therapist at participants' bedside away from view of hospital occupational therapists. Education manual that covered nature of hospital falls and how participants can prevent them guided but did not limit content of these sessions. Programme curriculum was covered over four sessions, though participants were allowed to receive repetitions of education sessions as deemed appropriate	Occupational therapy staff
Hip protectors	Safehip‡ (force deflection—firm shield) hip protectors aimed at reducing incidence of fractures of neck of femur. Hospital staff could decide part way into a participant's stay that hip protector was no longer required	Medical, nursing, physiotherapy

Results Participants in the intervention group (n = 310) experienced 30% fewer falls than participants in the control group (n = 316). This difference was significant (Peto log rank test P = 0.045) and was most obvious after 45 days of observation. In the intervention group there was a trend for a reduction in the proportion of participants who experienced falls (relative risk 0.78, 95% confidence interval 0.56 to 1.06) and 28% fewer falls resulted in injury (log rank test P = 0.20). **Conclusions** A targeted multiple intervention falls prevention programme reduces the incidence of falls in the subacute hospital setting.

What is already known on this topic

Although several randomised controlled trials in community settings support the use of targeted multiple intervention programmes in reducing falls, there is little evidence of their effectiveness in hospitals

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The three published trials that investigated falls prevention interventions in the hospital setting were underpowered and did not show a significant reduction in falls

What this study adds

A targeted multiple intervention falls prevention programme in addition to usual care compared with usual care alone reduced the incidence rate of falls by 30% in a subacute hospital setting

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There was also a trend towards a reduction in the proportion of participants who were "fallers" and the incidence rate of fall related injuries

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A targeted programme in addition to usual care leads to safer stays in hospitals for patients

Components of multiple-intervention

The content of the multifaceted interventions has varied substantially from study to study, including components such as strength, balance, and gait training; improving transferring and ambulation with or without the use of aids; footwear improvements; investigation and management of untreated medical problems; medication review and adjustment (especially psychotropic drugs); vision tests with referral to an optometrist or ophthalmologist if necessary; hip protectors; patient and staff education about fall prevention; fall risk alert cards; post-fall assessments; and environmental and home risk assessment and management.

Components of multiple-intervention

This heterogeneity not only indicates the complexity of the falls problem, but also prevents direct study-to-study comparisons and thus straightforward recommendations for optimum multiple intervention for fall prevention. General guidelines for fall prevention seem to have accommodated effective single interventions and used them as the basis for the various components of multipart interventions.[10,16,22,50,53,54,117,121–123]

Limits of multiple-intervention

- Cannot distinguish between the independent role of individual modified risk factor
- Cannot established which part of the intervention is effective
- To implement a complex intervention when, in truth, the use of 1 or 2 of its components is equally effective
- Intensive and expensive labour; no cost-effective
- Importance of selection of content and target group

Conclusions

Thus, fall prevention in elderly people consists of regular strength and balance training, vitamin D and calcium supplementation, reduction of the number and doses of psychotropic medication, cataract surgery, and professional home-hazard assessment and management in people with a history of falling. Programmes for simultaneous assessment and reduction of many of the predisposing and situational risk factors are also effective in prevention of falls, although their implementation might be expensive. In prevention of fall-induced injuries, strength and balance training provides the most consistent and best evidence, followed by vitamin D and calcium supplementation, and, for hip fractures, use of hip protectors can be an effective alternative. Vitamin D, calcium, and hip protectors are probably most effective for institutionalised people at high risk.

Much work needs to be done, and many subgroups, such as frail elderly men and people with cognitive impairment or chronic stroke, will need further investigation. Future studies should be large enough to see the effect of the intervention on not only falls but also fall-induced injuries and fractures. Also, before recommendations can be made, any old or new potential intervention for prevention of falls and related injuries, such as bed or chair alarms, movement detectors, canes, walkers, use of restraints or less resistant floorings, footwear improvements, or visual correction with glasses, have to be tested in the same rigorous way.

Reduction in Fear of Falling Through Intense Tai Chi Exercise Training in Older, Transitionally Frail Adults

Richard W. Sattin, MD, Kirk A. Easley, MS,† Steven L. Wolf, PhD, FAPTA,‡ Ying Chen, MS,† and Michael H. Kutner, PhD†*

J Am Geriatr Soc 53:1168–1178, 2005

N.311 community – living patients; 80 y

2 sessions 1-1.5h / w; duration 48 w

vs wellness education (WE)

MEASUREMENTS: Activity-related fear of falling using the Activities-Specific Balance Confidence Scale (ABC) and the Fall Efficacy Scale at baseline and every 4 months for 1 year. Demographics, time to first fall and all subsequent falls, functional measures, Centers for Epidemiologic Studies Depression Scale, medication use, level of physical activity, comorbidities, and adherence to interventions.

RESULTS: Mean ABC was similar in both cohort groups at the time of randomization but became significantly higher (decreased fear) in the tai chi cohort at 8 months (57.9 vs 49.0, $P < .001$) and at study end (59.2 vs 47.9, $P < .001$). After adjusting for covariates, the mean ABC after 12 months of intervention was significantly greater in the tai chi group than in the WE group, with the differences increasing with time (mean difference at 12 months = 9.5 points, 95% confidence interval = 4.8–14.2, $P < .001$).

CONCLUSION: Tai chi led to a significantly greater reduction in fear of falling than a WE program in transitionally frail older adults. The mean percentage change in ABC scores widened between tai chi and WE participants over the trial period. Tai chi should be considered in any program designed to reduce falling and fear of falling in transitionally frail older adults.

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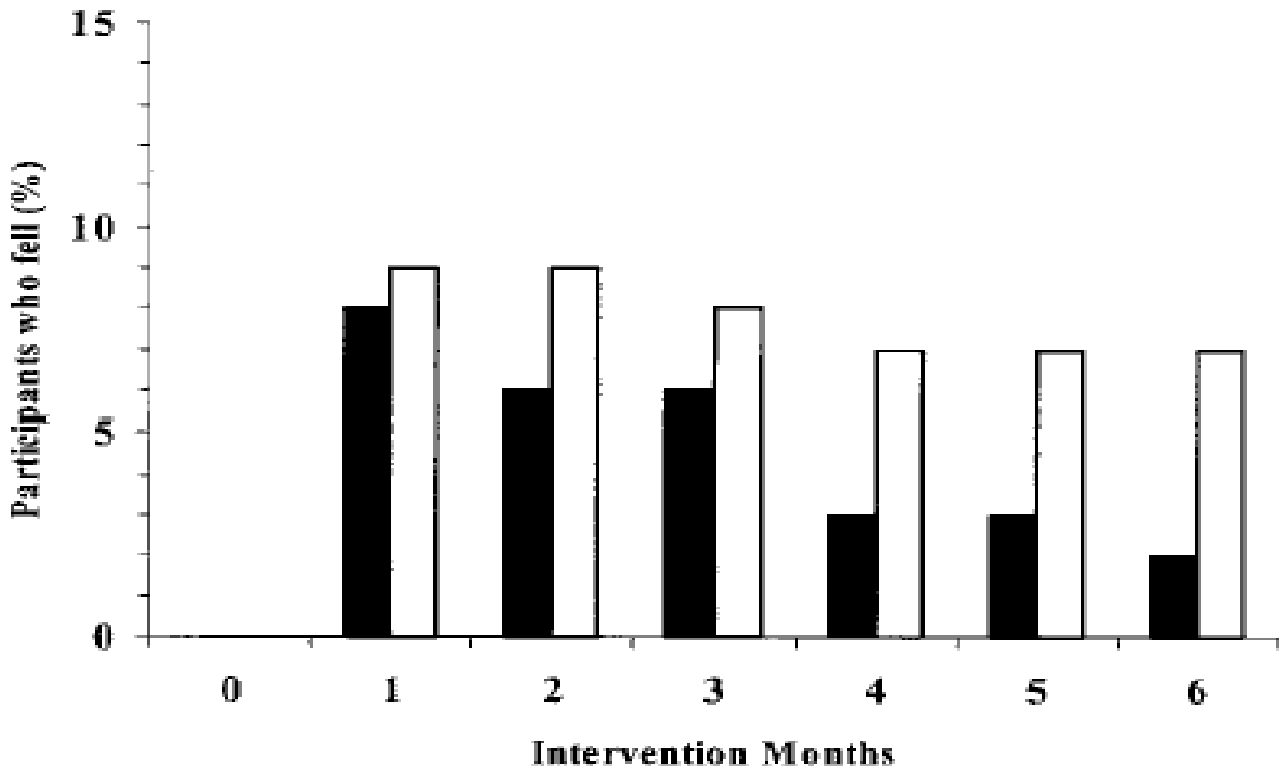
Tai Chi and Fall Reductions in Older Adults: A Randomized Controlled Trial

Fuzhong Li,[1] Peter Harmer,[2] K. John Fisher,[1] Edward McAuley,[3] Nigel Chaumeton,[1] Elizabeth Eckstrom,[4] and Nicole L. Wilson[1]

Methods. This randomized controlled trial involved a sample of 256 physically inactive, community-dwelling adults aged 70 to 92 (mean age, 77.48 years; standard deviation, 4.95 years) who were recruited through a patient database in Portland, Oregon. Participants were randomized to participate in a three-times-per-week Tai Chi group or to a stretching control group for 6 months. The primary outcome measure was the number of falls; the secondary outcome measures included functional balance (Berg Balance Scale, Dynamic Gait Index, Functional Reach, and single-leg standing), physical performance (50-foot speed walk, Up&Go), and fear of falling, assessed at baseline, 3 months, 6 months (intervention termination), and at a 6-month postintervention follow-up.

Results. At the end of the 6-month intervention, significantly fewer falls ($n = 38$ vs 73; $p = .007$), lower proportions of fallers (28% vs 46%; $p = .01$), and fewer injurious falls (7% vs 18%; $p = .03$) were observed in the Tai Chi group compared with the stretching control group. After adjusting for baseline covariates, the risk for multiple falls in the Tai Chi group was 55% lower than that of the stretching control group (risk ratio, .45; 95% confidence interval, 0.30 to 0.70). Compared with the stretching control participants, the Tai Chi participants showed significant improvements ($p < .001$) in all measures of functional balance, physical performance, and reduced fear of falling. Intervention gains in these measures were maintained at a 6-month postintervention follow-up in the Tai Chi group.



Tai Chi Participants	**125**	**110**	**106**	**101**	**98**	**95**	**95**
Stretching Participants	**131**	**97**	**95**	**95**	**94**	**93**	**93**

Figure 2. The percentage of participants who fell during the intervention months (month 1 through month 6) is shown. The numbers at the bottom of the figure represent the numbers of participants remaining in the trial at the end of each month. Filled columns, Tai Chi participants; open columns, stretching participants.

Conclusion

Older persons can decrease the number of falls and injurious falls by participating in a regular program of Tai Chi. Additional concomitant benefits of Tai Chi include improved functional balance and physical performance and reduced fear of falling, indicating the utility of Tai Chi for maintaining and promoting health and functional mobility among older adults. The sustained benefits of Tai Chi justify advocating long-term practice. With this accumulated evidence, the time is near for Tai Chi to be recommended as a preferred exercise for balance training and to be routinely prescribed for older patients at risk for falling after appropriate screening (4).

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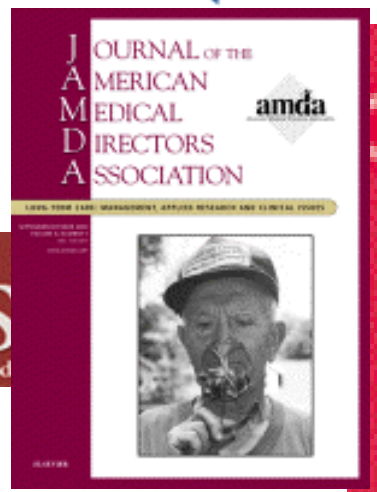

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Prevention of falls—a time to translate evidence into practice

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It is 10 years since the publication of Tinetti's seminal paper showing that it is possible to prevent falls in an at-risk population [1]. The recent release of UK NICE guidelines 'Falls: the assessment and prevention of falls in older people' summarise the available evidence up until the end of 2003 and give simple guidance on approaches found to be effective in preventing falls in older people [2]. The guidelines build on the existing BGS/AGS/AOA guidelines [3] and dovetail with the Cochrane database for falls [4].

With 10 years' worth of randomised controlled clinical trial (RCT) data one might reasonably enquire as to whether we have enough data to steer us in the right direction and perhaps the time has come to invest time, energy and resource into the implementation of the evidence base.

There is little doubt that prevention of falls is a complex area given the methods by which we identify and define risk, the heterogeneity of the population at risk and the modes of intervention on offer. Are all falls of equal impact and are all interventions of equal value within and between different at-risk populations?

Mencken's law—'to every complex problem, there is a simple, easy to understand, wrong answer'.

There are undoubtedly remaining gaps in the falls literature which require further scientific scrutiny and experimentation. However, 10 years after the publication of Tinetti's successful paper on the prevention of falls in community-dwelling older people with pre-determined risk factors for falls, I wonder what percentage of an equivalent population now receive this care as standard everyday practice. How long will it be before Davison *et al.* can say that assessment and access to a specialised falls service for older people presenting to the Emergency Department with a fall is routine clinical practice?

Secondary prevention of falls and osteoporotic fractures in older people

Oliver BMJ 331:123-4, 2005

Systematic understimation of the problem results from the lack of an International Classification of Disease (ICD) diagnostic code for falls in older people and

the tunnel vision of health staff who fail to list falls as the underlying reason for presenting injury.

Guideline 2004 UK NICE

National Institute for Health and Clinical Excellence

National service framework for older people in UK stipulates that by 2005 all localities will have a comprehensive, integrated service for the prevention of falls and fractures.

But at the present there are few services.

A problem so common, so costly, and so harmful
– and with this much potential for prevention –
does not deserve “backwater” status,
just because older people are its main victims.

2005 avanzamenti

- Conferma: prevenzione cadute è una realtà
- Complessa e difficilmente standardizzabile
- Condizionata non solo dal paziente e setting, ma anche dal team
- Unità funzionale: IP+ FKT + consulenza medica ?
- Assessment rischio con protocolli
- Interventi multifattoriali
- Esercizio fisico riduce cadute
- Valore componenti interventi multifattoriali
- Applicabilità e costi