

La riabilitazione e l'anziano fragile

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Il nuovo scenario della riabilitazione

Anziani e ospedale

	Dato nazionale (Min Sal, 1999)	Dato nazionale (Min Sal, 2004)	Dato nazionale (Min Sal, 2005)
Totale ricoveri ↓	10.165.184	9.096.392	8.970.561
65-74 aa ↓	1.981.181 (19.49%)	1.603.797 (17.63%)	1.578.735 (17.60%)
> 75 aa ↑	1.767.460 (17.39%)	1.970.274 (21.66%)	2.028.357 (22.61%)
Totale ultra65enni	3.748.641 (36.88%)	3.574.071 (39.29%)	3.607.092 (40.21%)

Discharge setting for patients with hip fracture

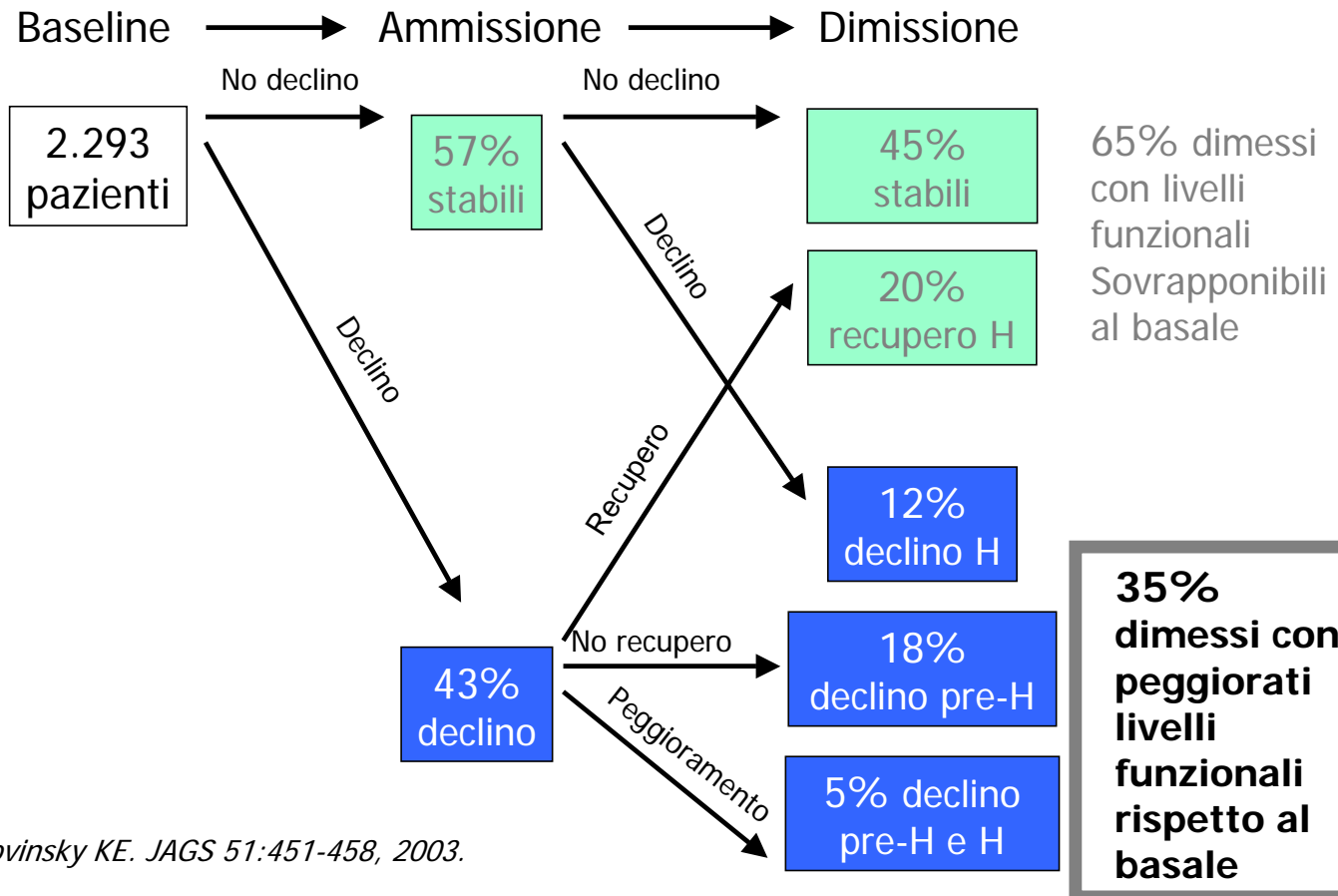
	2001 (n=9,791)	2002 (n=9,122)	2003 (n=8,928)	2004 (n=8,656)	2005 (n=8,187)
Age (mean ± SD)	83.6 ± 7.3	83.4 ± 7.3	83.6 ± 7.4	83.4 ± 7.3	83.3 ± 7.4
Women (%)	76.7	75.9	75.9	75.5	74.6
Race/ethnicity (%)					
Whites	93.1	92.9	93.5	93.2	93.0
Blacks	3.7	3.6	3.5	3.5	3.5
Hispanics	1.1	1.2	1.1	1.3	1.2
Others	2.1	2.4	1.9	2.0	2.3
Admitting diagnoses (%)					
Transcervical fracture	34.7	35.2	34.8	35.1	35.3
Pertrochanteric fracture	20.4	20.5	20.2	19.9	19.5
Not specified	45.0	44.3	45.0	45.0	45.1
Comorbidity (%)					
None	--	46.0	46.7	44.6	44.2
1	--	26.4	25.5	26.5	27.6
2	--	14.4	15.2	14.7	14.9
3 or more	--	13.1	12.6	14.2	13.3
Procedure (%)					
None	7.7	7.7	7.3	7.8	7.5
Internal fixation	57.3	56.9	56.2	57.0	57.0
Arthroplasty	35.0	35.4	36.5	35.2	35.5
Hospital length of stay (mean ± SD)	6.5 ± 4.8	6.6 ± 5.7	6.5 ± 4.9	6.4 ± 5.5	6.3 ± 4.5
Discharge (%)					
Home	12.5	11.2	9.2	9.4	8.8
IRF	12.2	17.5	21.3	22.8	23.9
SNF	65.5	63.7	62.7	62.2	61.5
NH/Long-term care/hospice	6.4	4.3	3.2	2.5	2.6
Died	3.4	3.8	3.6	3.1	3.2

Trends in LOS, functional outcomes and mortality following medical rehabilitation UDS Medical Rehab (n=148,807)

	1994	1996	1998	2001
Age, mean (SD)	69.9 (15.3)	68.9 (15.4)	66.8 (16.5)	67.8 (15.6)
LOS, median, d	20 (13-29)	16 (10-25)	13 (8-20)	12 (7-19)
Time to follow-up, median, d	89 (83-96)	89 (84-97)	90 (84-98)	89 (82-93)
Onset to admission, median, d	8 (6-16)	7 (4-13)	6 (4-11)	5 (3-10)
Comorbidities, % (ICD, 9 th)				
0	32	31	33	35
1-3	47	41	42	45
>3	21	28	25	20
Discharge home, no (%)	9364 (75)	12290 (71)	16035 (67)	11670 (63)
Follow-up setting at home	10590 (87)	15453 (89)	21645 (90)	16530 (86)
Efficiency	1.4 (0.9)	1.7 (1.2)	2.0 (1.8)	2.4 (1.8)
Mortality, %	0.9	2.2	3.1	4.7

Ottenbacher JAMA, 2004

Functional transitions in older adults hospitalized with medical illnesses



Kovinsky KE. JAGS 51:451-458, 2003.

Profili clinici 2003-2005-2007 dei pazienti ricoverati in Riabilitazione AdC, Cremona

	2003	2005	2007
Età (anni)	76.2±11.3	76.9±10.7	78.8±10.0
75-89 anni	57.5	57.4	62.6
90 anni	7.4	8.0	10.3
Sesso femminile	71.7	72.8	70.7
MMSE	22.6±6.3	22.5±6.3	21.5±6.6
GDS 15-items	6.1±3.6	5.8±3.3	6.1±3.7
BMI (Kg/cm ²)	24.4±4.9	25.7±5.4	24.2±5.6
Charlson Index	2.7±2.2	2.7±2.0	--
CIRS severity	--	--	1.8±0.3
CIRS comorbidity	--	--	4.2±1.9
Barthel pre-ingresso	81.8±22.0	83.5±21.1	80.8±22.3
Barthel ingresso	55.6±27.7	56.6±26.0	55.1±27.9
Barthel dimissione	74.0±5.7	77.7±25.2	72.6±27.9
≤1 evento avverso	27.6	25.5	31.5
≥2 eventi avversi	11.6	13.2	18.7

I valori sono espressi come Media + DS o %

Da: Bellelli & Trabucchi *Riabilitare l'anziano*, in press

Chi sono allora i pazienti della riabilitazione?

- L'età media degli utenti è aumentata
 - Quota crescente di "*oldest old*"
- È aumentata la comorbilità
- È diminuita la durata della degenza negli ospedali per acuti (sotto la pressione dei DRG)
- La dimissione è più precoce che non nel passato ed avviene verso i reparti di riabilitazione
- I pazienti giungono in reparto compromesi sotto il profilo funzionale e più "instabili" (eventi clinici avversi) che non nel passato

Rehabilitation of frail elders: critical points

1. La definizione di fragilità

Frailty and the Foolishness of Eos

- For the Greeks, equivalence between longevity and physical decadence is a limit only for humans. In fact, gods can age and remain fit. It is through “foolishness,” or forgetfulness, rather than necessity, that living long becomes associated with frailty: Eos asked of Zeus that Tithonos may be deathless but forgets to ask for agelessness and its specific corollary, eternal youth, therefore bringing to her lover eternal aging. Interestingly, a “wise” solution to this dilemma was to transform Tithonos into a cicada (tettix). Greeks believed the cicada, being almost free from the need of food and at the same time having an extremely short life, to be a symbolic bridge between the ageless immortals and humans.

Table 1. Frailty-Defining Criteria: WHAS and CHS

Characteristics	WHAS		CHS	
	Definition	%*	Definition	%*
Weight loss	Either of: i) Weight at age 60 – weight at exam $\geq 10\%$ of age 60 weight or ii) BMI at exam $< 18.5 \text{ kg/m}^2$	12.7	Lost >10 pounds unintentionally in last year	7.3
Exhaustion	Self-report of any of: i) low usual energy level (≤ 3 , range 0–10) [†] , ii) felt unusually tired in last month [‡] , or iii) felt unusually weak in the past month [‡]	14.1	Self-report of either of: i) felt that everything I did was an effort in the last week, or ii) could not get going in the last week	21.3
Low energy expenditure [§]	90 on activity scale (6 items)	19.8	270 on activity scale (18 items)	24.1
Slowness [§]	Walking 4 m: Speed $\leq 4.57/7$ for height ≤ 159 cm or Speed $\leq 4.57/6$ for height >159 cm	31.3	Walking 15 feet (4.57 m): Time ≥ 7 for height ≤ 159 cm or Time ≥ 6 for height >159 cm	38.0
Weakness [§]	Grip strength: As for CHS	20.8	Grip strength ≤ 17 for BMI ≤ 23 , ≤ 17.3 for BMI 23.1–26, ≤ 18 for BMI 26.1–29, or ≤ 21 for BMI $>29 \text{ kg/m}^2$	26.2
Overall frailty status	Robust	44.9	Robust	33.2
	Intermediate	43.8	Intermediate	55.2
	Frail	11.3	Frail	11.6

The Edmonton Frail Scale

Frailty domain	Item	0 point	1 point	2 points
Cognition	Please imagine that this pre-drawn circle is a clock. I would like you to place the numbers in the correct positions then place the hands to indicate a time of 'ten after eleven'	No errors	Minor spacing errors	Other errors
General health status	In the past year, how many times have you been admitted to a hospital? In general, how would you describe your health?	0 'Excellent', 'Very good', 'Good'	1-2 'Fair'	≥2 'Poor'
Functional independence	With how many of the following activities do you require help? (meal preparation, shopping, transportation, telephone, housekeeping, laundry, managing money, taking medications)	0-1	2-4	5-8
Social support	When you need help, can you count on someone who is willing and able to meet your needs?	Always	Sometimes	Never
Medication use	Do you use five or more different prescription medications on a regular basis? At times, do you forget to take your prescription medications?	No No	Yes Yes	
Nutrition	Have you recently lost weight such that your clothing has become looser?	No	Yes	
Mood	Do you often feel sad or depressed?	No	Yes	
Continence	Do you have a problem with losing control of urine when you don't want to?	No	Yes	
Functional performance	I would like you to sit in this chair with your back and arms resting. Then, when I say 'GO', please stand up and walk at a safe and comfortable pace to the mark on the floor (approximately 3 m away), return to the chair and sit down'	0-10 s	11-20 s	One of >20 s patient unwilling, or requires assistance
Totals	Final score is the sum of column totals			

2. La definizione del setting

Il setting riabilitativo geriatrico nello scenario internazionale

- Dedicated Geriatric Rehab Unit in Acute Care and Rehab hospital
 - Geriatric Rehab, Geriatric Rehab Unit (GRU), Geriatric Assessment & Rehab Unit (GARU), Geriatric Assessment & Treatment Unit (GATU)
 - Moderate intensity (30' per day, 5 days), interdisciplinary, geographically clustered beds, various goals (including discharge destination), 2 from 12 weeks
- Mixed Rehab Unit in Acute Care and Rehab hospital
 - General Rehabilitation or Medical Rehabilitation
 - Intensive Interdisciplinary Rehab program, geographically clustered beds
 - Disease or specific population disease program, 2-8- weeks
- Low Tolerance Long Duration Rehab in CCC and rehab hospital
 - Geriatric Activation Program, Complex Medical, Functional Enhancement
 - Low to moderate intensive rehab program, interdisciplinary, 3-6 months

Toronto, Ca 2007



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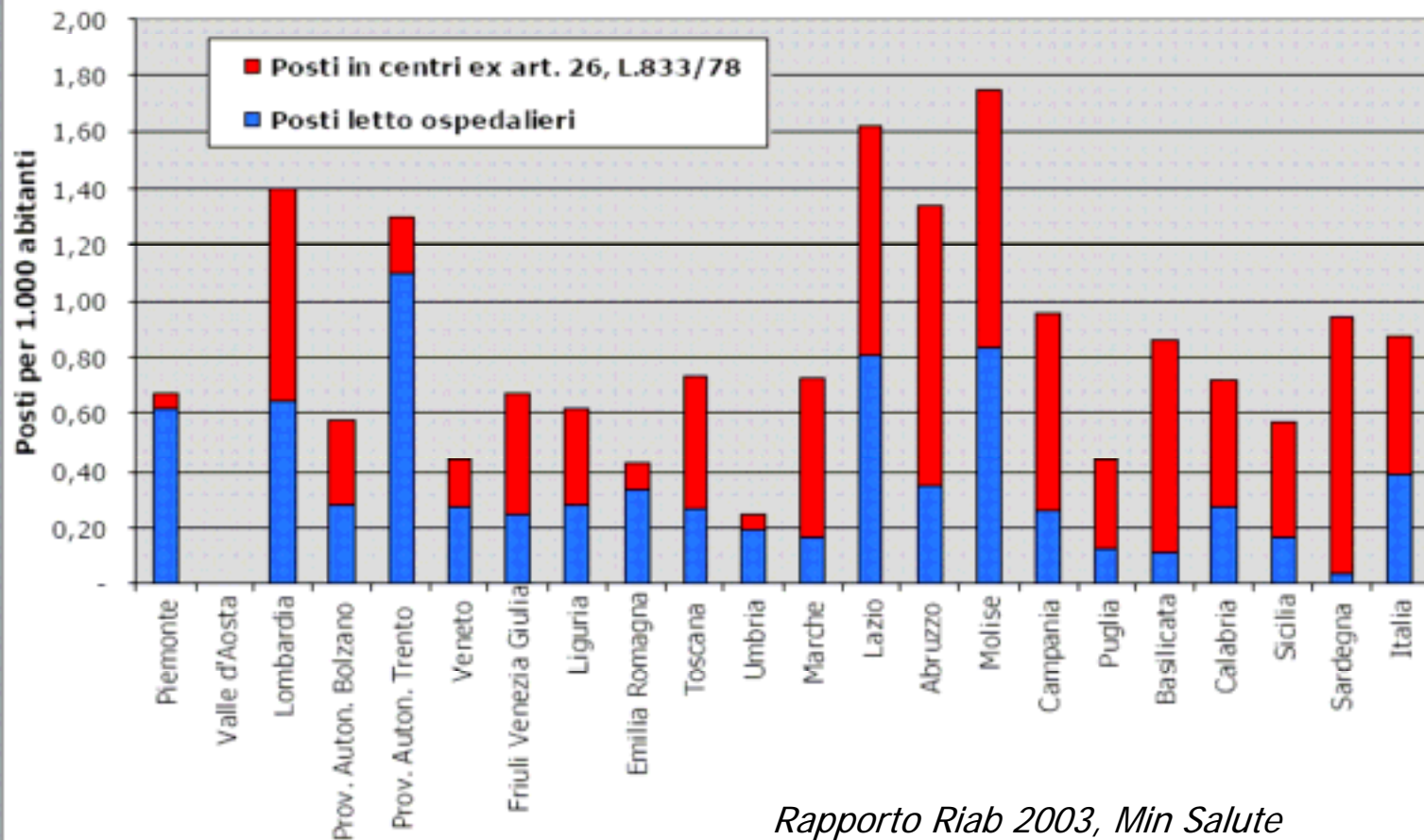
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Posti di riabilitazione in strutture ospedaliere e nei centri ex art. 26, L. 833/78



Rapporto Riab 2003, Min Salute

**In questo contesto
organizzativo-concettuale
possiamo trovare una
specificità all'ambito della
riabilitazione dell'anziano
fragile?**

La complessità come paradigma della riabilitazione nell'anziano fragile

- Comorbilità somatica
 - Impatto diretto ed indiretto
- Comorbilità psichica
 - Demenza
 - Depressione
- Sindromi geriatriche
 - Delirium, DSD (la necessità di una sorveglianza clinica costante)
- Approccio fisioterapico
 - Intensività, body & mind

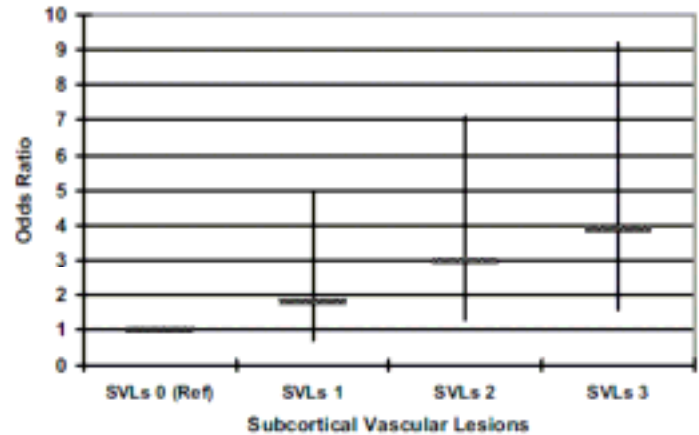
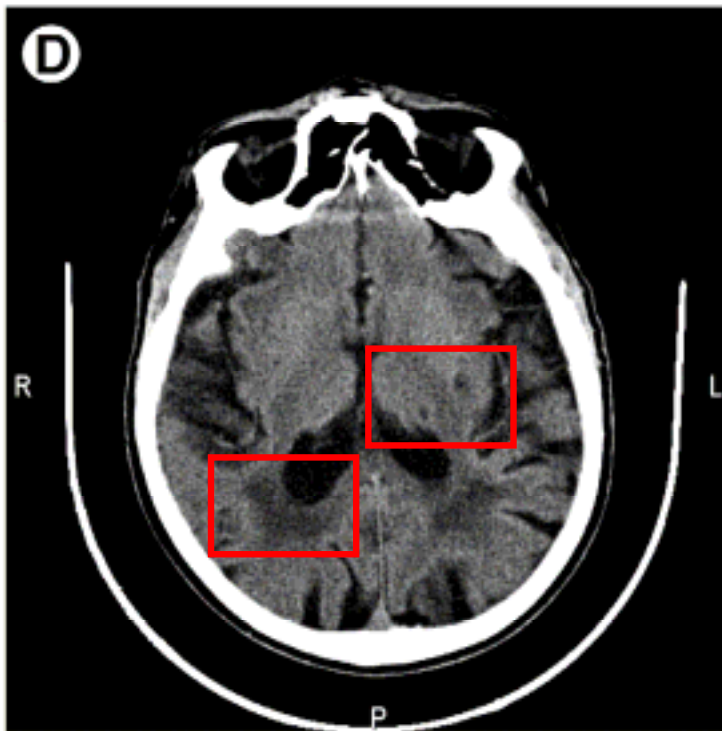
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ORIGINAL ARTICLE

Subcortical Vascular Lesions Predict Falls at 12 Months in Elderly Patients Discharged From a Rehabilitation Ward

Fabio Guerini, MD, Giovanni B. Frisoni, MD, Alessandra Marrè, MD, Renato Turco, MD, Giuseppe Bellelli, MD, Marco Trabucchi, MD



Arch Phys Med Rehab, 2008; 89: 1522-7

Comorbidity and intensity of rehabilitative procedures

	Low comorbidity		High comorbidity		<i>p</i>
	Tinetti 0-12 (n=24)	Tinetti 13-28 (n=26)	Tinetti 0-12 (n=17)	Tinetti 13-28 (n=13)	
Age	74.5±12.6	71.5±8.9	77.8±7.2	76.0±9.1	.41
Female (%)	18 (36.0)	17 (34.0)	9 (30.0)	5 (16.7)	.14
BMI (Kg/cm ²)	25.8±4.5	27.2±4.5	23.4±4.6	24.4±7.2	.18
Albumine (g/dl)	3.5±0.4	3.5±0.2	3.5±0.5	3.5±0.6	.99
Charlson Index	1.5±1.0	1.5±1.1	6.1±1.7	5.1±1.7	.000
Drugs (number)	5.0±2.0	4.5±1.4	5.4±1.5	4.3±1.6	.24
LOS (days)	19.4±6.0	16.0±5.4	27.0±9.5	18.3±3.7	.000
MMSE	24.7±3.7	27.0±2.6	17.0±9.7	22.1±3.6	.000
GDS (15-items)	4.4±3.2	4.4±4.0	5.2±4.1	6.0±3.4	.54
IADL (funct. lost)	2.0±2.3	2.3±2.2	5.7±2.7	4.2±2.4	.008
Barthel Index	47.0±17.4	71.2±13.3	29.7±22.5	66.4±10.0	.000
Tinetti change from adm. to discharge	16.6±4.6	6.0±8.0	6.5±5.8	4.9±2.6	.000
N° procedures	7.6±2.5	5.3±3.1	6.7±2.3	4.7±1.9	.003
RPI	21.3±14.5	13.6±16.3	11.6±10.9	8.1±5.1	.02

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Does cognitive performance affect physical therapy regimen after hip fracture surgery?

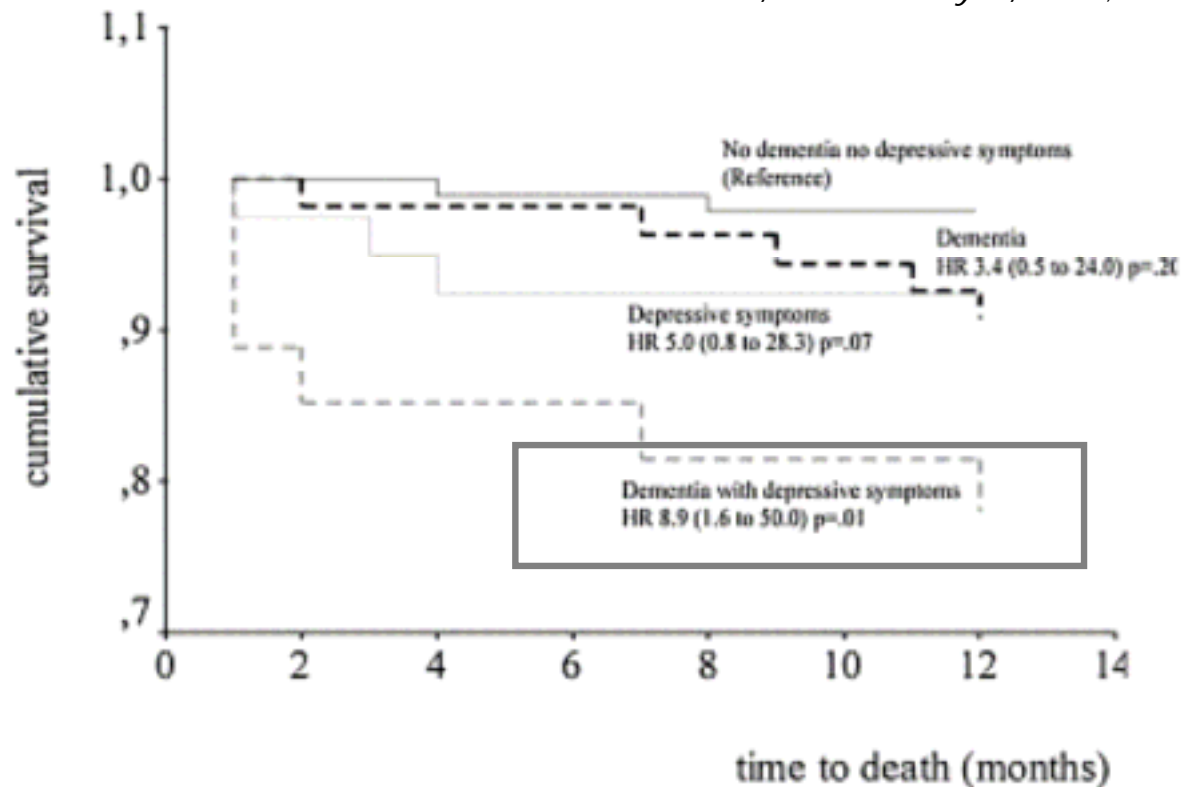
	Non corretto			Corretto *		
	B	95% CI	P	B	95% CI	P
MMSE < 18		ref	Ref		ref	ref
MMSE= 19-24	.7	-0.3 to 1.8	.200	.5	-0.8 to 1.7	.464
MMSE= 25-26	2.4	1.2 to 3.5	<.0005	2.4	1.0 to 3.7	.001
MMSE > 27	3.1	2.0 to 4.1	<.0005	2.6	1.1 to 3.9	.001

* età, sesso, Barthel Index pre-frattura.

B = coefficienti di regressione P = significatività al T test

Depressione, demenza & mortalità

Bellelli G et al, *Int J Ger Psych*, 2008; 23:1073-7



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Delirium & institutionalization and re-hospitalization

Table 3. Predictors of Institutionalization at 12-Month Follow-up

	B	OR	95% Confidence Intervals	P
Age, y				
78 to 83	1.10	3.0	1.6–5.8	.001
≥84	1.56	4.8	2.6–8.9	.000
Mini Mental State Examination score ≤20/30	0.84	2.3	1.4–3.9	.001
Barthel Index at discharge				
69/100 to 85/100	1.56	4.8	2.2–10.5	.000
≤68/100	2.32	10.2	4.7–22.5	.000
Occurrence of delirium	0.82	2.3	1.3–3.9	.003
Living alone	–0.86	0.5	0.3–0.8	.012

Multiple stepwise logistic regression analysis adjusted for gender, albumin and cholesterol serum levels, Charlson Index, Body Mass Index, occurrence of adverse clinical events and intensity of the physiotherapeutic sessions.

B, regression coefficient; OR, odds ratio; P, significance.

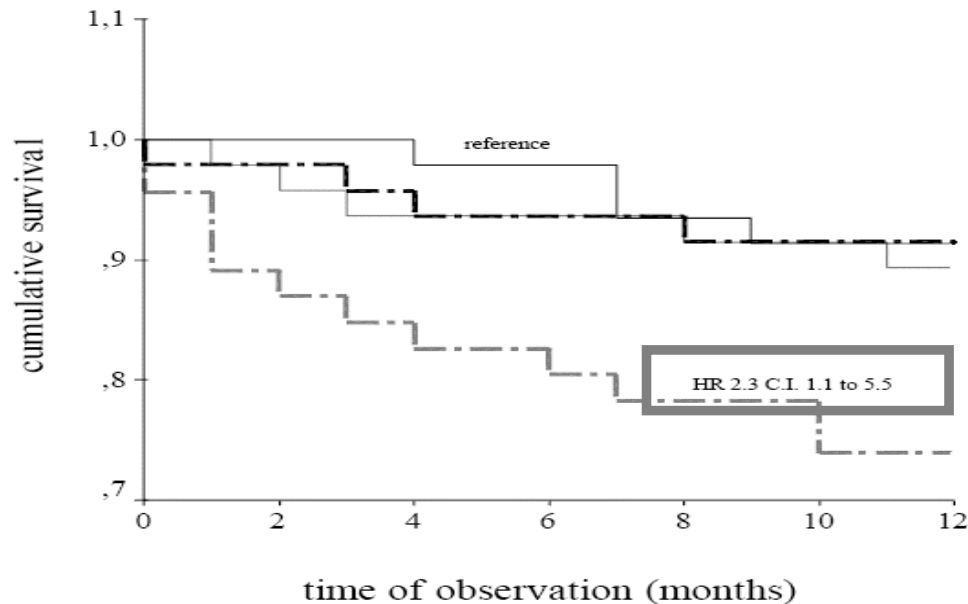
Table 5. Predictors of Rehospitalization at 12-Month Follow-up

	B	OR	95% Confidence Intervals	P
Charlson Index score				
2 to 3	0.71	2.0	1.5–2.7	≤.0005
≥4	0.77	2.2	1.5–3.1	≤.0005
Occurrence of delirium	0.73	1.6	1.1–2.4	.01

Multiple stepwise regression analysis adjusted for age, gender, living alone, albumin and cholesterol serum levels, Body Mass Index, Mini Mental State Examination, Barthel Index at discharge, occurrence of adverse clinical events, and intensity of the physiotherapeutic sessions.

B, regression coefficient; OR, odds ratio; P, significance.

Il delirium associato a demenza (DSD) ha un impatto significativo ed indipendente sulla mortalità



black solid line=no delirium no dementia; black dotted line=dementia

grey solid line= delirium; grey dotted line = DSD

Bellelli G et al J Gerontol 2007; Nov;62(11):1306-9

Biological, functional and cognitive changes of study subjects according to the phase of incident delirium (n=21)

	On RACU adm	Before delirium	At delirium onset	Resolution of delirium	At RACU discharge
	T0	T1	T2	T3	T4
APACHE II	--	--	10.3±2.8	7.3±2.1	--
TCT (0-100)	55.7±30.0	74.3±23.7	39.5±23.7	73.8±22.8	79.9±23.8
Tinetti (0-28)	9.8±7.9	13.9±6.9	6.4±5.2	12.9±6.0	17.1±7.6
Clock	--	--	1.0±1.5	2.5±2.0	--
Digit forw	--	--	2.9±1.0	3.9±1.2	--
Digit back	--	--	1.0±0.9	1.5±1.3	--
Cognit est	--	--	1.6±1.1	2.2±1.2	--
Verbal abstr	--	--	0.7±0.6	1.8±1.5	--

Personal data, unpublished

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Verbal abstr	--	--	0.7±0.6	1.8±1.5	--

Personal data, unpublished

Medical & rehabilitation complexity

- Comorbidità somatica
 - Impatto diretto ed indiretto
- Comorbidità psichica
 - Demenza
 - Depressione
- Sindromi geriatriche
 - Delirium, DSD
- **Approccio fisioterapico**
 - Intensività, body & mind

La complessità nell'approccio fisioterapico



Brain function, cognition,
and motor control...

"Multi-tasking"

Model for stress resistance
testing

The Deleterious Effects Of Bed Rest Among Community-Living Older Persons

Table 4. Mean Disability Scores at 18 Months According to the Number of Months With Bed Rest*

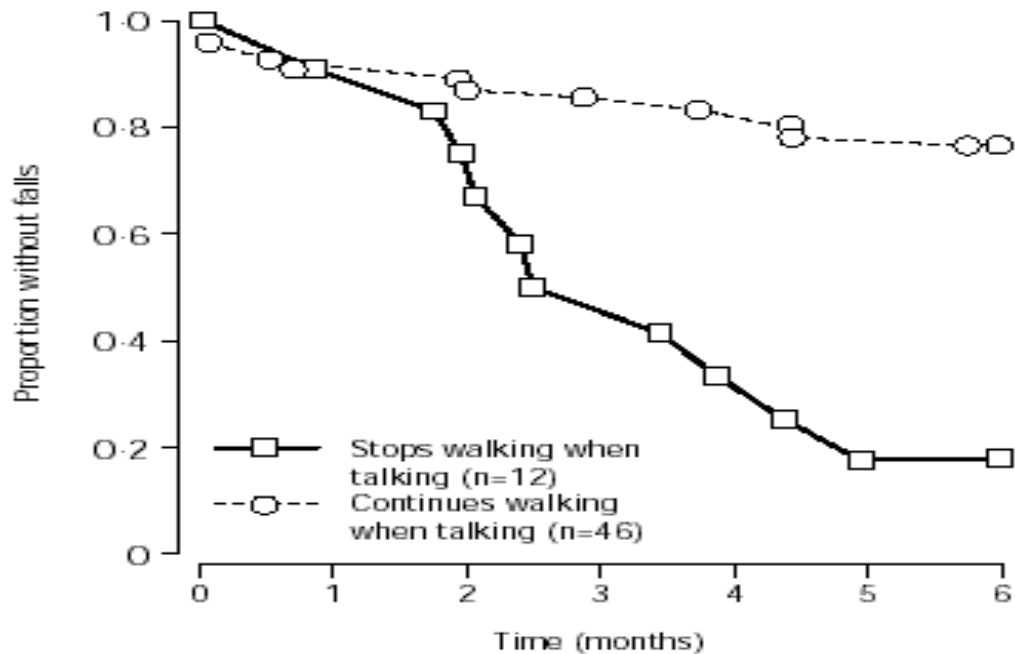
Number of Months With Bed Rest [†]	Overall	Physically Frail	
		No	Yes
IADL disability			
None	1.27	0.78	2.30
One	1.32	0.95	2.10
Two to three	1.62	1.21	2.43
Four or more	2.20	2.16	2.89
<i>p</i> Value for trend	<.001	<.001	<.044
Mobility disability			
None	2.15	1.44	3.54
One	2.34	1.69	3.52
Two to three	2.60	1.97	3.76
Four or more	2.73	2.20	4.10
<i>p</i> Value for trend	<.001	<.001	<.076

Notes: *Values represent the least square means, as calculated from the regression models, and are adjusted for the baseline value of the respective disability measure, age, sex, race/ethnicity, living situation, years of education, number of chronic conditions, physical frailty (for overall results only), cognitive impairment, and depressive symptoms as described in Methods.

[†]Higher scores represent greater disability for each of the outcomes.

IADL = instrumental activities of daily living.

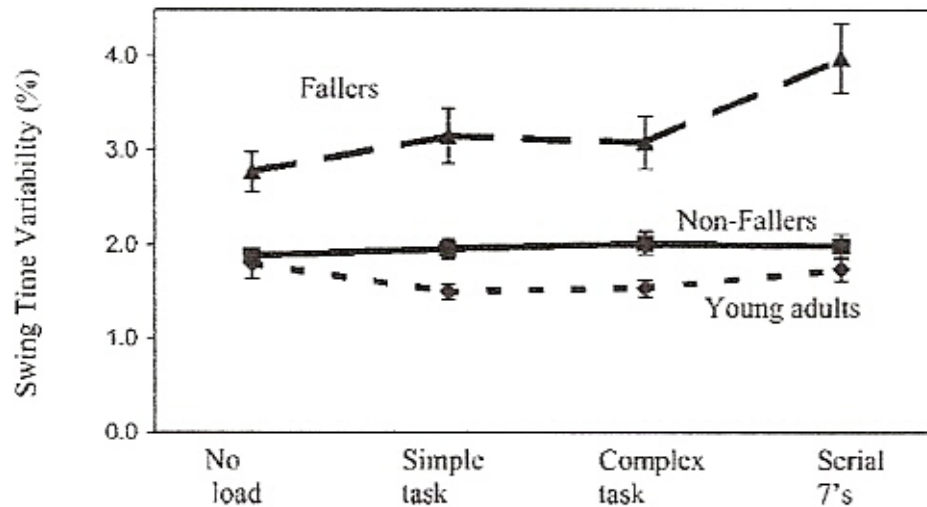
Stops walking when talking as a predictor of falls in elderly patients



Kaplan-Meier curves for falls during 6 months

Lundin-Ollson L et al, Lancet 1997;349: 617

Effects of dual-tasking on swing time variability in young adults, older fallers and non-fallers



Springer S, Giladi N, Peretz C et al. Dual-tasking effects on gait variability: the role of aging, falls, and executive function. *Movement Disorders* 2006;21:950-7.

Exercising body and mind: an integrated approach to functional independence in hospitalized older people

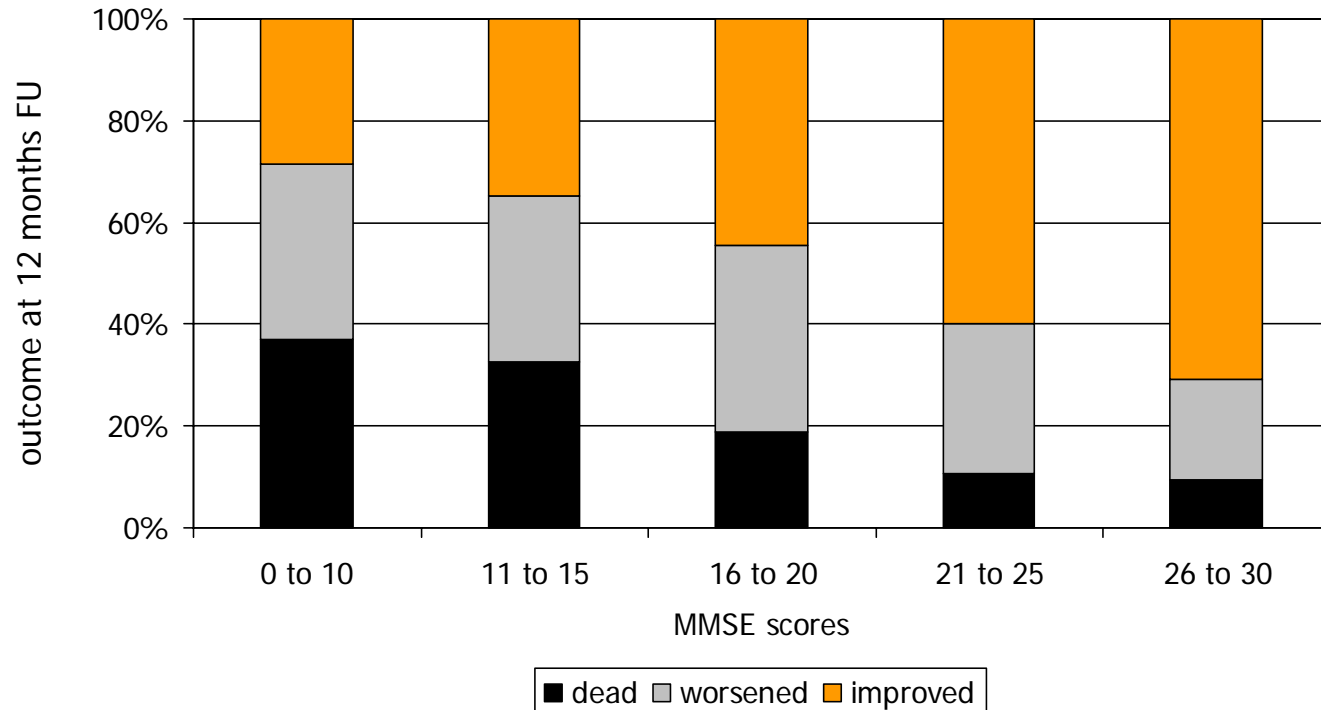
- **Multi component early rehabilitation program – individualized graduated exercise program**
- **Prospective controlled trial with blinded outcome evaluation**
- **124 patients from ER to control or intervention medical ward (terminal ill, completely dependent and nursing home patients excluded)**
- **Results**
 - **Functional status: MBI improvement 8.5 vs 3.5**
 - **Reduction in delirium: 19.4% vs 35.5% p=0.04**
 - **Trend to reduced falls: 4.8 vs 11.3 (p=0.11)**

Efficacia dell'approccio riabilitativo di stimolazione dei neuroni mirror in pazienti anziani con patologia ortopedica (S=13; C=11)

	T0		T1		T2		T3	
	Sperim	Cont	Sperim	Cont	Sperim	Cont	Sperim	Cont
Age	71.6±10.5	72.5±5.9						
Sex F	11 (84.6)	6 (50.0)						
FIM	82.1±18.6	94.8±14.2					105±16	107±13
MMSE	24.0±4.0	24.9±3.6						
GDS	3.0±4.0	3.1±2.6						
CIRS sev	1.3±0.3	1.3±0.7						
CIRS com	2.1±1.0	1.8±0.7						
BMI	22.3±10.5	22.0±7.2						
Ausilio (%)								
1 canadese	--				5 (38.5)		13 (100)	7 (70)
2 canadesi	5 (38.5)	8 (72.7)	7 (53.8)	8 (72)	8 (61.5)	10 (91)		3 (30)
Walker	8 (61.5)	3 (27.3)	6 (42.6)	3 (28)		1 (9)		
Degenza (gg)	21.1±2.2	21.1±2.2						

**E la riabilitazione dell'
anziano con grave demenza?**

Outcomes at 12-month follow-up in 316 elderly patients discharged from a RACU after hip fracture rehabilitation



personal data, unpublished

Conclusioni

- La riabilitazione dell'anziano fragile è un ambito di interesse specifico per la geriatria in ragione dei crescenti bisogni epidemiologici e delle competenze che derivano da un approccio specifico
- La specificità dell'intervento consiste nella capacità di interpretare la complessità clinica che deriva dalla concomitanza di comorbidità e sindromi
- In futuro dovranno essere considerati con sempre maggior interesse modelli riabilitativi che sappiano coniugare attività specifiche per l'apparato motorio con interventi di stimolazione cognitiva in un contesto di grande flessibilità degli interventi