Trastornos de la marcha y caídas en la DM

Heredia Ramirez Rodrigo Alberto
Bernardo Hermont Loures Valle
Angelo José G Brito Bós
Ana Margarita Viloria De Carrillo
Araselis Del Valle
Leitón Arrieta Sylvia
Cuadros Moreno Juan

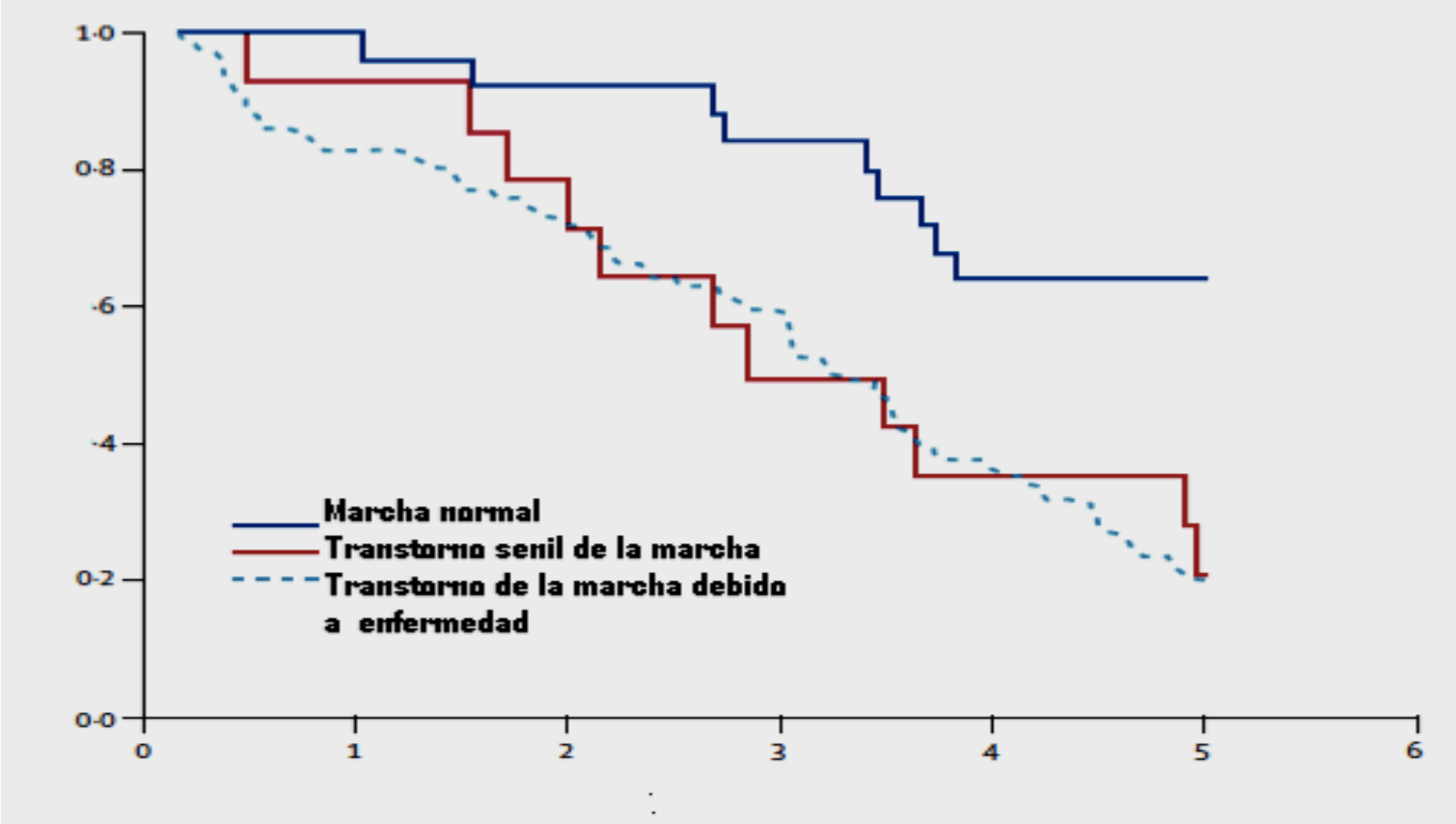
Epidemiología

Desórdenes de la marcha

- 60 años →15%
- 85 años → 40-82%
- Consecuencias
  - Caídas (50%) → fracturas (5%) y TCE
  - Reducción de la movilidad
  - Miedo a caerse
  - Marcador del desarrollo de enfermedad cardiovascular y demencia
  - Reducción de la sobrevida

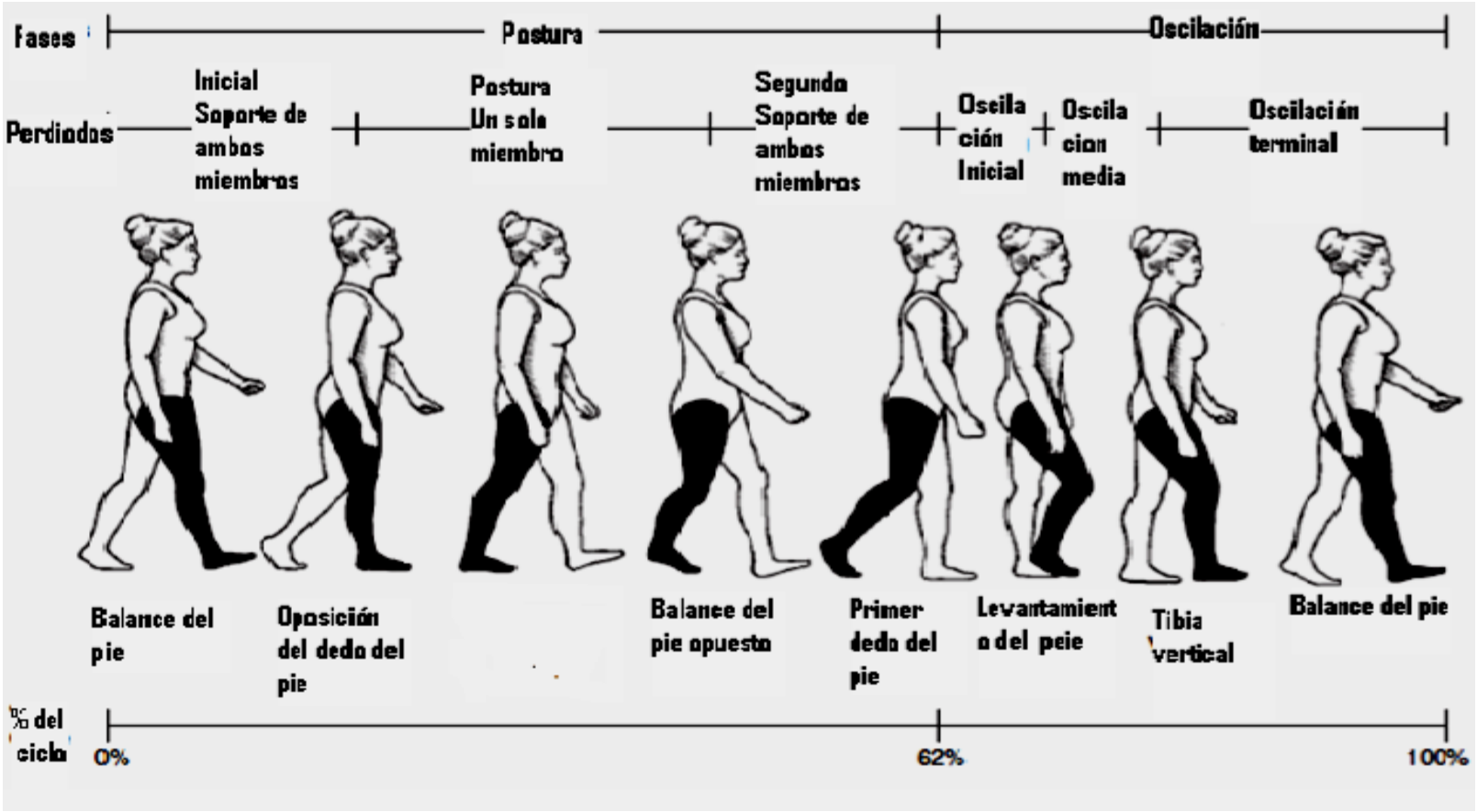
Moe, J Am Acad Orthop Surg 2007*15:107-117*

Sobrevida en pacientes con alteraciones de la marcha



Snijders,Lancet Neurol 2007; 6: 63-74

Fases de la marcha



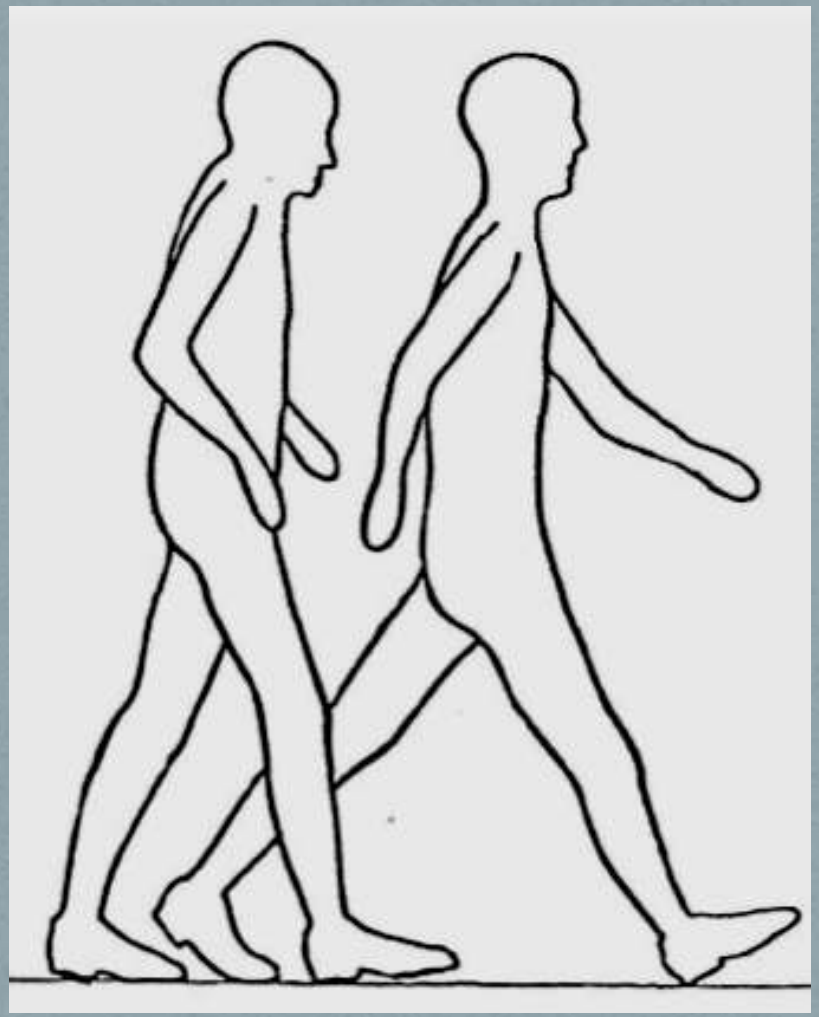
Moe, J Am Acad Orthop Surg 2007*15:107-117*

Cambios normales del envejecimiento

- ↓ velocidad (10 a 20%)
  - 1-2% por año (60ª- 80ª)
  - ↓ longitud del paso
  - ↓ longitud de zancada
  - ↓ extensión del tobillo
  - ↓ rotación pélvica y articulaciones
- ↑ de estancia y ↓ de balanceo
- ↑ de la variabilidad de la marcha

Menz,Age and Ageing 2003; 32: 137-142

Comparación de la marcha entre el joven y el anciano



- Hombre :Postura flexionada,
- Flexión de hombros y rodillas,
- Disminución de braceo
- Mujer: Mayor balanceo de pelvis

Moe, J Am Acad Orthop Surg 2007*15:107-117*

Clasificación jerárquica de Nutt

- **Nivel senso-motor bajo**

  neuropatia motor y sensitiva con ataxia, miopatia

  :Neuropatía periférica post ganglionar en un 15%

  El 5% de los diabéticos desarrollan una artropatía de Charcot

- **Medio:**
  - lesiones isquémicas en arteria cerebral posterior y ganglios basales, que influencia en mapa espacial del cuerpo e integración sensorial

Clasificación jerárquica de Nutt

- **Alto:** Marcha cuidadosa
  - lesiones corticales y subcorticales

Gait & Posture 34 (2011) 548–552

Contents lists available at ScienceDirect

Gait & Posture

journal homepage: www.elsevier.com/locate/gaitpost

Gait pattern alterations in older adults associated with type 2 diabetes in the absence of peripheral neuropathy—Results from the Baltimore Longitudinal Study of Aging

Seung-uk Ko [a,*], Sari Stenholm [c], Chee W. Chia [b], Eleanor M. Simonsick [b], Luigi Ferrucci [b]

Gait parameters by diabetes status for three walking tasks.

	Self-selected speed walking			Maximum speed walking		
	Non-diabetic Mean (SE)	Type 2 diabetes Mean (SE)	*p*-value	Non-diabetic Mean (SE)	Type 2 diabetes Mean (SE)	*p*-value
Spatiotemporal parameters						
Speed, m/s	1.15 (0.01)	1.12 (0.03)	0.318	1.68 (0.02)	1.60 (0.05)	0.154
Stride length, m	1.24 (0.01)	1.21 (0.02)	0.106	1.45 (0.01)	1.40 (0.02)	**0.033**
Cadence, steps/min	111.46 (0.60)	114.10 (1.53)	0.114	138.47 (0.89)	143.02 (2.29)	0.070
Knee 1 flexion, % gait cycle	13.09 (0.10)	13.68 (0.26)	**0.040**	14.08 (0.14)	14.89 (0.35)	**0.033**
Stride width, cm	10.55 (0.16)	10.47 (0.42)	0.860	10.30 (0.17)	9.91 (0.45)	0.432
In the sagittal plane						
Range of motion, degree						
Hip	40.50 (0.30)	38.86 (0.76)	**0.049**	46.12 (0.38)	44.51 (0.97)	0.123
Knee	55.05 (0.32)	54.26 (0.82)	0.378	57.79 (0.34)	56.67 (0.87)	0.235
Ankle	24.39 (0.29)	23.13 (0.74)	0.122	24.81 (0.33)	24.28 (0.85)	0.566
Generative MWE in 1000 × J/kg						

- Disminución de la velocidad de la marcha con paso mas pequeño, aceleración menos rítmica de la cabeza y la pelvis

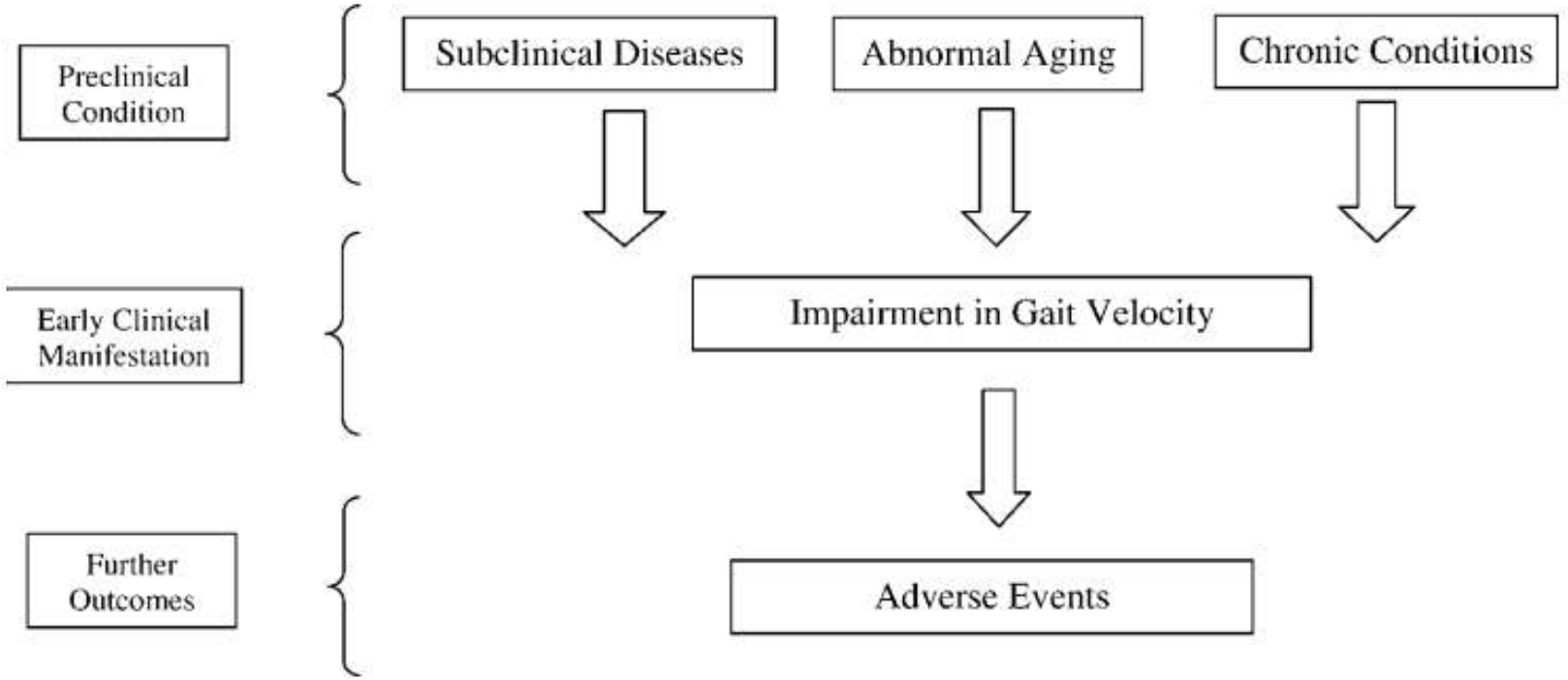
Mecanismos fisiopatológicos

- Problemas específicos
  - Hipoglicemia
  - Polineuropatia diabética (1/3 ptes)
  - Retinopatía (60%)
  - Salud ósea

Gait Velocity as a Single Predictor of Adverse Events in Healthy Seniors Aged 75 Years and Older

Manuel Montero-Odasso,[1,2,3,5] Marcelo Schapira,[2,3] Enrique R. Soriano,[2,4] Miguel Varela,[2,3] Roberto Kaplan,[2,5] Luis A. Camera,[2,3] and L. Marcelo Mayorga[3]

[1]Division of Geriatric Medicine, McGill University, Montreal, Canada.
[2]Geriatric Medicine Program, [3]Internal Medicine Department, and
[4]Informatics and Biostatistics Department, Hospital Italiano de Buenos Aires, Argentina.
[5]Geriatric Fellowship, Faculty of Medicine, University of Buenos Aires, Argentina.



Journal of Gerontology 2005, Vol. 60A, No. 10, 1304–1309

Trastornos de la marcha y DM

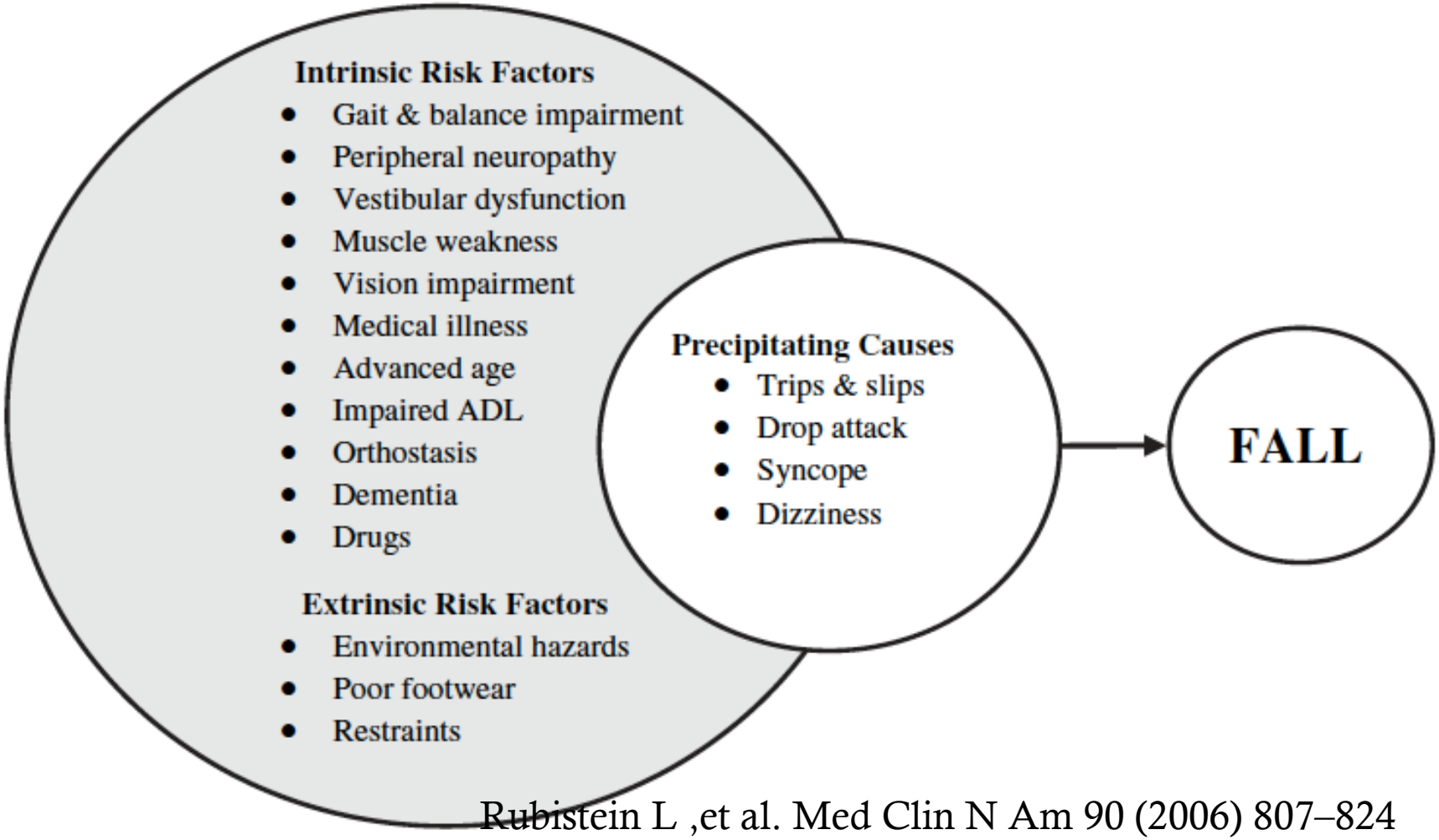
Caídas

INTRODUCCIÓN

- 1/3 de los ≥ 65 años que viven en comunidad presentan 1 caída /año
- Mortalidad a un año paciente con fx de cadera 20-30%
- 25-75% no recupera su funcionalidad previa

Rubistein L ,et al. Med Clin N Am 90 (2006) 807–824

Interacciones y causas de caidas



Rubistein L ,et al. Med Clin N Am 90 (2006) 807–824

Causas de caídas

Causes of falls in older persons: summary of 12 large studies

Cause	Mean (%)[a]	Range[b]
Accident and environment related	31	1–53
Gait and balance disorders or weakness	17	4–39
Dizziness and vertigo	13	0–30
Drop attack	9	0–52
Confusion	5	0–14
Postural hypotension	3	0–24
Visual disorder	2	0–5
Syncope	0.3	0–3
Other specified causes[c]	15	2–39
Unknown	5	0–21

Caídas y DM

- Neuropatía periférica
- Alteraciones visuales
- Enfermedad Renal Crónica
- Tratamiento médico
  - Insulina
  - Riesgo de hipoglucemia
  - Polifarmacia

ELSEVIER

Journal of Diabetes and Its Complications 20 (2006) 158–162

Journal of Diabetes and its Complications

Falls as a complication of diabetes mellitus in older people☆

Lindsey M. Tilling*, Khaled Darawil, Mary Britton

Department of Elderly Care Medicine, Homerton University Hospital, Hackney, London E9 6SR, United Kingdom

Received 29 March 2005; received in revised form 27 May 2005; accepted 1 June 2005

Demographics and diabetic control

	Falls (%) [*n*=30]	No falls (%) [*n*=47]	Total (%) [*n*=77]	Falls/no falls ratio (95% confidence interval)
Female	23 (77)	22 (47)	45 (58)	2.336 (1.144 to 4.766)
Male	7 (23)	25 (53)	32 (42)	0.428 (0.21 to 0.73)
Age >75	14 (47)	13 (27)	27 (35)	1.62 (1.014 to 2.586)
Lives alone	13 (43)	16 (34)	29 (38)	1.265 (0.729 to 2.196)
Lives with one other	16 (53)	28 (60)	44 (57)	0.857 (0.491 to 1.495)
Lives in an institution	1 (3)	3 (6)	4 (5)	0.633 (0.112 to 3.521)
Frame to mobilize	2 (7)	0 (0)	2 (3)	2.679 (1.998 to 3.593)
Stick to mobilize	17 (57)	15 (32)	32 (42)	1.839 (1.048 to 3.227)
Mobilize independently	11 (37)	33 (70)	44 (57)	0.434 (0.241 to 0.783)
Smoker	5 (17)	5 (11)	10 (13)	1.34 (0.670 to 2.682)
>14 Units alcohol/week	3 (10)	0 (0)	3 (4)	0.670 (0.497 to 0.904)
Tablets only	11 (37)	21 (45)	32 (42)	0.814 (0.452 to 1.466)
Diet only	0 (0)	4 (9)	4 (5)	0
Insulin only	13 (43)	14 (30)	27 (35)	1.699 (0.969 to 2.980)
Insulin and tablets	6 (20)	6 (13)	12 (16)	1.354 (0.708 to 2.591)
HBA1C >7%	26 (87)	28 (60)	54 (70)	7.83 (2.948 to 20.799)
Incidence of hypoglycaemic episode	15 (50)	14 (30)	29 (38)	1.655 (0.957 to 2.862)

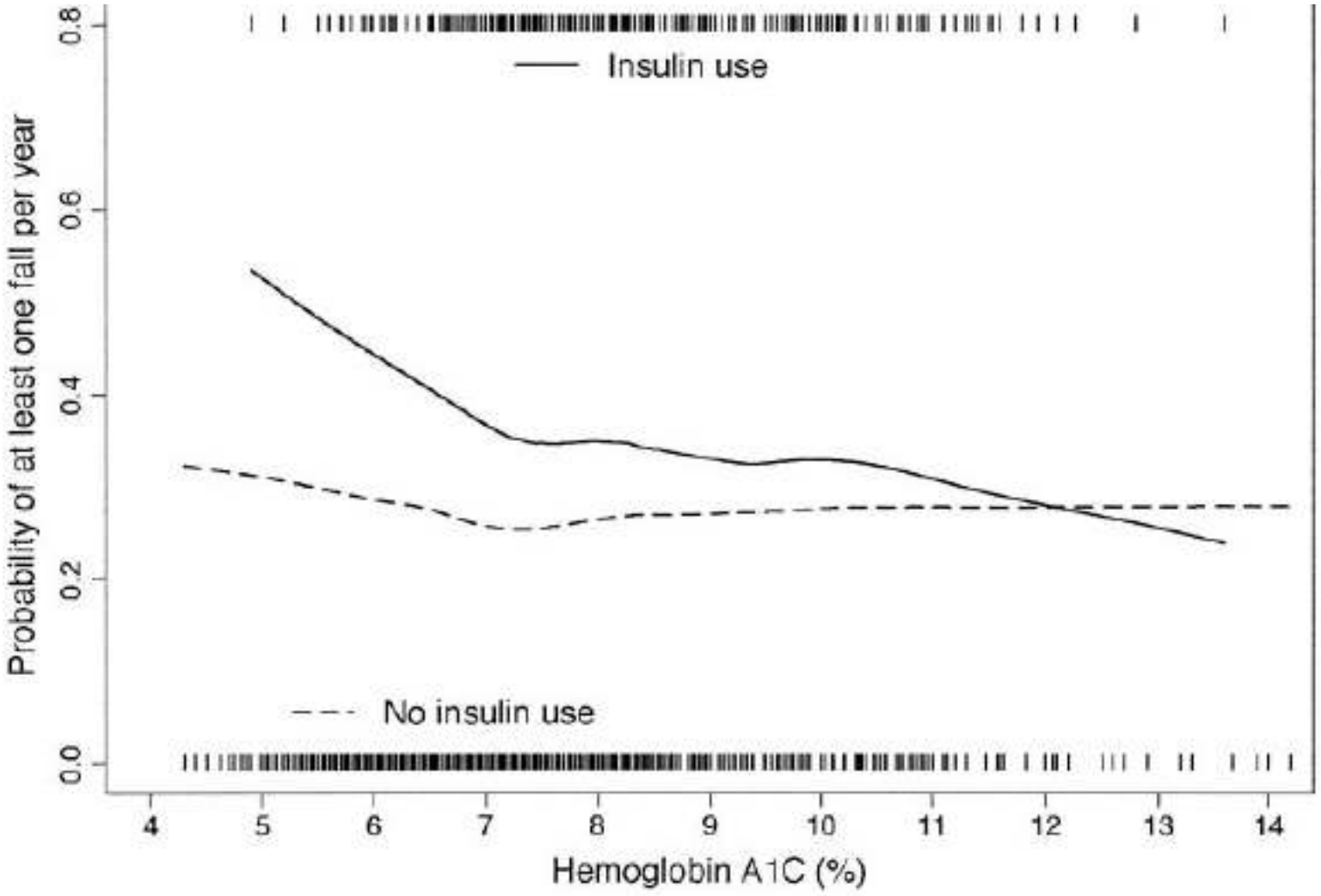
Clinical Care/Education/Nutrition/Psychosocial Research

ORIGINAL ARTICLE

Diabetes-Related Complications, Glycemic Control, and Falls in Older Adults

Table 2—*Association between selected variables and more frequent falls in older adults with diabetes*

Variable (units)	Minimally adjusted*	Model 1†	Model 2‡
Weight change			
Weight loss (≥2 kg)	1.54 (1.21–1.95)	1.56 (1.22–1.98)	1.58 (1.23–2.01)
Stable weight (<2 kg)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Weight gain (≥2 kg)	1.34 (1.03–1.75)	1.25 (0.95–1.64)	1.26 (0.96–1.66)
Insulin use and A1C			
Among those using insulin			
A1C >8%	1.00 (reference)	1.00 (reference)	1.00 (reference)
7% < A1C ≤ 8%	1.08 (0.57–2.07)	1.09 (0.57–2.11)	1.15 (0.60–2.22)
6% < A1C ≤ 7%	1.19 (0.53–2.68)	1.31 (0.58–2.99)	1.27 (0.56–2.91)
A1C ≤6%	3.78 (1.14–12.51)	4.36 (1.32–14.46)	4.10 (1.24–13.54)
Among those not using insulin			
A1C >8%	1.00 (reference)	1.00 (reference)	1.00 (reference)
7% < A1C ≤ 8%	0.88 (0.60–1.29)	0.81 (0.55–1.19)	0.83 (0.56–1.23)
6% < A1C ≤ 7%	1.00 (0.68–1.49)	1.00 (0.67–1.49)	0.98 (0.65–1.45)
A1C ≤6%	0.93 (0.59–1.44)	0.84 (0.53–1.33)	0.83 (0.52–1.31)
Insulin use in those with A1C >8%	1.15 (0.65–2.04)	0.97 (0.55–1.72)	0.88 (0.50–1.55)
Peripheral nerve function			
Peroneal nerve response amplitude (≤1.5mV)§	1.71 (1.19–2.44)	1.50 (1.07–2.12)	1.38 (0.98–1.94)
Vibration perception threshold (≤26.79 μm)§	1.38 (0.94–2.03)	—	—
Monofilament detection (neither versus either)‖	1.74 (1.10–2.78)	—	—
Vision			
Contrast sensitivity (≤1.4)§	1.86 (1.27–2.73)	1.41 (0.97–2.04)	1.24 (0.86–1.79)
Visual acuity (≥0.20 logmar)§	1.53 (1.05–2.23)	—	—
Depth perception (worst score versus all others)	1.47 (1.05–2.05)	—	—
Renal function			
CysC (mg/l) (per 0.38 mg/l)	1.52 (1.23–1.88)	1.38 (1.11–1.71)	1.25 (1.01–1.55)
eGFR <60 ml/min per 1.73 m^2	1.44 (0.96–2.16)	—	—
Blood pressure			
Change in DBP: standing-seated (below median)	1.50 (1.18–1.90)	1.54 (1.21–1.95)	1.53 (1.21–1.95)
Physical performance			
Grip strength (per 10 kg)	0.80 (0.69–0.93)	—	0.85 (0.68–1.05)
Standing balance (per 10 s)	0.74 (0.67–0.82)	—	0.79 (0.70–0.88)
6-m normal walk (s)	1.15 (1.03–1.30)	—	0.99 (0.87–1.12)
Knee extensor strength (per 10 Nm)	0.93 (0.90–0.98)	—	—


Insulin use
No insulin use
Probability of at least one fall per year
0.0
0.2
0.4
0.6
0.8
4
5
6
7
8
9
10
11
12
13
14
Hemoglobin A1C (%)

Evaluación

- Historia clínica
- Examen físico
- Neurológico completo
- Instrumentos para evaluar marcha
  - Observación
  - Con reto
  - Cronometrados (Timed up and Go)
  - Balance
  - Estudio cinemático

Snijders,Lancet Neurol 2007; 6: 63-74

Alexander,JAGS 44:434-451,1996

- ✓ Los adultos mayores con diabetes deben ser examinados anualmente por las caídas.
- ✓ los que tienen dos o más caídas en el año anterior
- ✓ una caída única con trastorno de la marcha más dolor o alteración en el balance
- ✓ Evaluación integral