UNIVERSIDAD DE SALAMANCA
DEPARTAMENTO DE MEDICINA

DIABETES Y FRAGILIDAD

XI Curso ALMA

1 al 4 de Abril de 2012

Salamanca, España

“El Anciano con Diabetes”

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FRAGILIDAD

- El que lee mucho y anda mucho, ve mucho y sabe mucho

- El Quijote



CONTENIDO

- Fragilidad
- Fragilidad y diabetes en cifras
- La fisiopatología se parese
- Evidencia de relación entre fragilidad y DM2
- ¿Qué hacer?

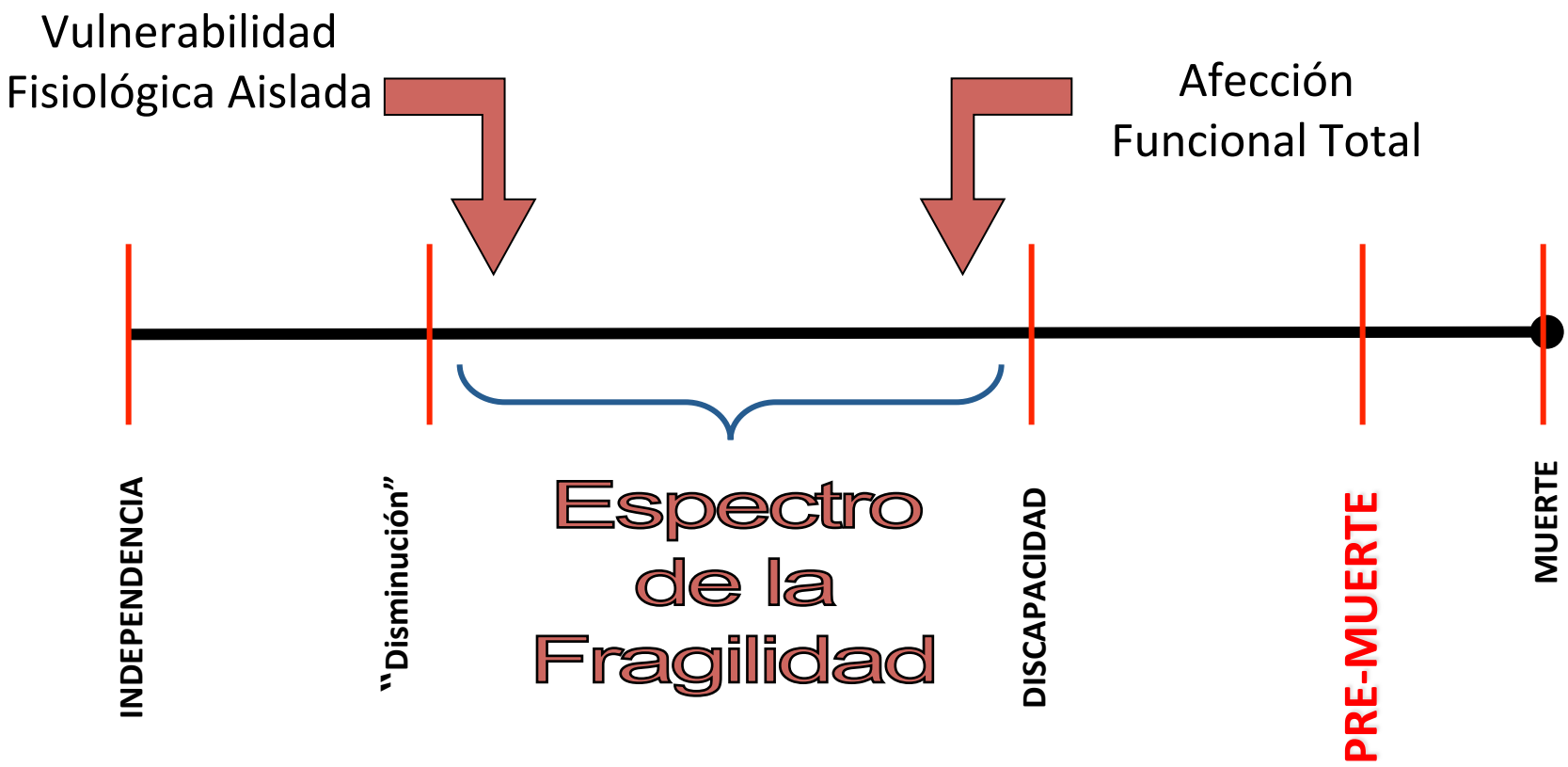
FRAGILIDAD y DM
Definición

- Estado vulnerabilidad
- Disminución en la capacidad de mantener homeostasis
- Edad dependiente
- Caracterizado por
  - Disminución en la reserva funcional
  - Múltiples sistemas

Bergman H et al. Journal of Gerontology 2007:62A (7):731-737

Fragilidad y Dm

Continuo funcional

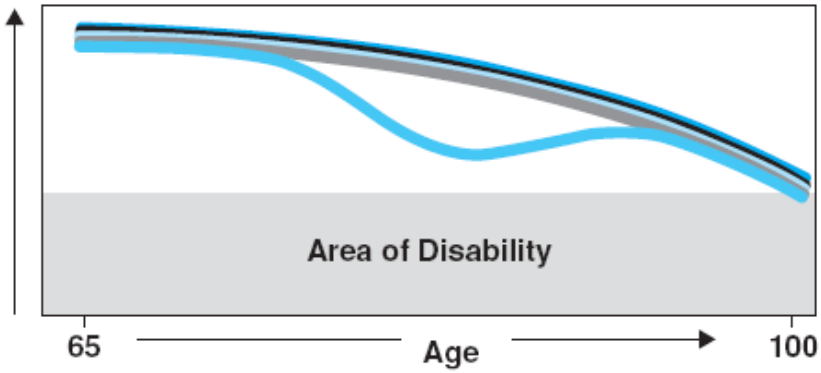


Whitson HE et al., 2007

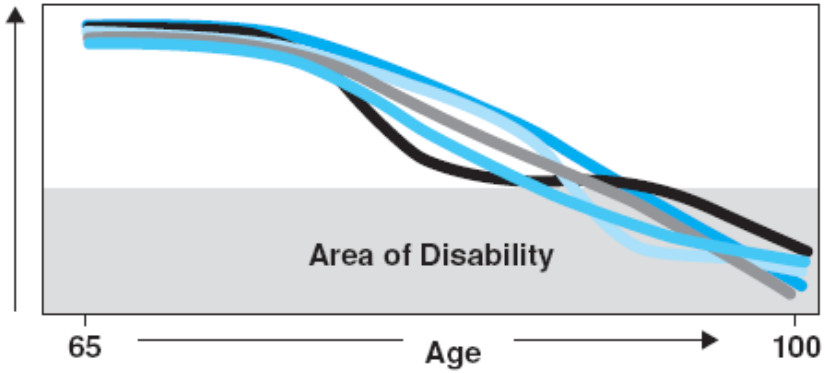
FRAGILIDAD y DM

Modelos de fragilidad

Fried LP



Rockwood K



Rockwood K. J Am Geriat Soc. 2006;54:975-979

Fried et al. J Gerontol Med Sci. 2001;56A:M146-M156

FRAGILIDAD y DM

Modelos de fragilidad: Fried L.

- Disminución en la fuerza de prensión
  - En base a género e IMC
- Tiempo al caminar (15 pies)
  - 20% menos ajustado por edad y peso
- Extenuación
  - Todo lo que hago requiere un gran esfuerzo o siento que no puedo seguir adelante
- Pobre actividad física
  - Hombres (kcal/semana) <383
  - Mujeres (kcal/sem) <270
- Pérdida de peso
  - > 10 lb en el ultimo año

Fried LP. J Gerontol. 2001;56A:M146-M156

FRAGILIDAD y DM

Modelos de fragilidad: Rokwood K.

- Índice
  - #variables / Total de variables
- Constructo frágil
  - No Frágil ≤0.08
  - Prefrágil 0.09-0.24
  - Frágil ≥0.25

Rockwood K. J Am Geriat Soc. 2006;54:975-979

FRAGILIDAD y DM

Modelos de fragilidad: Rokwood K.

Appendix 1: List of variables used by the Canadian Study of Health and Aging to construct the 70-item CSHA Frailty Index

- Changes in everyday activities
- Head and neck problems
- Poor muscle tone in neck
- Bradykinesia, facial
- Problems getting dressed
- Problems with bathing
- Problems carrying out personal grooming
- Urinary incontinence
- Toileting problems
- Bulk difficulties
- Rectal problems
- Gastrointestinal problems
- Problems cooking
- Sucking problems
- Problems going out alone
- Impaired mobility
- Musculoskeletal problems
- Bradykinesia of the limbs
- Poor muscle tone in limbs
- Poor limb coordination
- Poor coordination, trunk
- Poor standing posture
- Irregular gait pattern
- Falls
- Mood problems
- Feeling sad, blue, depressed
- History of depressed mood
- Tiredness all the time
- Depression (clinical impression)
- Sleep changes
- Restlessness
- Memory changes
- Short-term memory impairment
- Long-term memory impairment
- Changes in general mental functioning
- Onset of cognitive symptoms
- Clouding or delirium
- Paranoid features
- History relevant to cognitive impairment or loss
- Family history relevant to cognitive impairment or loss
- Impaired vibration
- Tremor at rest
- Postural tremor
- Intention tremor
- History of Parkinson's disease
- Family history of degenerative disease
- Seizures, partial complex
- Seizures, generalized
- Syncope or blackouts
- Headache
- Cerebrovascular problems
- History of stroke
- History of diabetes mellitus
- Arterial hypertension
- Peripheral pulses
- Cardiac problems
- Myocardial infarction
- Arrhythmia
- Congestive heart failure
- Lung problems
- Respiratory problems
- History of thyroid disease
- Thyroid problems
- Skin problems
- Malignant disease
- Breast problems
- Abdominal problems
- Presence of snout reflex
- Presence of the palmomental reflex
- Other medical history

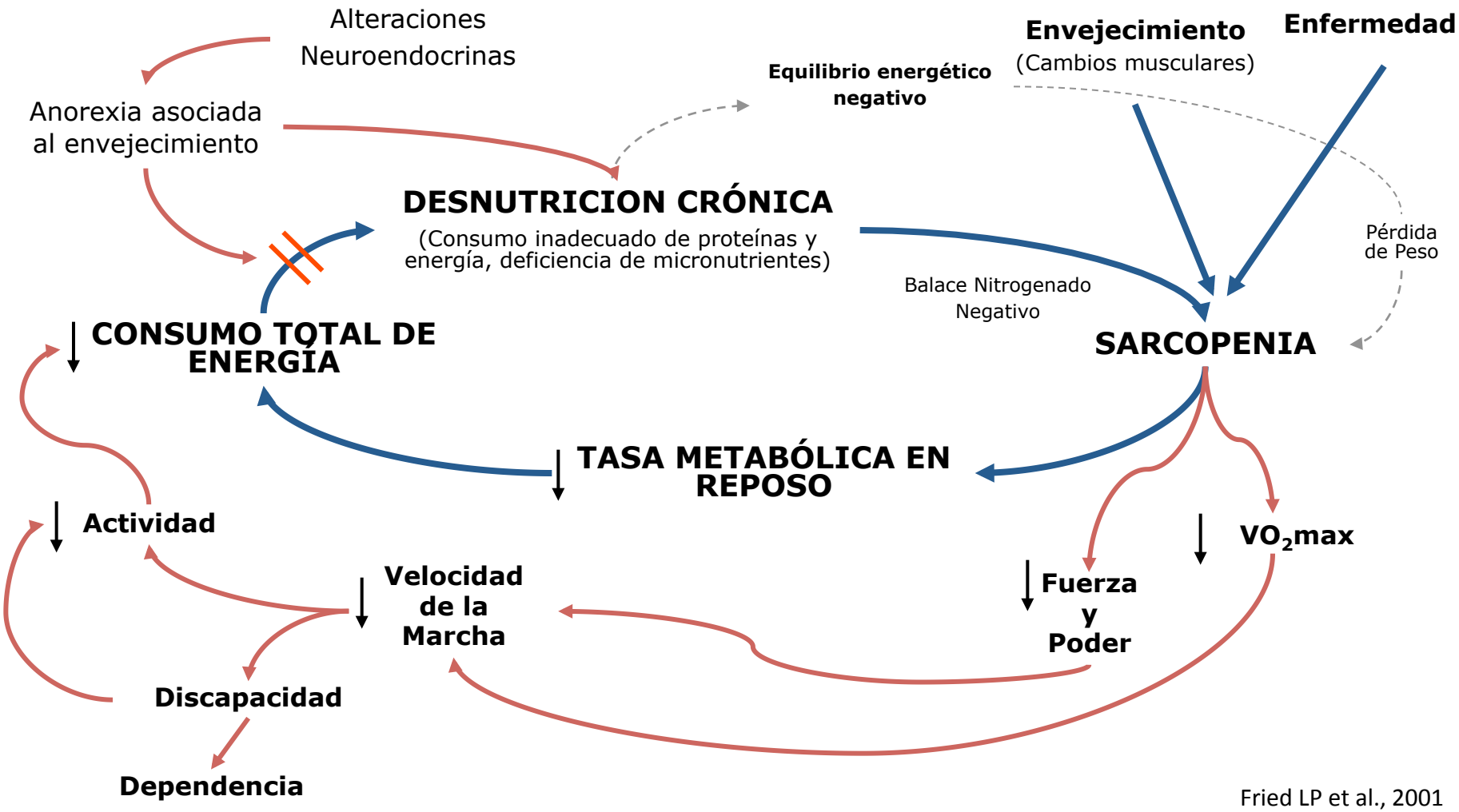
Rockwood K. J Am Geriat Soc. 2006;54:975-979

Fragilidad y diabetes en cifras.

- Se espera qué en Canadá la diabetes afecte entre el 15 y 20% de PAM
- Para el 2050 en EEUU la DM en >75ª incrementará en un 271% en mujeres y 473% en mujeres.
- Como aumenta la población mayor de 80ª, aumentan las personas frágiles con diabetes

Fragilidad y Dm

Ciclo de la fragilidad



Fried LP et al., 2001

Fragilidad y Dm

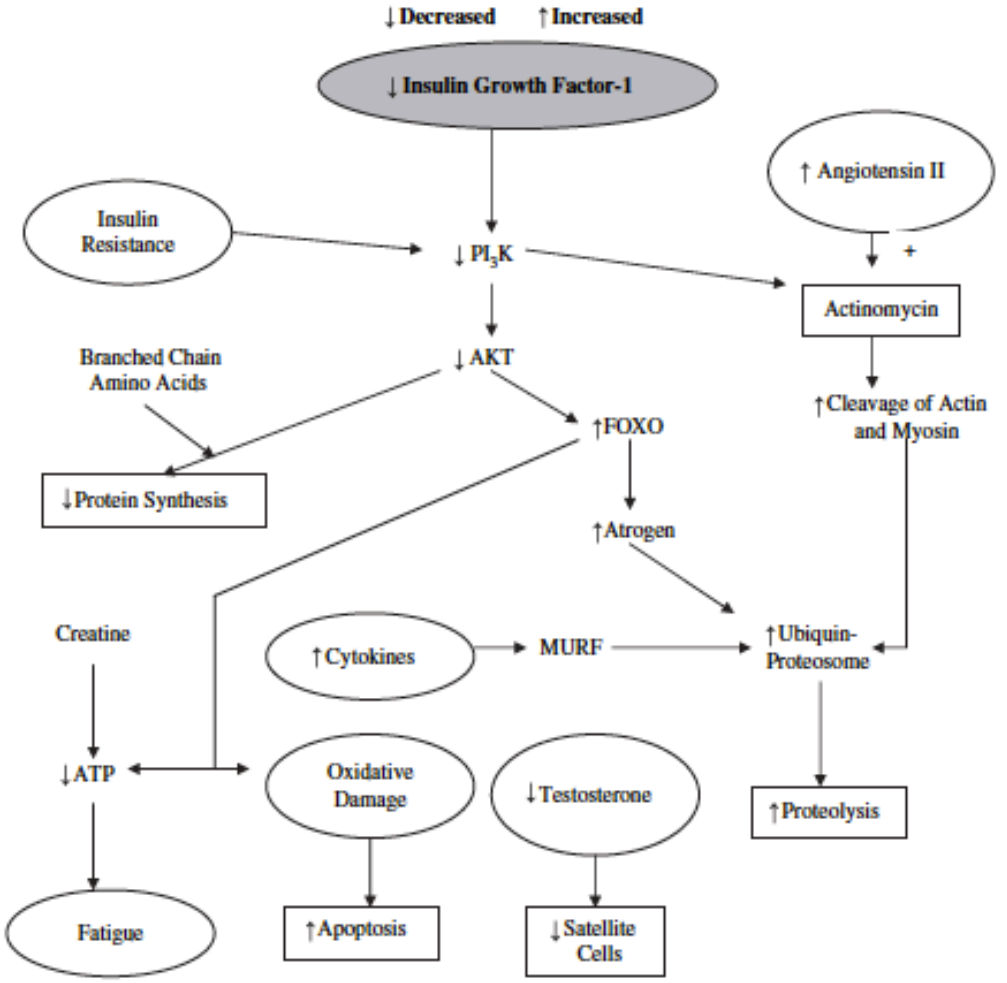


Fig. 1. Biochemical changes in muscle in diabetes. ↓, decreased; ↑, increased; KT, active human protein kinase (protein kinase-B); FOXO, forkhead protein; MURF, muscle ring finger protein; PI3K, phosphatidyl inositol-3-kinase.

Clin Geriatr Med 27 (2011) 39–52

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CLINICS IN
GERIATRIC
MEDICINE

Clin Geriatr Med 24 (2008) 455–469

Diabetes, Sarcopenia, and Frailty

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[b]*Geriatric Medicine, Saint Louis University School of Medicine, 1402 S. Grand Boulevard, Room M238, St. Louis, MO 63104-1079, USA*

Cuadro 2. Factores asociados al desarrollo de sarcopenia en DM y Fragilidad.*

Factor	Envejecimiento	Diabetes mellitus
Placas motoras	↓	↓
IGF-1	↓	↓
Factor de mecanocrecimiento	↓	Desconocido
Testosterona	↓	↓
Citocinas proinflamatorias	↑	↑
Creatina/amino ácidos ramificados	↓	↓
Actividad física	↓	↓

DIABETES RESEARCH AND CLINICAL PRACTICE 96 (2012) 24–28

Functional balance in elderly with diabetic neuropathy

Tabassom Ghanavati [a,*], *Mohammad Jafar Shaterzadeh Yazdi* [b,1], *Shahin Goharpey* [b,2], *Ali-Asghar Arastoo* [b,3]

[a] *Department of Physical Therapy, University of Social Welfare and Rehabilitation, Daneshjoo Blvd., Velenjak, Tehran, Iran*
[b] *Department of Physical Therapy, School of Rehabilitation, University of Jondi-Shapour Medical Sciences, Ahwaz, Iran*

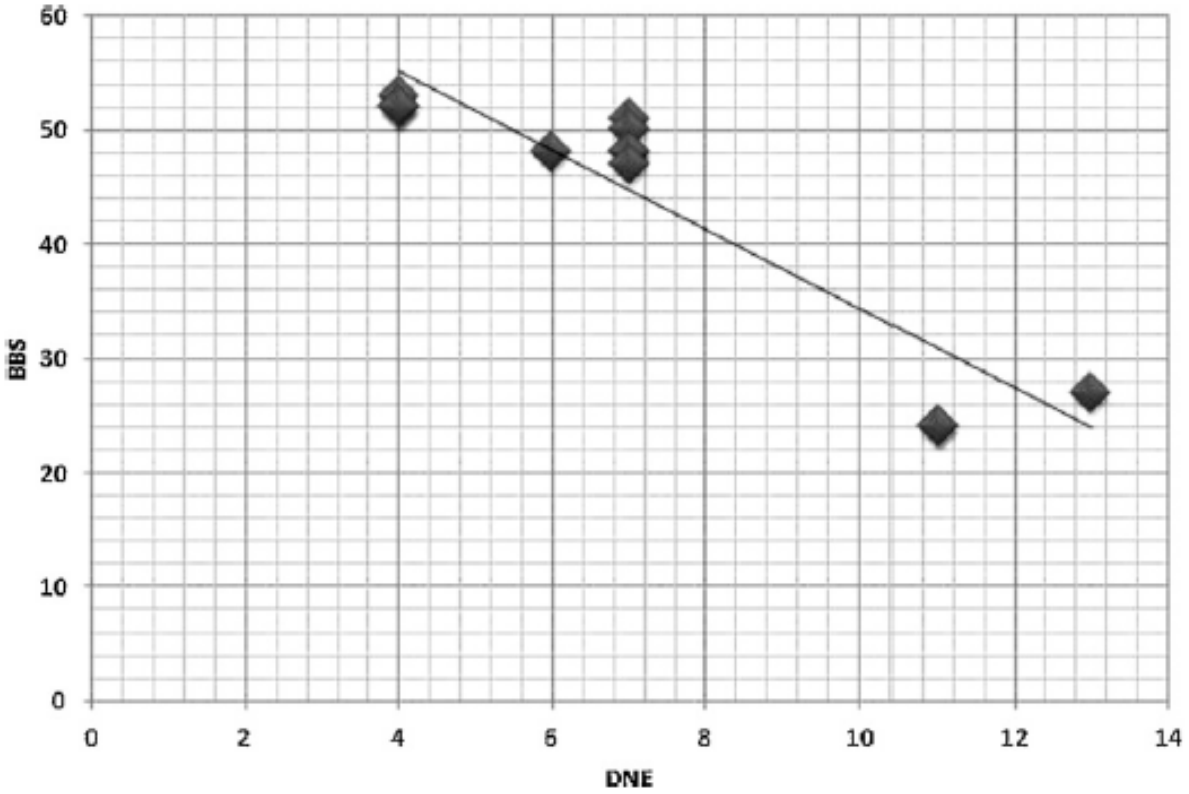


Fig. 1 – Correlation between DNE and BBS scores in patients with DPN.

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

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[b] Clinical Research Branch, NIA, Baltimore, MD, USA
[c] Department of Health, Functional Capacity and Welfare, National Institute for Health and Welfare, Turku, Finland

Table 1
Characteristics of the study population by diabetes status.

Characteristics for participants	Mean (SE) and proportion		
	Non-diabetic (N=160)	Type 2 diabetes (N=26)	P-value
Age, years	70.45 (0.58)	70.00 (1.43)	0.770
Sex, women, %	51	27	0.021
Height, m	1.67 (0.01)	1.68 (0.02)	0.976
Mass, kg	75.65 (1.14)	81.95 (2.83)	0.041
HbA_{1c}, %	5.82 (0.04)	6.86 (0.11)	<0.001

SE = standard error. HbA_{1c} = Hemoglobin A1C.

Table 2
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						
Hip	158.47 (4.95)	168.33 (12.65)	0.473	288.88 (7.11)	297.44 (18.17)	0.664
Knee	101.81 (3.35)	88.72 (8.56)	0.160	144.86 (5.03)	137.53 (12.84)	0.599
Ankle	202.75 (4.27)	182.53 (10.90)	0.089	277.09 (5.95)	238.71 (15.19)	**0.021**
Absorptive MWE in, 1000 × J/kg						
Hip	266.18 (8.14)	256.18 (20.79)	0.658	324.16 (9.58)	329.44 (24.47)	0.842
Knee	185.08 (6.85)	219.02 (17.48)	0.075	283.16 (7.47)	332.43 (19.09)	**0.018**
Ankle	130.12 (3.47)	124.97 (8.86)	0.592	96.09 (4.06)	96.00 (10.37)	0.994
In the frontal plane						
Range of motion, degree						
Hip	10.20 (0.16)	9.51 (0.42)	0.127	12.37 (0.21)	12.22 (0.54)	0.796
Knee	9.88 (0.30)	10.78 (0.76)	0.279	9.98 (0.28)	11.13 (0.73)	0.147
Ankle	9.58 (0.23)	9.32 (0.58)	0.681	9.76 (0.26)	9.78 (0.66)	0.979
Generative MWE in, 1000 × J/kg						
Hip	72.40 (2.34)	77.47 (5.97)	0.434	76.24 (2.64)	84.20 (6.75)	0.279
Knee	11.67 (0.64)	11.84 (1.64)	0.921	16.77 (0.91)	16.94 (2.33)	0.946
Ankle	8.81 (0.44)	9.89 (1.14)	0.384	11.42 (0.74)	13.49 (1.89)	0.317
Absorptive MWE in, 1000 × J/kg						
Hip	47.97 (1.63)	54.00 (4.15)	0.183	75.10 (2.69)	81.68 (6.88)	0.379
Knee	18.33 (0.83)	19.42 (2.12)	0.638	22.00 (0.99)	24.92 (2.53)	0.289
Ankle	17.66 (0.72)	15.42 (1.83)	0.262	22.05 (0.99)	21.44 (2.52)	0.824

Spatiotemporal parameters were adjusted for height, mass, sex, age. Kinematics and kinetics were adjusted for gait speed, height, mass, sex, and age.
Bold *p* values are significant with $p < 0.05$.

Factores de riesgo para muerte

	Hazard ratio	95% Confidence interval		Significance
		Lower	Upper	
Age	1.06	1.05	1.07	< 0.001
Male sex	1.64	1.44	1.86	< 0.001
Resident in institution at baseline	1.72	1.49	1.98	< 0.001
Diabetes	1.42	1.20	1.69	< 0.001
Co-morbidity (Cumulative Illness Rating Scale score)	1.03	1.01	1.04	0.001
Frailty (score of 5 or more on the Clinical Frailty Scale)	2.72	2.34	3.16	< 0.001

Diabet. Med. 27, 603–606 (2010)

Supervivencia

- Fragilidad con Diabetes:

  23 meses (IC 95% 18–28)

- Fragilidad sin Diabetes:

  30 meses (IC 95% 27–33)

Diabet. Med. 27, 603–606 (2010)

Riesgo de complicaciones de DM

- Diabetes con Fragilidad:

2.62 (IC 95% 1.36–5.06).

Diabet. Med. 27, 603–606 (2010)

Diabetes y fragilidad

- Relación fisiopatológica posible
- La DM acelera el envejecimiento
  - La fragilidad como fenómeno del envejecimiento
- Pacientes DM y frágiles
  - Peores pronósticos
    - Hipoglucemia
    - Dependencia
  - Manejo individualizado

Diabetes y fragilidad

- La evaluación geriátrica integral
  - Son los que más se benefician.

- Diabetes se asocia a
  - Envejecimiento no exitoso
    - RR .10 (IC 95% 0.010-0.79, P<0.001)
      - Independiente de la Edad

- Bourdel Marchasson Caring de elderly diabetic patient with respect to concepts of successful aging and frailty Diabetes Metab 2005-3
- Maurcen Diabetes in the fraily elderly in the long term care. Diabetes & Metabolism 2005;31:5S13-5S19

Diabetes y dependencia

- La diabetes es un predictor independiente de cuidados a largo plazo en el anciano (1)
- Diabetes aumenta el costo del cuidado del anciano enfermo hasta en un 25%
- La diabetes es una enfermedad crónica qué interfiere con la calidad de envejecimiento y con la calidad de vida (2)

- 1. Tsuji, Predictors of nurcing home in communitt –baseds long-term care-J Ger American Soc 1995
- Bourdel Marchasson Caring de elderly diabetic patient with respect to concepts of successful aging and frailty Diabetes Metab 2005-3

Dignidad y autonomía

- Dignidad incluye el respeto a la identidad, a los derechos humanos y a la capacidad de ser independiente y autónomo.
- La pérdida de autonomía física o mental expone a qué la persona mayor se sientan como una carga, y sienten qué esto es incompatible con la dignidad.
- Otros opinan qué a pesar de la pérdida de autonomía se mantiene la dignidad

¿Diagnosticar fragilidad?



- La fragilidad aumenta el riesgo de discapacidad, morbilidad, institucionalización y muerte .
- El diagnóstico de fragilidad debe conllevar intervenciones.

European Diabetes Working Party for Older People 2011 Clinical Guidelines for Type 2 Diabetes Mellitus. Executive Summary

A Report of the European Diabetes Working Party for Older People (EDWPOP) Revision Group on Clinical Practice Guidelines for Type 2 Diabetes Mellitus

2. For frail (dependent; multisystem disease; care home residency including those with dementia) patients where the hypoglycaemia risk is high and symptom control and avoidance of metabolic decompensation is paramount, the target HbA_{1c} range should be 7.6-8.5%. *Evidence level 1+, Grade of recommendation A.*

Diabetes & Metabolism 37 (2011) S27-S38

European Diabetes Working Party for Older People 2011 Clinical Guidelines for Type 2 Diabetes Mellitus. Executive Summary

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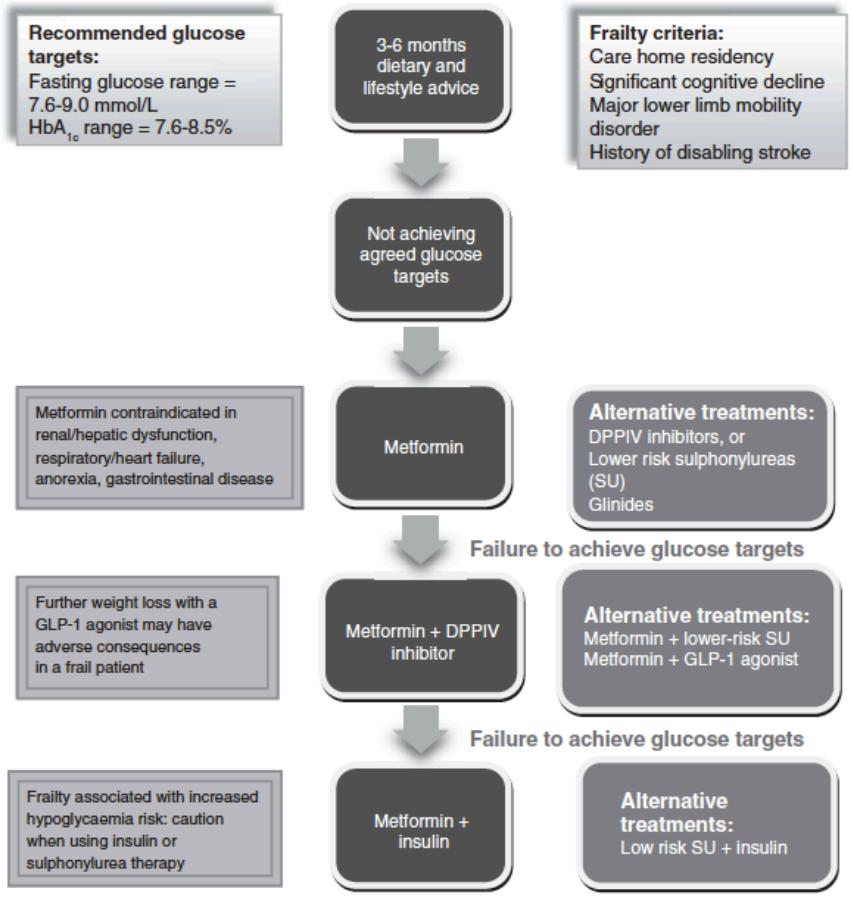


Fig. 1. Glucose-lowering algorithm for frail patients with type 2 diabetes mellitus.

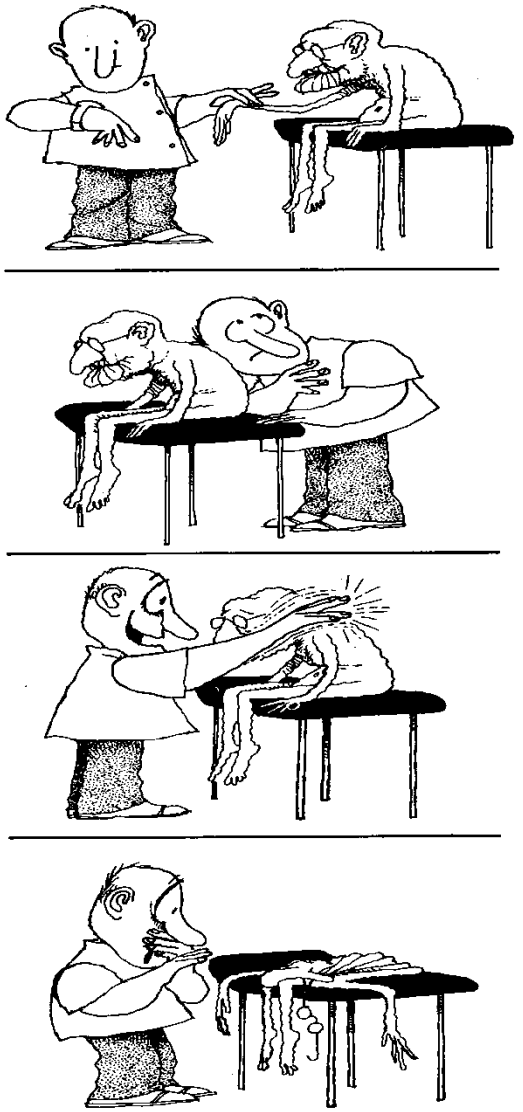
Diabetes & Metabolism 37 (2011) S27-S38

DIAGNOSTICAR

Y

ACTUAR

“A TIEMPO”



Moverse, moverse, moverse

- Disuse activity occurs rapidly in older persons at bed rest
- Exercise, particularly resistance exercise, plays a key role in the maintenance of muscle mass

- Taylor JD. The impact of a supervised strength and aerobic training program on muscular strength and aerobic capacity in individuals with type 2 diabetes. J Strength Cond Res 2007; 21:824–30.;
- Latham NK, Bennett DA, Stratton CM, et al. Systematic review of progressive resistance strength training in older adults. J Gerontol A Biol Sci Med Sci 2004;59:48–61.].
- Kortebien P, Ferrando A, Lombeida J, et al. Effect of 10 days of bed rest on skeletal muscle in healthy older adults. JAMA 2007;297:1772–4.].

GRACIAS POR SU ATENCIÓN

