

Aspectos propios de la patología arterial periférica

IGNACIO MICHEL GUIASOLA

ANGIOLOGÍA Y CIRUGÍA VASCULAR

HOSPITAL UNIVERSITARIO 12 DE OCTUBRE



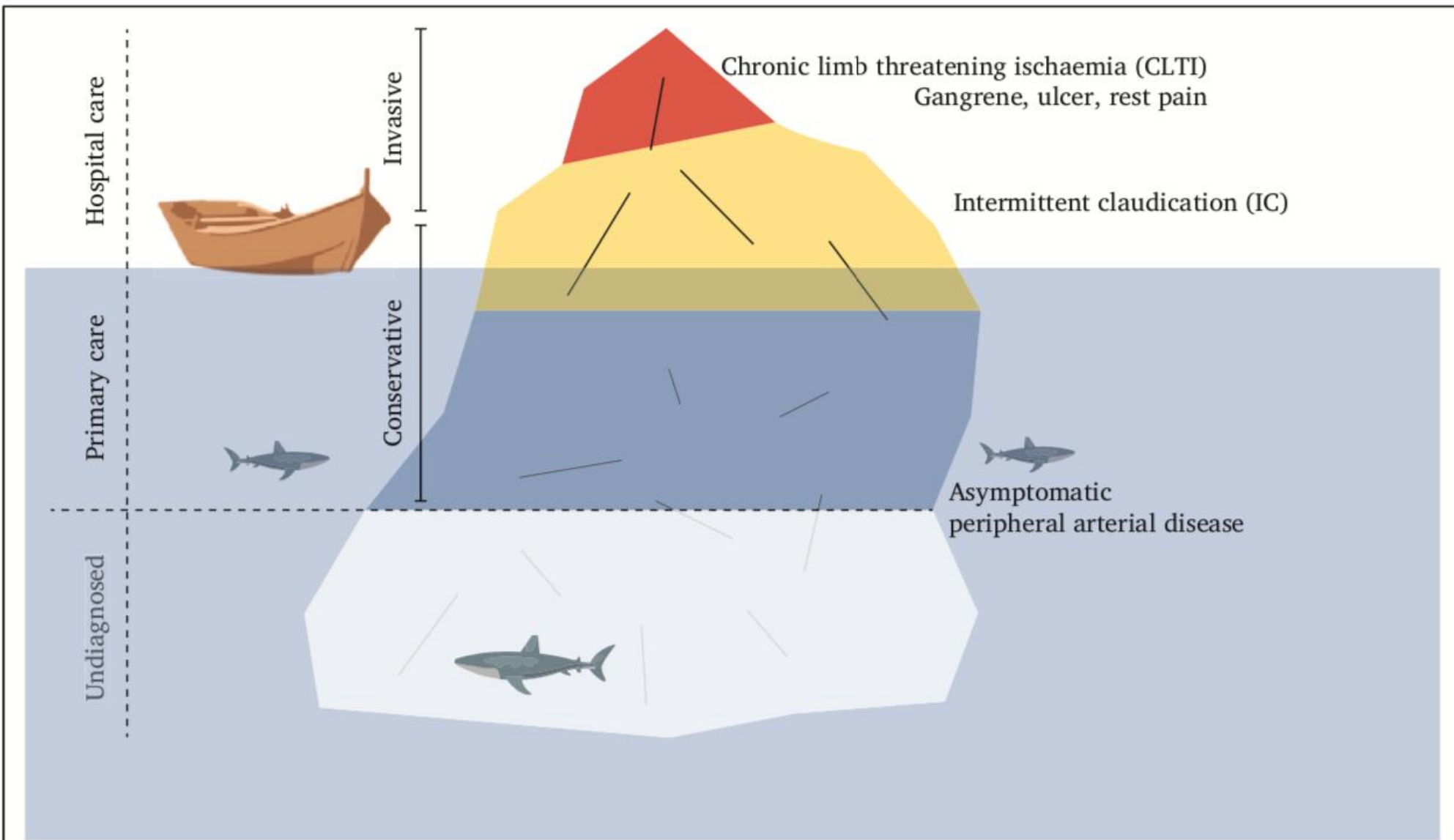


Figure 3. Schematic illustration of the lower limb peripheral arterial disease (PAD) iceberg epidemiology, indirectly illustrating the real challenges associated with reaching out to the entire patient population with any healthcare intervention. (Modified after Sogaard et al. *Vasa*. 2023;52:77-80.⁷²)

SINTOMATOLOGIA

Table 8. The Fontaine and the revised Rutherford peripheral arterial disease classifications.

Fontaine		Rutherford			
Class	Symptoms	Grade	Category	Symptoms	Objective criteria
Stage I	Asymptomatic	0	0	Asymptomatic	Normal treadmill or reactive hyperaemia test
Stage II	Claudication pain in limb IIA: Claudication at a distance ≥ 200 m IIB: Claudication at a distance < 200 m	I	1	Mild claudication	Completes treadmill exercise; AP after exercise > 50 mmHg but at least 20 mmHg lower than resting value
			2	Moderate claudication	Between categories 1 and 3
			3	Severe claudication	Cannot complete standard treadmill exercise, and AP after exercise < 50 mmHg
Stage III	Rest pain, mostly in the feet	II	4	Ischaemic rest pain	Resting AP < 40 mmHg, flat or barely pulsatile ankle or metatarsal PVR; TP < 30 mmHg
Stage IV	Ulceration and or gangrene of the limb	III	5	Minor tissue loss – non-healing ulcer, focal gangrene with diffuse pedal ischaemia	Resting AP < 60 mmHg, ankle or metatarsal PVR flat or barely pulsatile; TP < 40 mmHg
			6	Major tissue loss – extending above transmetatarsal level, functional foot no longer salvageable	Same as category 5

AP = ankle pressure; PVR = pulse volume recordings; TP = toe pressure.

Recommendation 5

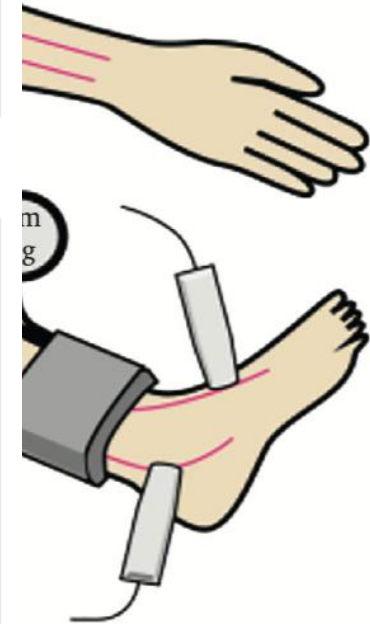
The ankle brachial index is recommended as the appropriate test to establish the diagnosis of lower limb peripheral arterial disease.

Class	Level	References	ToE
I	B	Aboyans <i>et al.</i> (2012) ⁶³ Xu <i>et al.</i> (2013) ⁶⁰ Donohue <i>et al.</i> (2020) ²⁰⁴ Weragoda <i>et al.</i> (2016) ²⁰⁵ Crawford <i>et al.</i> (2016) ²⁰⁶	

Recommendation 6

It is recommended that an ankle brachial index cutoff value ≤ 0.9 is used for lower limb peripheral arterial disease diagnosis, and that a value ≥ 1.4 be considered inconclusive.

Class	Level	References	ToE
I	C	Aboyans <i>et al.</i> (2012) ⁶³ Weragoda <i>et al.</i> (2016) ²⁰⁵	





Recommendation 11

For patients with suspected intermittent claudication and normal ankle brachial index at rest, a treadmill test with pre- and post-test measurements of the ankle brachial index* may be considered, to establish the peripheral arterial disease diagnosis and to quantify severity.

Class	Level	Reference	ToE
I b	C	Gardner <i>et al.</i> (1991) ²²⁰ Birkett <i>et al.</i> (2021) ²¹⁸ Hoogeveen <i>et al.</i> (2008) ²¹⁷	

* A post exercise ABI drop of $\geq 20\%$ or ankle pressure decrease > 30 mmHg confirms the PAD diagnosis.



Table 8. The Fontaine and the revised Rutherford peripheral arterial disease classifications.

Fontaine		Rutherford			
Class	Symptoms	Grade	Category	Symptoms	Objective criteria
Stage I	Asymptomatic	0	0	Asymptomatic	Normal treadmill or reactive hyperaemia test
Stage II	Claudication pain in limb	I	1	Mild claudication	Completes treadmill exercise; AP after exercise > 50 mmHg but at least 20 mmHg lower than resting value
	IIA: Claudication at a distance $\geq$ 200 m		2	Moderate claudication	Between categories 1 and 3
	IIB: Claudication at a distance < 200 m		3	Severe claudication	Cannot complete standard treadmill exercise, and AP after exercise < 50 mmHg
Stage III	Rest pain, mostly in the feet	II	4	Ischaemic rest pain	Resting AP < 40 mmHg, flat or barely pulsatile ankle or metatarsal PVR; TP < 30 mmHg
Stage IV	Ulceration and or gangrene of the limb	III	5	Minor tissue loss – non-healing ulcer, focal gangrene with diffuse pedal ischaemia	Resting AP < 60 mmHg, ankle or metatarsal PVR flat or barely pulsatile; TP < 40 mmHg
			6	Major tissue loss – extending above transmetatarsal level, functional foot no longer salvageable	Same as category 5

AP = ankle pressure; PVR = pulse volume recordings; TP = toe pressure.

CLAUDICACION INTERMITENTE

Table 4. Classical symptoms of intermittent claudication, modified from Rose.⁸¹

Exertional leg pain that:

Does not begin at rest

Involves the calf, thigh and or buttock

Causes the patient to reduce their walking speed or stop walking

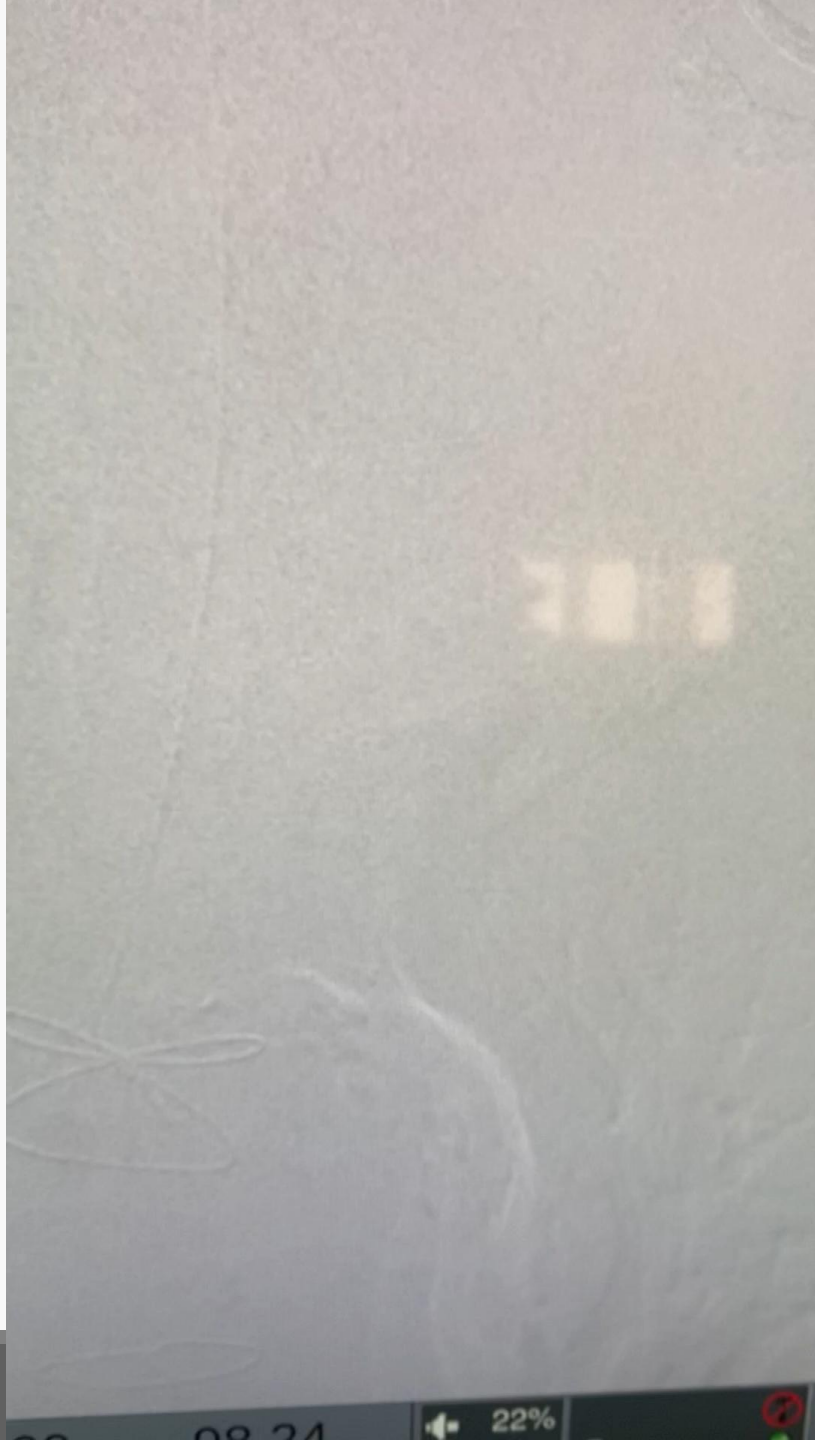
Resolves within 10 minutes of rest





Neuroc

F
DSA
MAG
70
165.2
29:22 m
583.85 mB



CLINICAL PRACTICE GUIDELINE DOCUMENT

Editor's Choice – European Society for Vascular Surgery (ESVS) 2024 Clinical Practice Guidelines on the Management of Asymptomatic Lower Limb Peripheral Arterial Disease and Intermittent Claudication

Joakim Nordanstig ^{*,a}, Christian-Alexander Behrendt ^a, Iris Baumgartner ^a, Jill Belch ^a, Maria Bäck ^a, Robert Fitridge ^a, Robert Hinchliffe ^a, Anne Lejay ^a, Joseph L. Mills ^a, Ulrich Rother ^a, Birgitta Sigvant ^a, Konstantinos Spanos ^a, Zoltán Szeberin ^a, Willemien van de Water ^a

ESVS Guidelines Committee ^b, George A. Antoniou, Martin Björck, Frederico Bastos Gonçalves, Raphael Coscas, Nuno V. Dias, Isabelle Van Herzeele, Sandro Lepidi, Barend M.E. Mees, Timothy A. Resch, Jean-Baptiste Ricco, Santi Trimarchi, Christopher P. Twine, Riikka Tulamo, Anders Wanhainen

Document Reviewers ^c, Jonathan R. Boyle, Marianne Brodmann, Alan Dardik, Florian Dick, Yann Goëffic, Andrew Holden, Stavros K. Kakkos, Phillipe Kolh, Mary M. McDermott

Recommendation 45

For patients with intermittent claudication, a stepwise approach is recommended, providing risk factor management, best medical treatment, and exercise therapy as a first step, and revascularisation as a second step in compliant patients with continued disabling limb symptoms.

Class	Level	References	ToE
I	B	Fakhry <i>et al.</i> (2021)⁴⁵⁴ Hageman <i>et al.</i> (2017)⁴⁵⁵ Van den Houten <i>et al.</i> (2016)⁴⁵³ Reynolds <i>et al.</i> (2014)⁴⁵⁰ Fokkenrood <i>et al.</i> (2014)⁴⁵² Mazari <i>et al.</i> (2013)⁴⁶² Spronk <i>et al.</i> (2008)⁴⁶³ Treesak <i>et al.</i> (2004)⁴⁵⁶ De Vries <i>et al.</i> (2002)⁴⁵⁷	

Ejercicio Físico Supervisado

¿Qué es la rehabilitación vascular?:

Programa de ejercicios y cambios en el estilo de vida diseñados para mejorar la capacidad funcional en pacientes con claudicación intermitente.

Objetivos:

Mejorar la distancia de claudicación

Reducir el dolor y la limitación funcional

Aumentar la calidad de vida

Fisiología

Reducción de marcadores inflamatorios

Mejoría la vasodilatación endotelio-dependiente

Aumenta la densidad capilar del músculo gastrocnemio

Cambia la composición de las fibras musculares

Altera el metabolismo del músculo esquelético a través de un aumento en las enzimas oxidativas.

Supervised walking therapy in patients with intermittent claudication

Farzin Fakhry, MSc,^{a,b} Koen M. van de Luijtgaarden, MD,^c Leon Bax, PhD,^d
P. Ted den Hoed, MD, PhD,^c M. G. Myriam Hunink, MD, PhD,^{a,b} Ellen V. Rouwet, MD, PhD,^c and
Sandra Spronk, PhD,^{a,b} *Rotterdam, The Netherlands; and Sunnyvale, Calif*

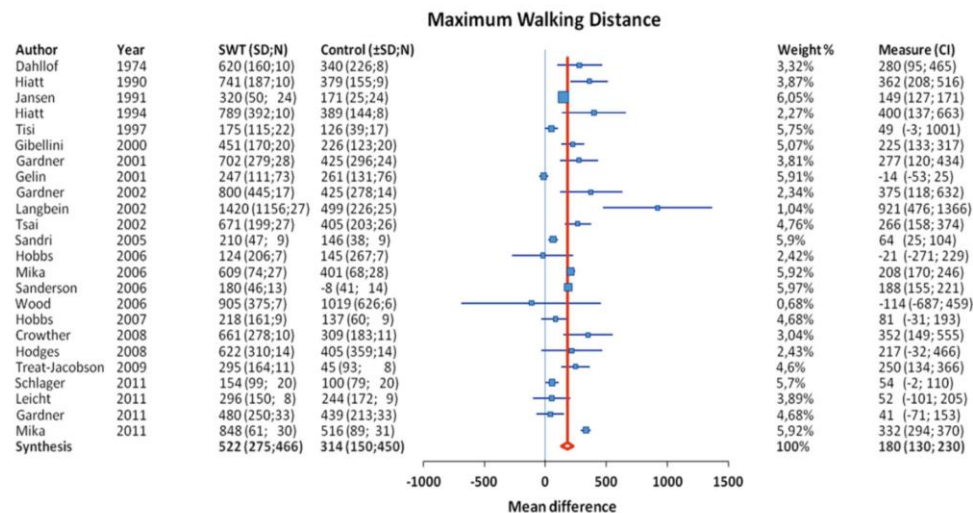


Fig 2. Mean difference in maximum walking distance (MWD) from randomized controlled trials comparing supervised walking therapy (SWT) vs noninterventional observation. CI, Confidence interval; SD, standard deviation.

DAC 180m

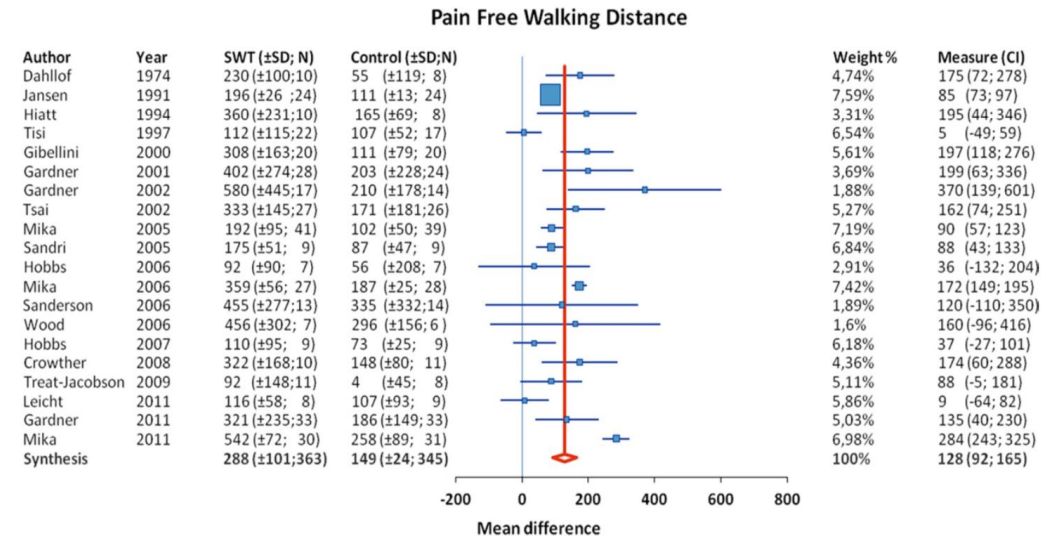


Fig 3. Mean difference in pain-free walking distance (PFWD) from randomized controlled trials comparing supervised walking therapy (SWT) vs noninterventional observation. CI, Confidence interval; SD, standard deviation.

DIC 128m



Cochrane
Library

Cochrane Database of Systematic Reviews

Authors' conclusions

Evidence of moderate and high quality shows that SET provides an important benefit for treadmill-measured walking distance (MWD and PFWD) compared with HBET and WAs, respectively. Although its clinical relevance has not been definitively demonstrated, this benefit translates to increased MWD of 120 and 210 meters after three months in SET groups. These increased walking distances are

Supervised exercise therapy versus home-based exercise therapy versus walking advice for intermittent claudication (Review)

Hageman D, Fokkenrood HJP, Gommans LNM, van den Houten MML, Teijink JAW

Exercise training for health-related quality of life in peripheral artery disease: A systematic review and meta-analysis

Belinda J Parmenter¹, Gudrun Dieberg², Glenn Phipps² and Neil A Smart²

Vascular Medicine

2015, Vol. 20(1) 30–40

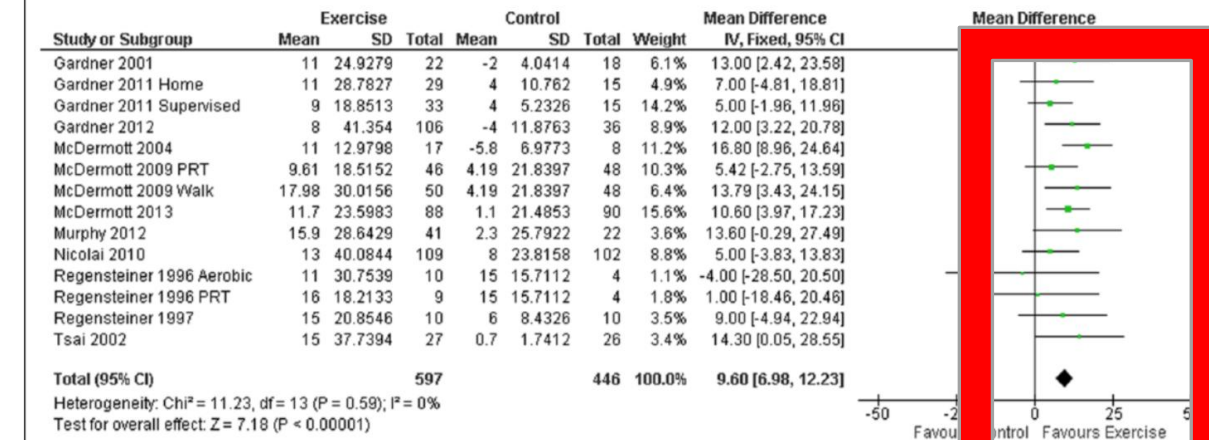
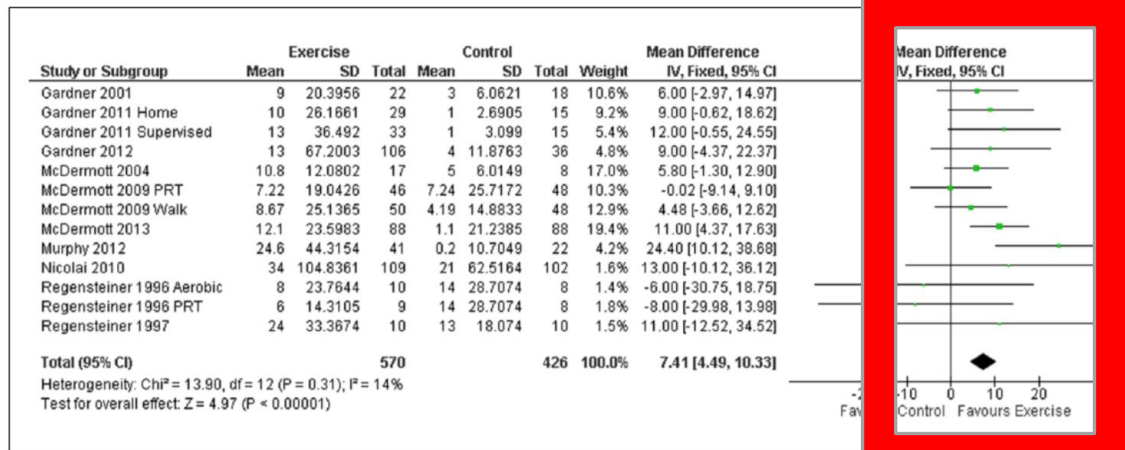
© The Author(s) 2014

Reprints and permissions:

sagepub.co.uk/journalsPermissions.nav

DOI: 10.1177/1358863X14559092

vmj.sagepub.com



The Effect of Supervision on Walking Distance in Patients with Intermittent Claudication: A Meta-analysis

L.N.M. Gommans^a, R. Saarloos^a, M.R.M. Scheltinga^{b,c}, S. Houterman^d, R.A. de Bie^e, H.J.P. Fokkenrood^{a,e}, J.A.W. Teijink^{a,e,*}

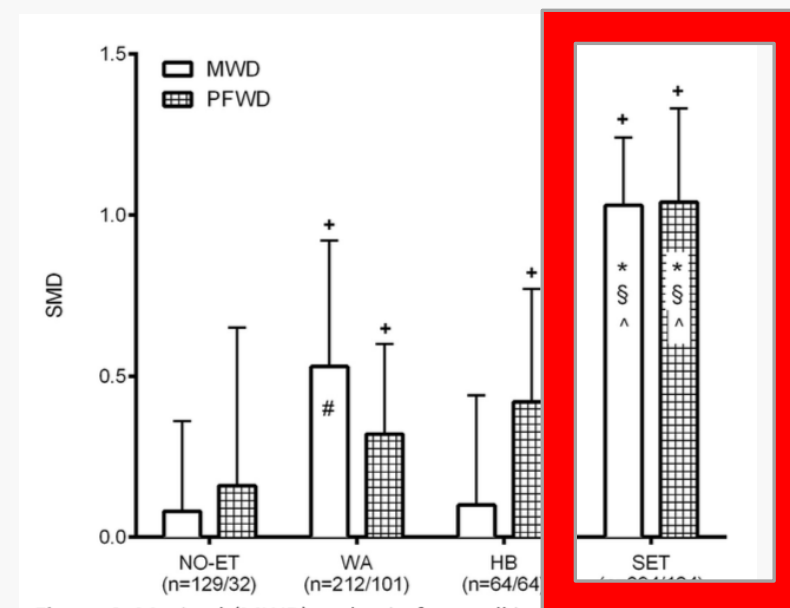
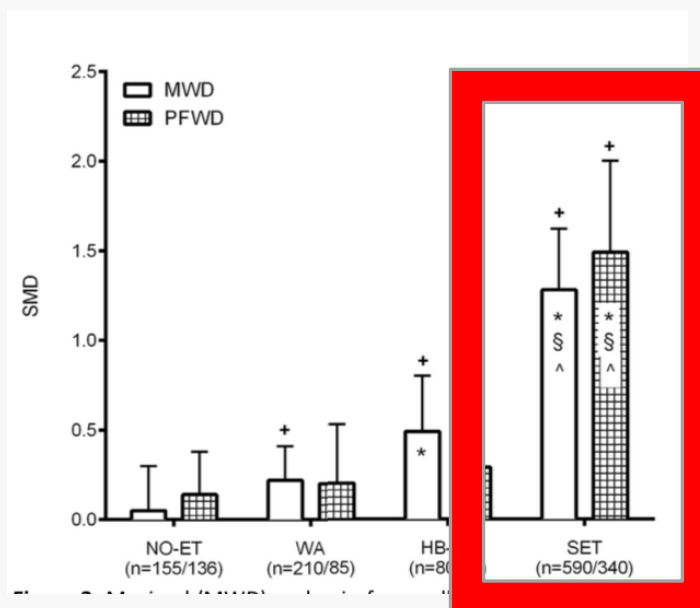
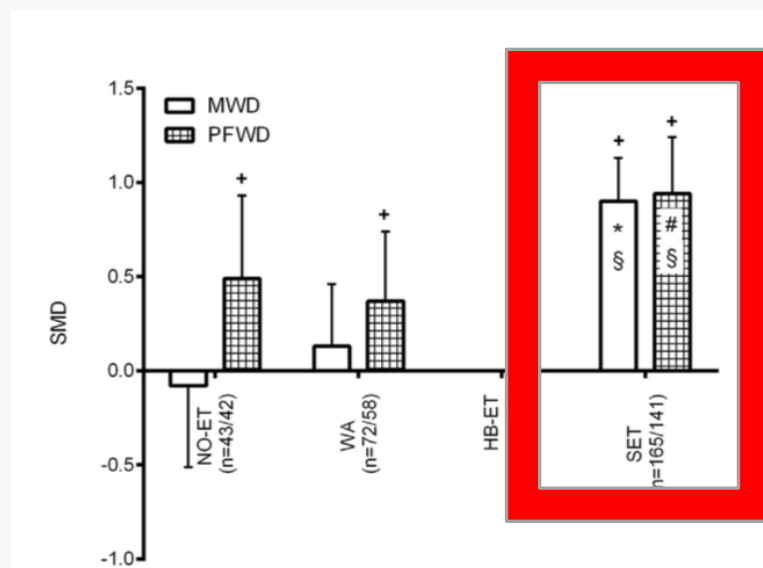
^a Catharina Hospital, Department of Vascular Surgery, P.O. Box 1350, 5602 ZA Eindhoven, The Netherlands

^b Maxima Medical Centre, Department of Vascular Surgery, P.O. Box 7777, 5500 MB Veldhoven, The Netherlands

^c CARIM Research School, Maastricht University, P.O. Box 606, 6200 MD Maastricht, The Netherlands

^d Catharina Hospital, Department of Education and Research, P.O. Box 1350, 5602 ZA Eindhoven, The Netherlands

^e CAPHRI Research School, Department of Epidemiology, Maastricht University, P.O. Box 606, 6200 MD Maastricht, The Netherlands



Supervised vs unsupervised exercise for intermittent claudication: A systematic review and meta-analysis



Sreekanth Vemulapalli, MD,^a Rowena J. Dolor, MD, MHS,^{b,c,d} Vic Hasselblad, PhD,^e Kristine Schmit, MD, MPH,^f Adam Banks, MD,^c Brooke Heidenfelder, PhD,^d Manesh R. Patel, MD,^{a,b} and W. Schuyler Jones, MD^{a,b} *Durham, NC*

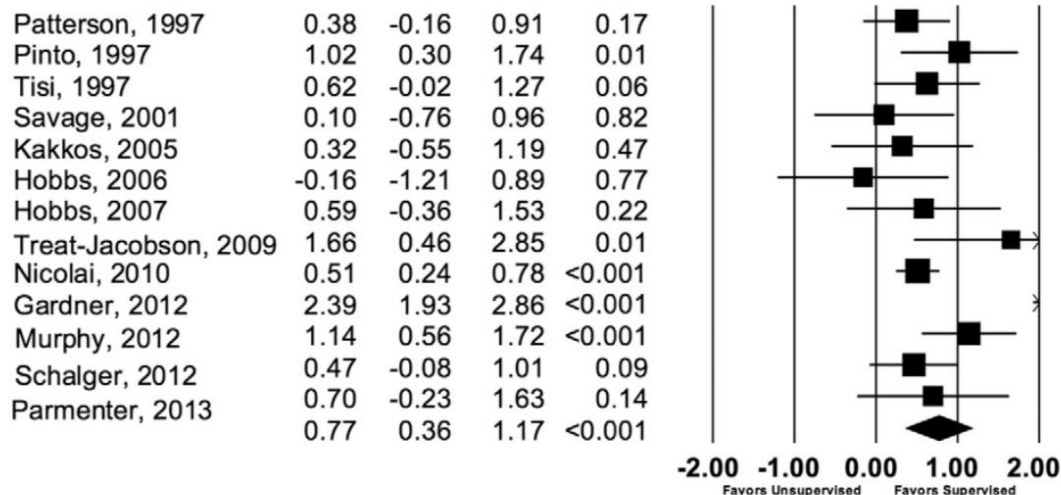
A

Study name

Statistics for each study

Std diff in means	Lower limit	Upper limit	p-Value
-------------------	-------------	-------------	---------

Std diff in means and 95% CI



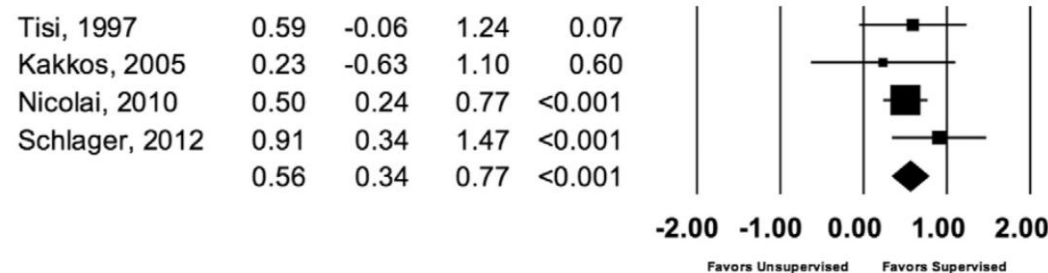
B

Study name

Statistics for each study

Std diff in means	Lower limit	Upper limit	p-Value
-------------------	-------------	-------------	---------

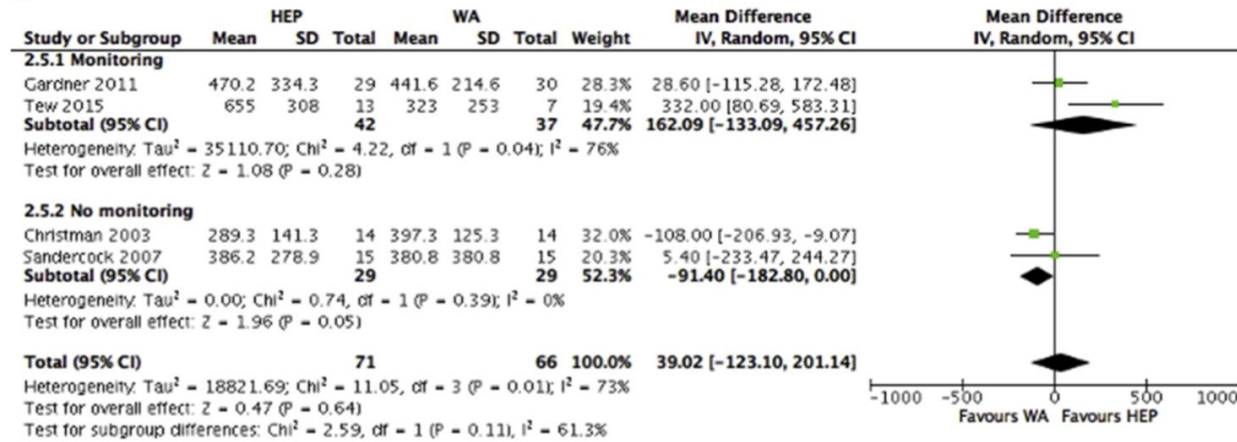
Std diff in means and 95% CI



An updated systematic review and meta-analysis of home-based exercise programs for individuals with intermittent claudication

Sean Pymer, PhD,^a Saïd Ibeggazene, PhD,^b Joanne Palmer, MSc,^a Garry A. Tew, PhD,^c Lee Ingle, PhD,^d George E. Smith, MD,^a Ian C. Chetter, MD,^a and Amy E. Harwood, PhD,^{d,e} *Hull, Sheffield, Newcastle, and Coventry, United Kingdom*

A



B

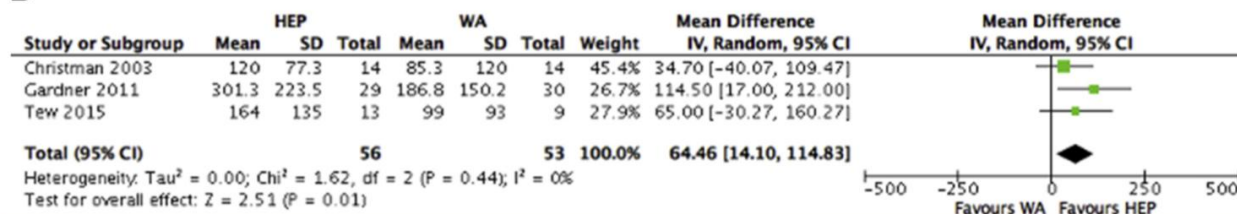


Fig 3. Comparison 2. Home exercise program (HEP) vs basic walking advice (WA) for maximum walking distance (MWD) and (A) and pain-free walking distance (PFWD) (B). CI, Confidence interval; SD, Standard deviation.

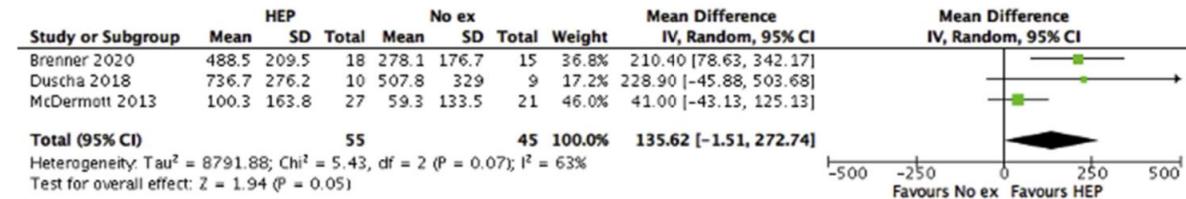


Fig 4. Comparison 3. Home exercise program (HEP) vs no exercise for maximum walking distance (MWD). CI, Confidence interval; SD, standard deviation.



How to do it ?

EJERCICIO FISICO SUPERVISADO

Caminar en cinta, alcanzando al menos un nivel moderado de dolor por claudicación, seguido de un breve período de descanso, con una duración total de 30 a 60 minutos por sesión, tres veces por semana durante tres a seis meses.

Circulation

AHA SCIENTIFIC STATEMENT

Optimal Exercise Programs for Patients With Peripheral Artery Disease

A Scientific Statement From the American Heart Association



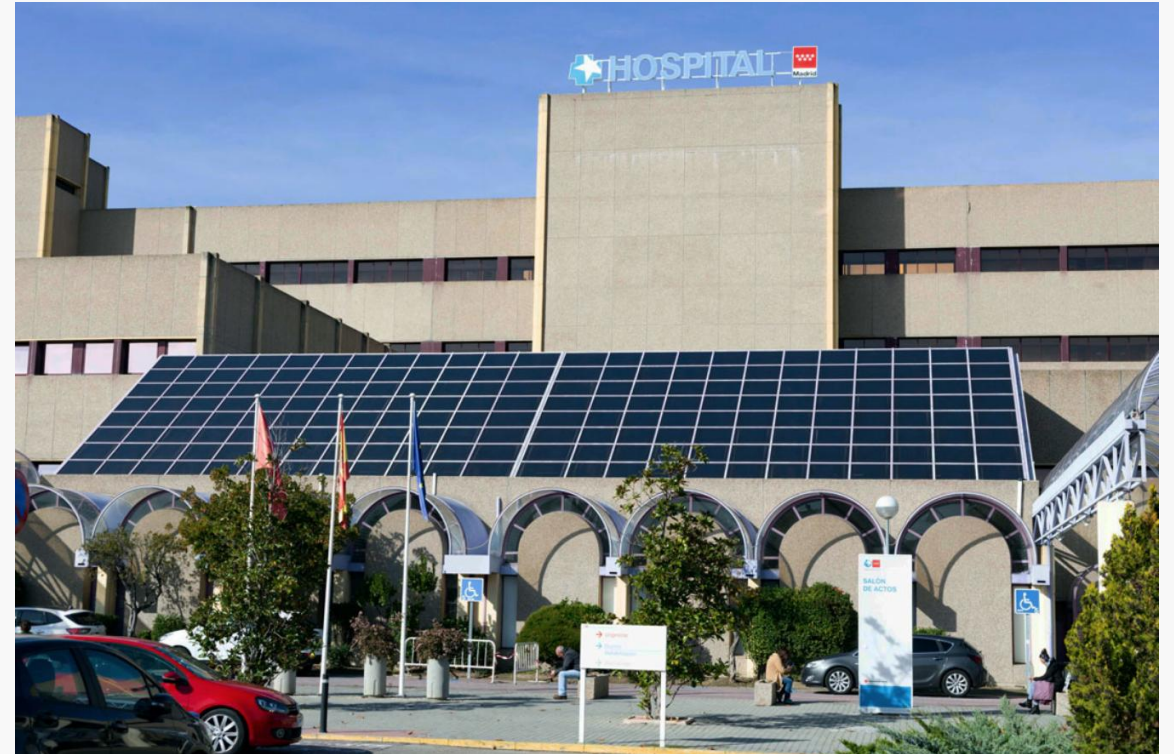
REHABILITACION VASCULAR

Hospital Universitario de Getafe

Dr. De Haro

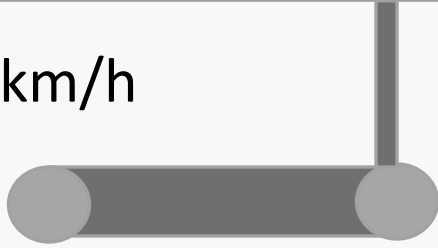
Dra. Bleda

Dr. Michel Guisasola



Programa de tratamiento

3,2 km/h



5%→10%



30 MINUTOS



Protocolo Rehabilitación Vascular

3 SESIONES SEMANALES

3 MESES



Protocolo Rehabilitación Vascular

CRITERIOS DE EXCLUSIÓN

- Hipertensión arterial **mal controlada**.
- **Incapacidad para completar el test de esfuerzo** en la cinta rodante por otros motivos que no fuera la claudicación intermitente (patología muscular, osteoarticular, neurológica,...etc.).
- Enfermedad **concomitante** (Ej. ICC previa, EPOC severo,... etc).
- **Obesidad mórbida**.
- Antecedentes o signos clínicos de **enfermedad coronaria**.

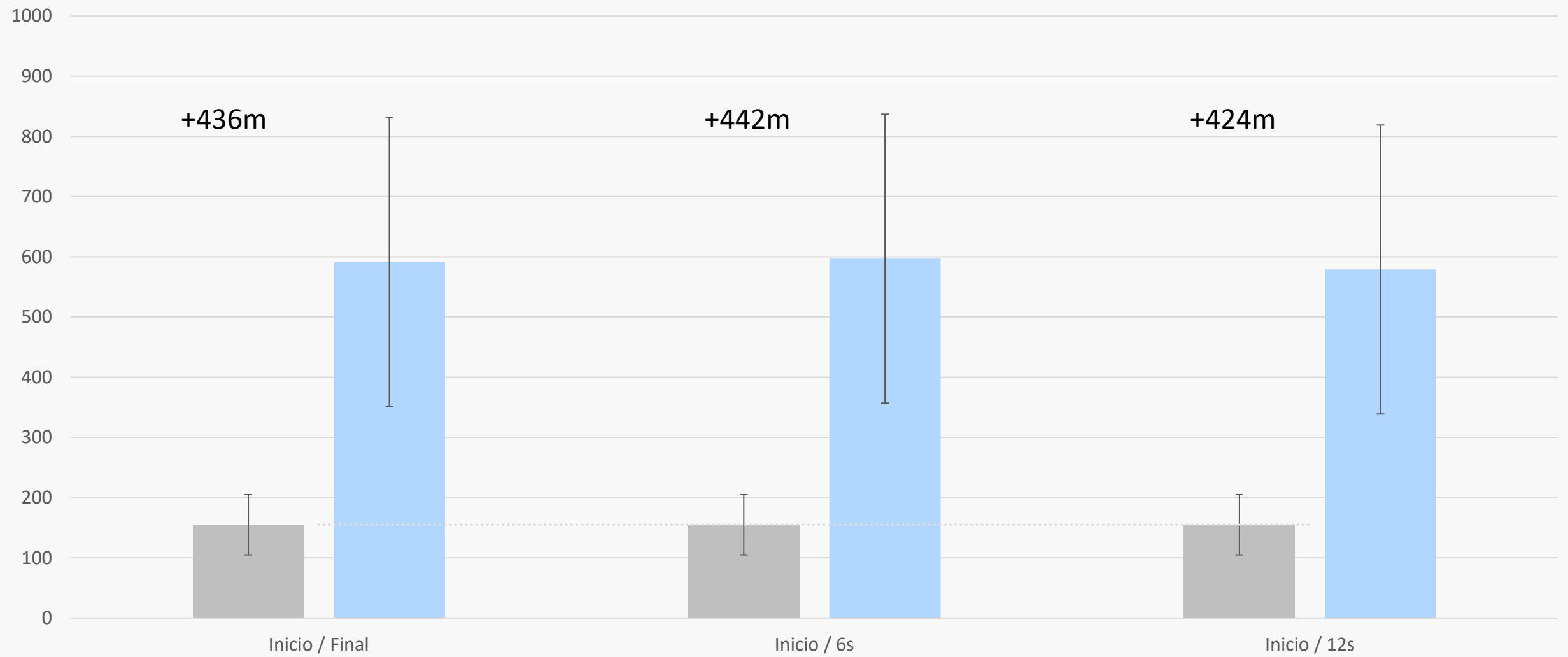
Resultados

N= 33 Pacientes

	Frecuencia
Genero	90%/10%
HTA	78,8%
DL	60,6%
DM	57,6%
IRC	9,1%
TABAQUISMO	78,8%

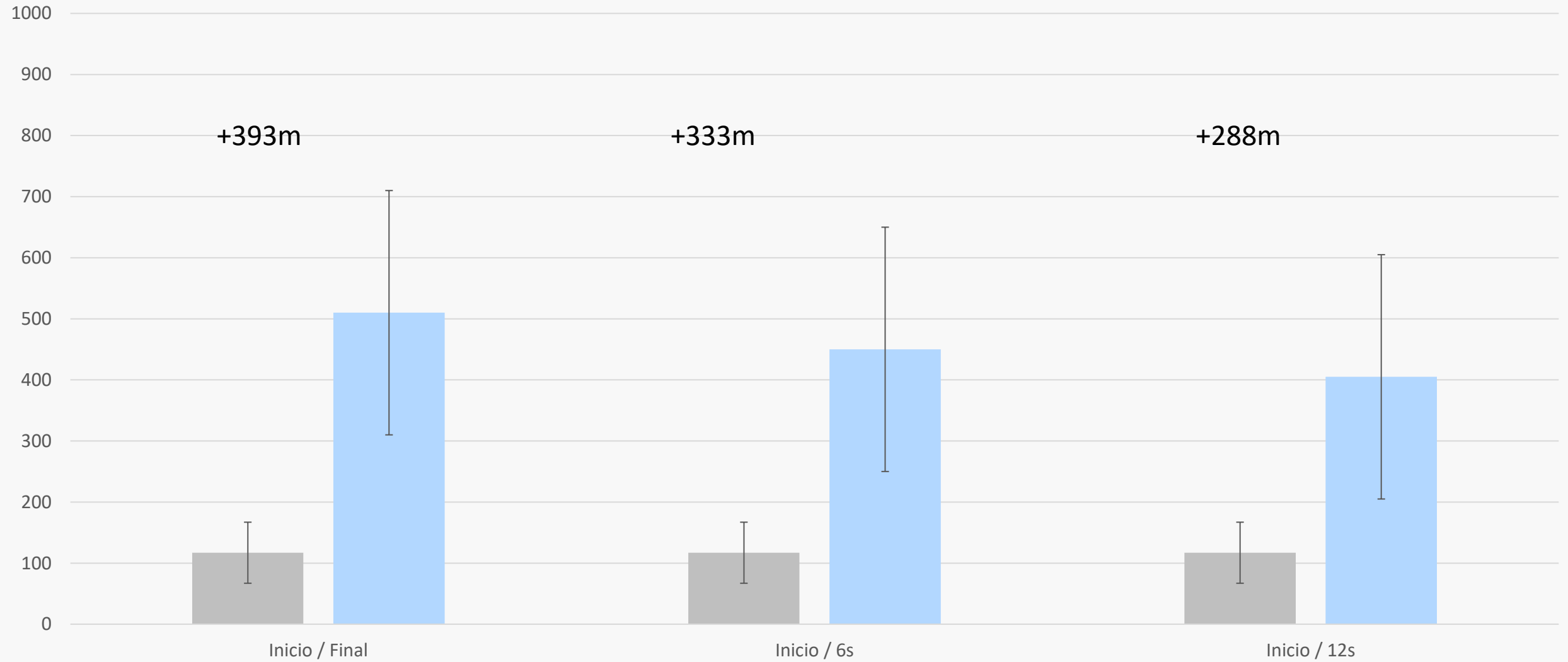
DSC

$P=0,0001$



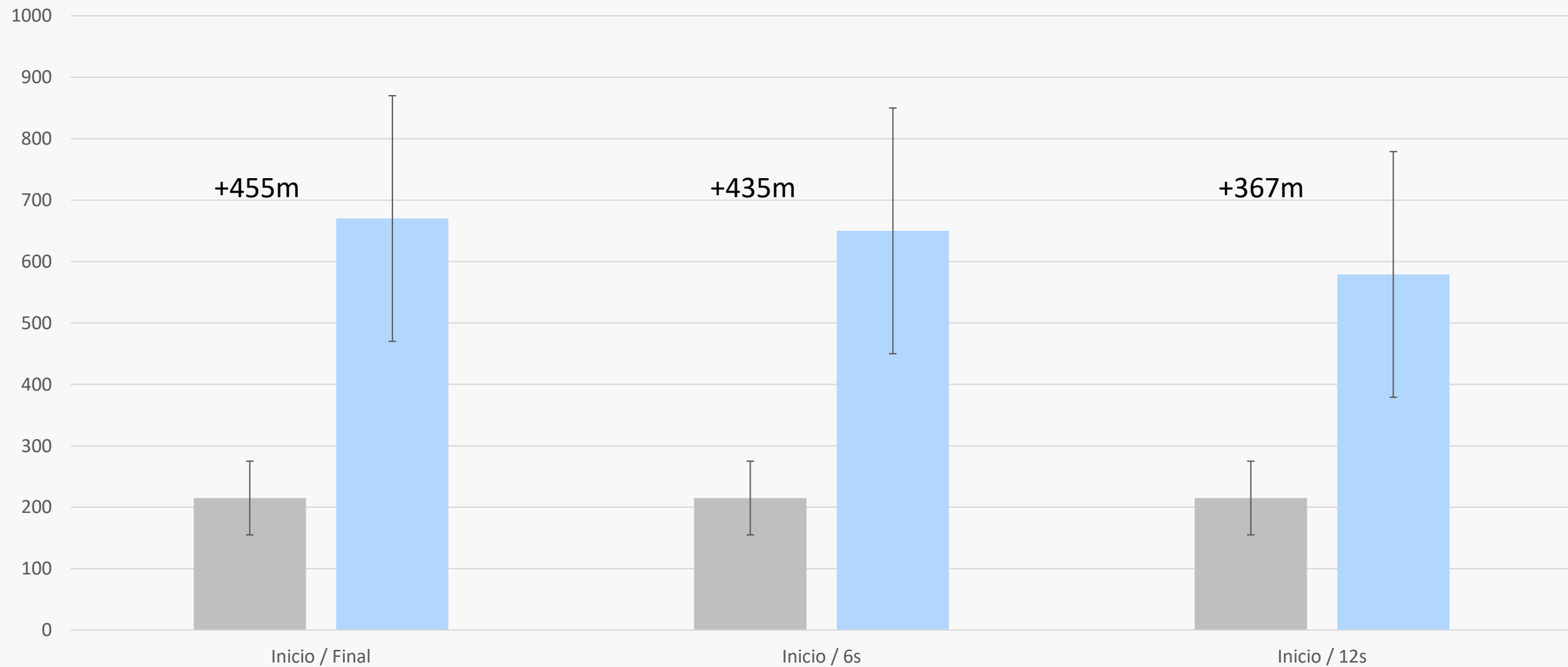
DIC

P=0,0001



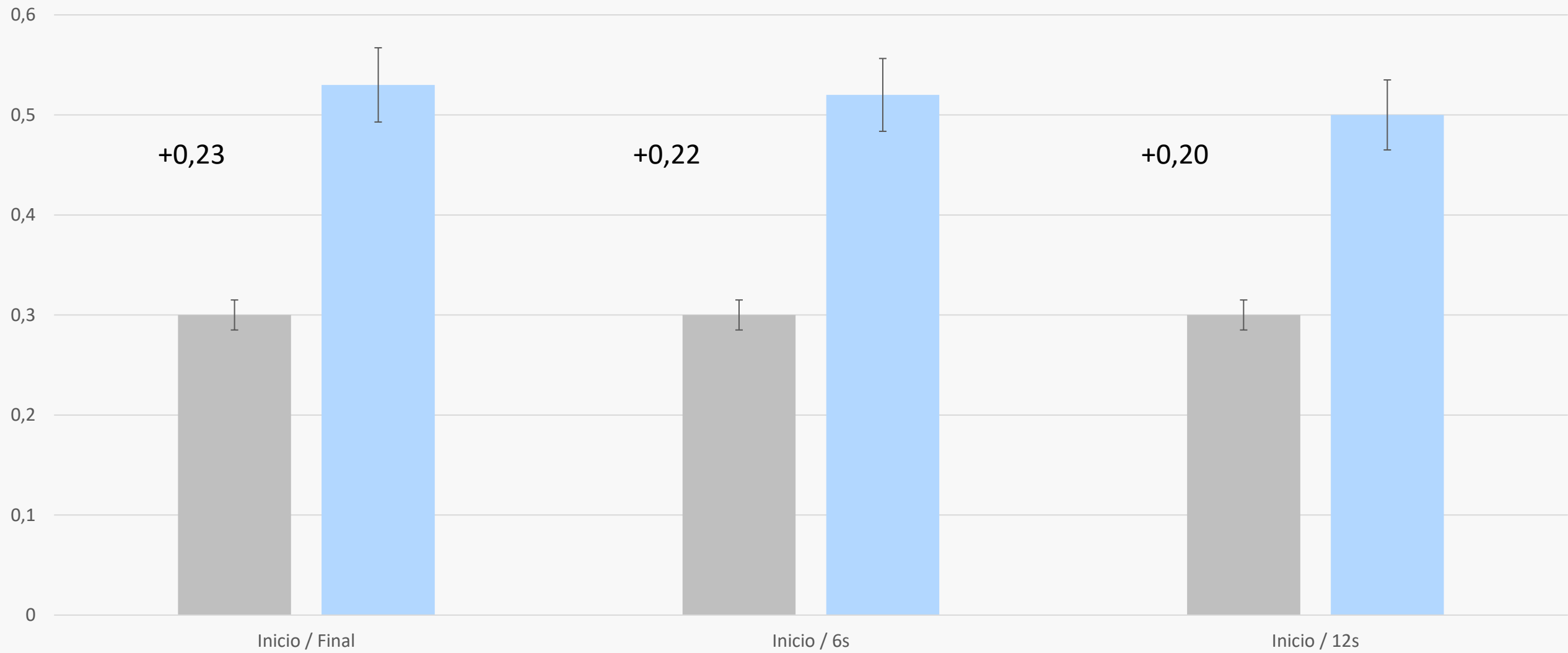
DAC

P=0,0001



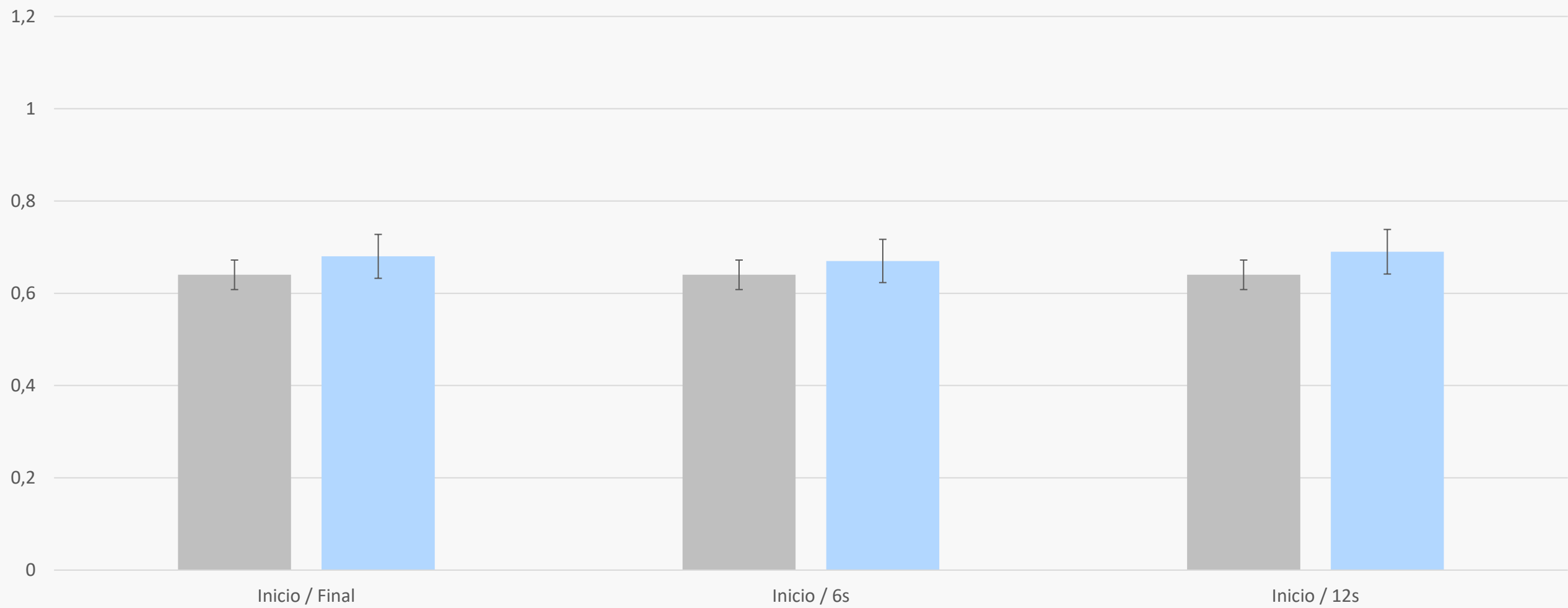
WIQ

P=0,0001



ITB

$P > 0,05$



Seguridad

	FRECUENCIA
MORTALIDAD	0%
TASA AMPUTACION	0%
REVASCULARIZACION	0%
MACE	0%
MAE	0%

Mediana de Seguimiento : 12 meses. [6-18 meses]

¿Por Qué?

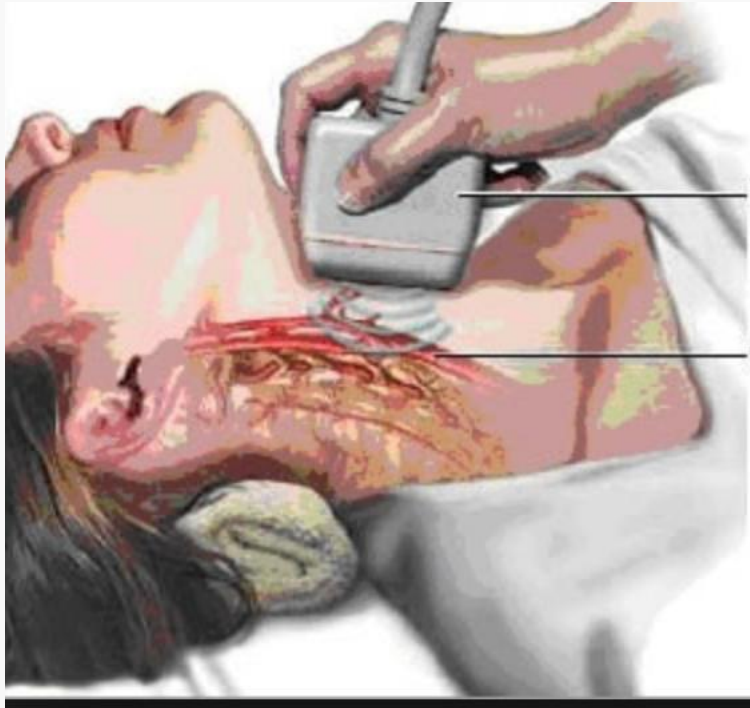
¿Qué Mecanismos Biológicos
Permiten esta Mejoría?

Método

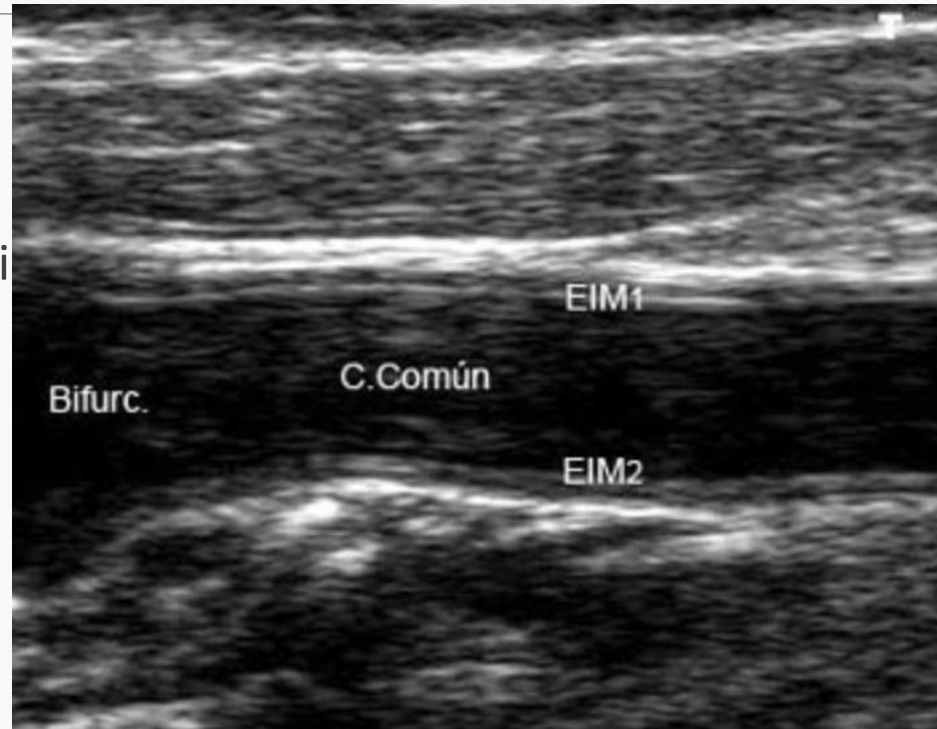
Análisis:

- Principales marcadores de Aterosclerosis
- Disfunción endotelial
- Estado Proinflamatorio

EIMC

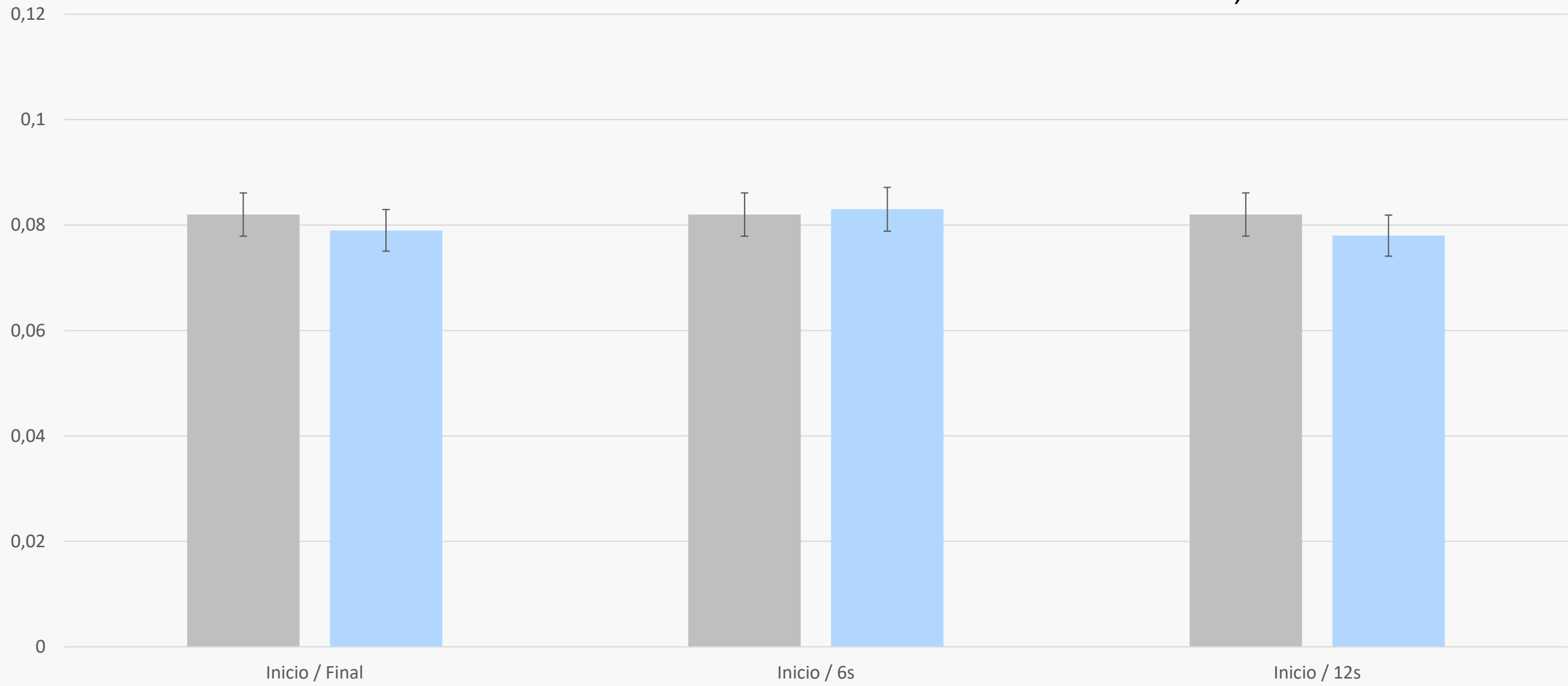


oesclerosi



EIMC

P>0,05

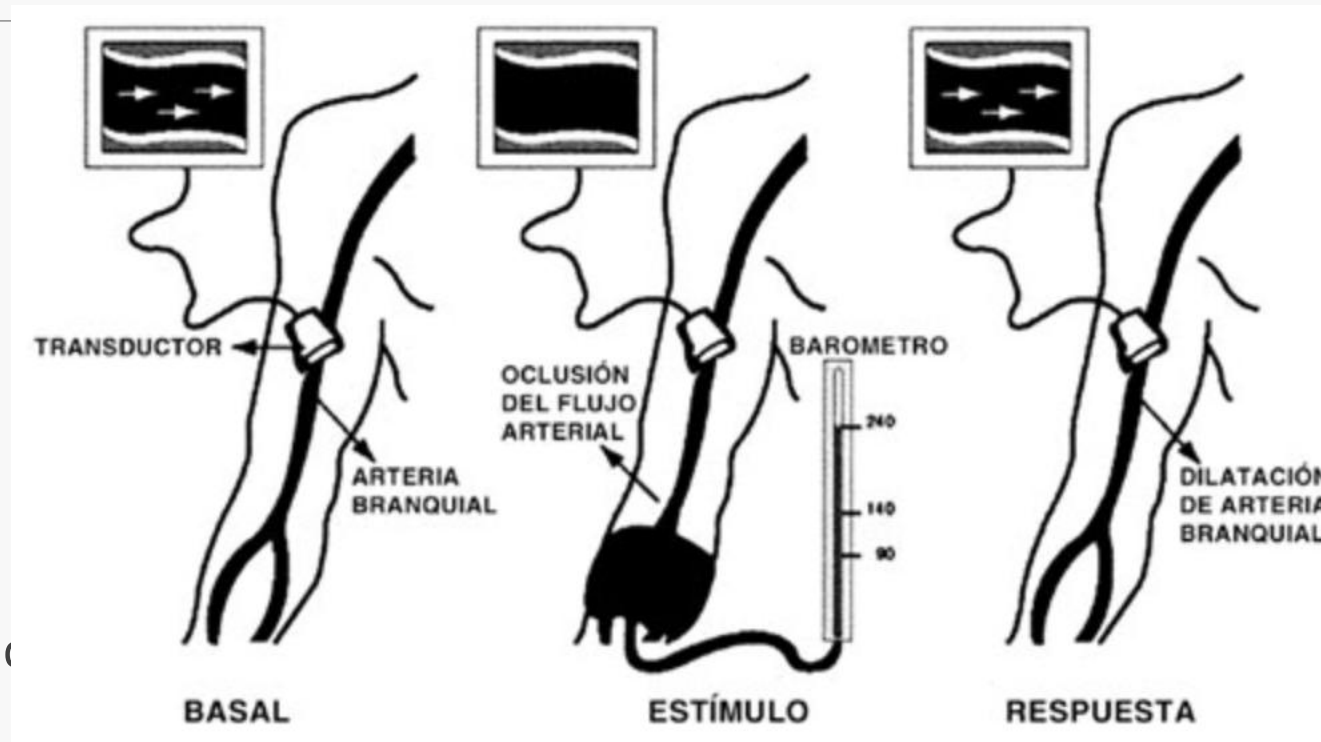


Disfunción Endotelial

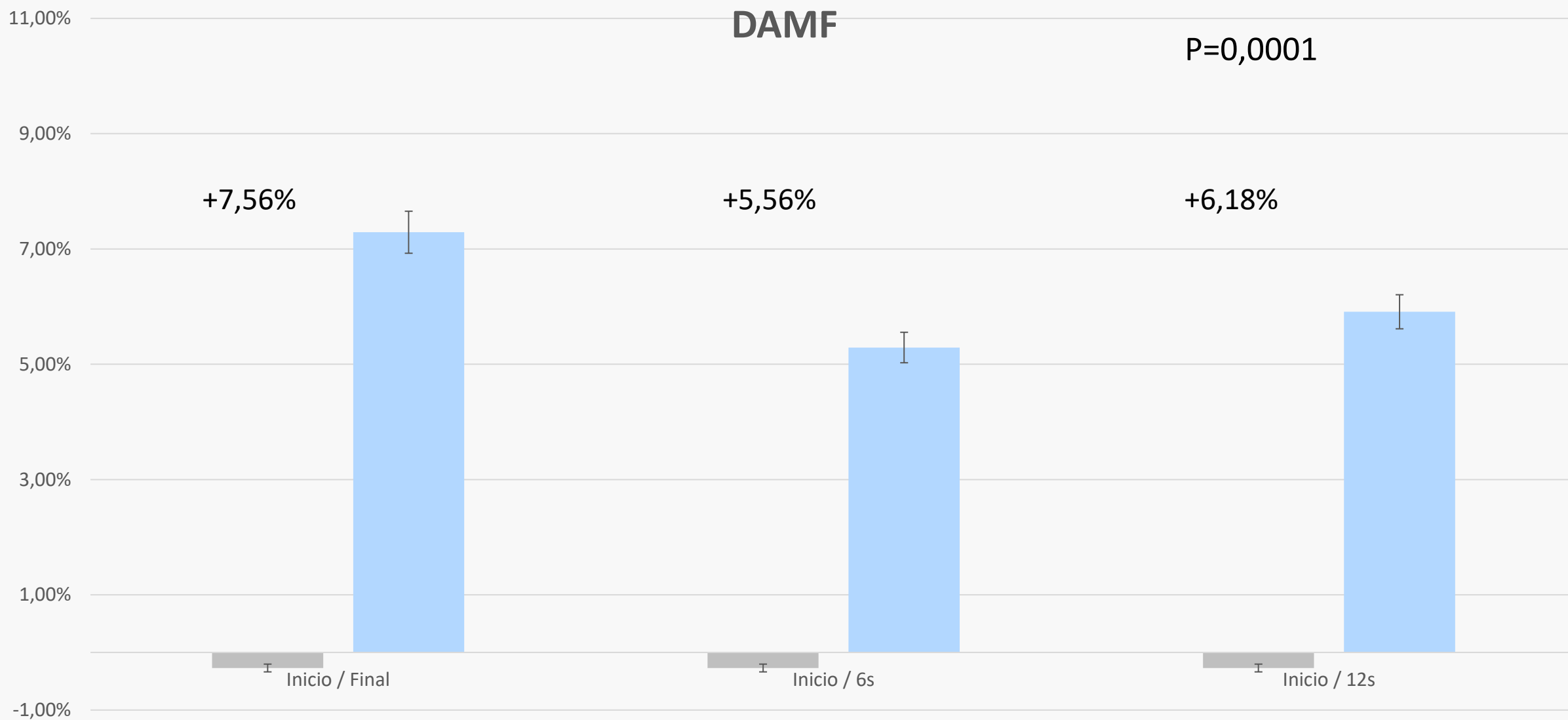
EAP →

Descenso de NO

Técnica que estudia



IIA



Disfunción Endotelial

A Role for Endothelin-1 in Peripheral Vascular Disease

Janice C.S. Tsui^{1,*} and Michael R. Dashwood²

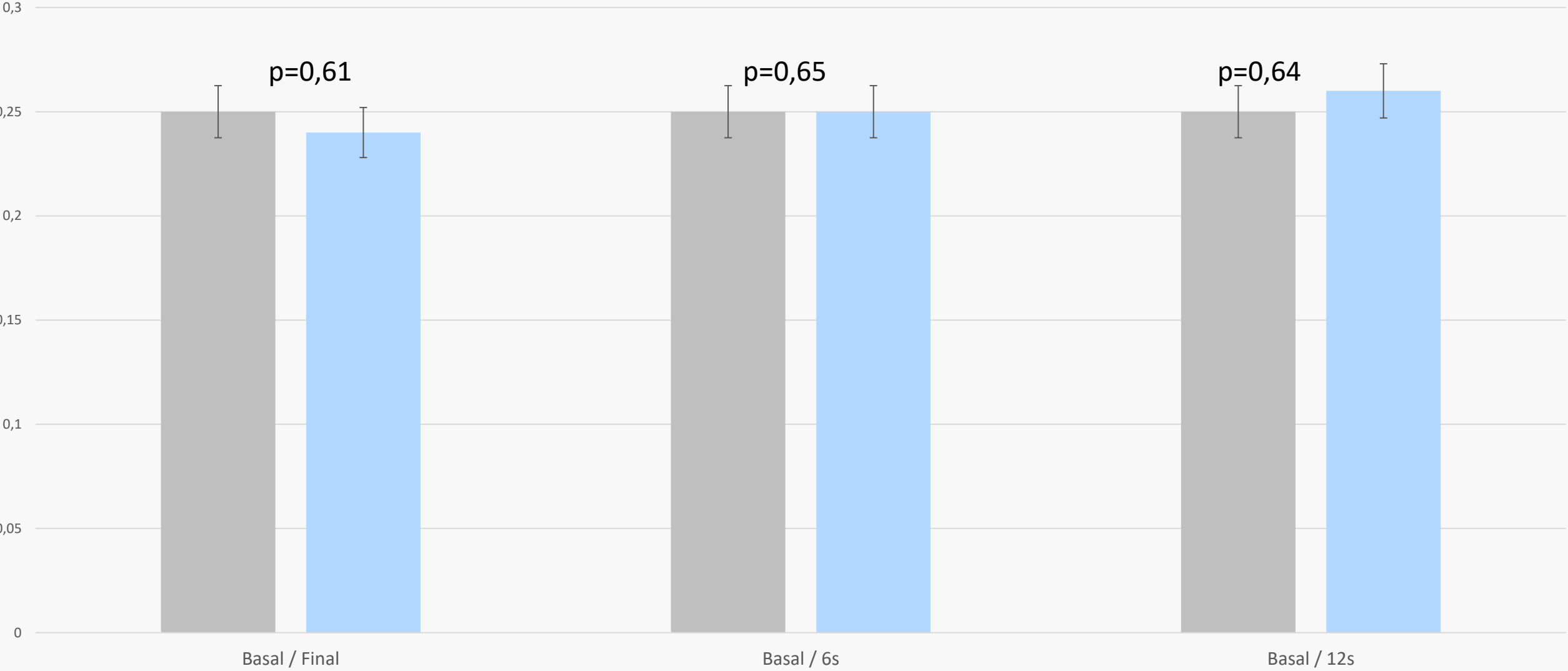
¹
U

Effect of Bosentan on Claudication Distance and Endothelium-Dependent Vasodilation in Hispanic Patients With Peripheral Arterial Disease



Joaquin De Haro, MD*, Silvia Bleda, MD, Cesar Varela, MD, Leticia Esparza, MD, and Francisco Acin, MD, PhD, for the Bosentan Population-Based Randomized Trial for Clinical and Endothelial Function Assessment on Endothelin Antagonist Therapy in Patients With Intermittent Claudication (CLAU) Investigators

ET- 1



Estado proinflamatorio



Plasma

C-Reactive Protein and Endovascular Treatment of Lower Limb Peripheral Artery Disease: An Independent Prognostic Factor



of

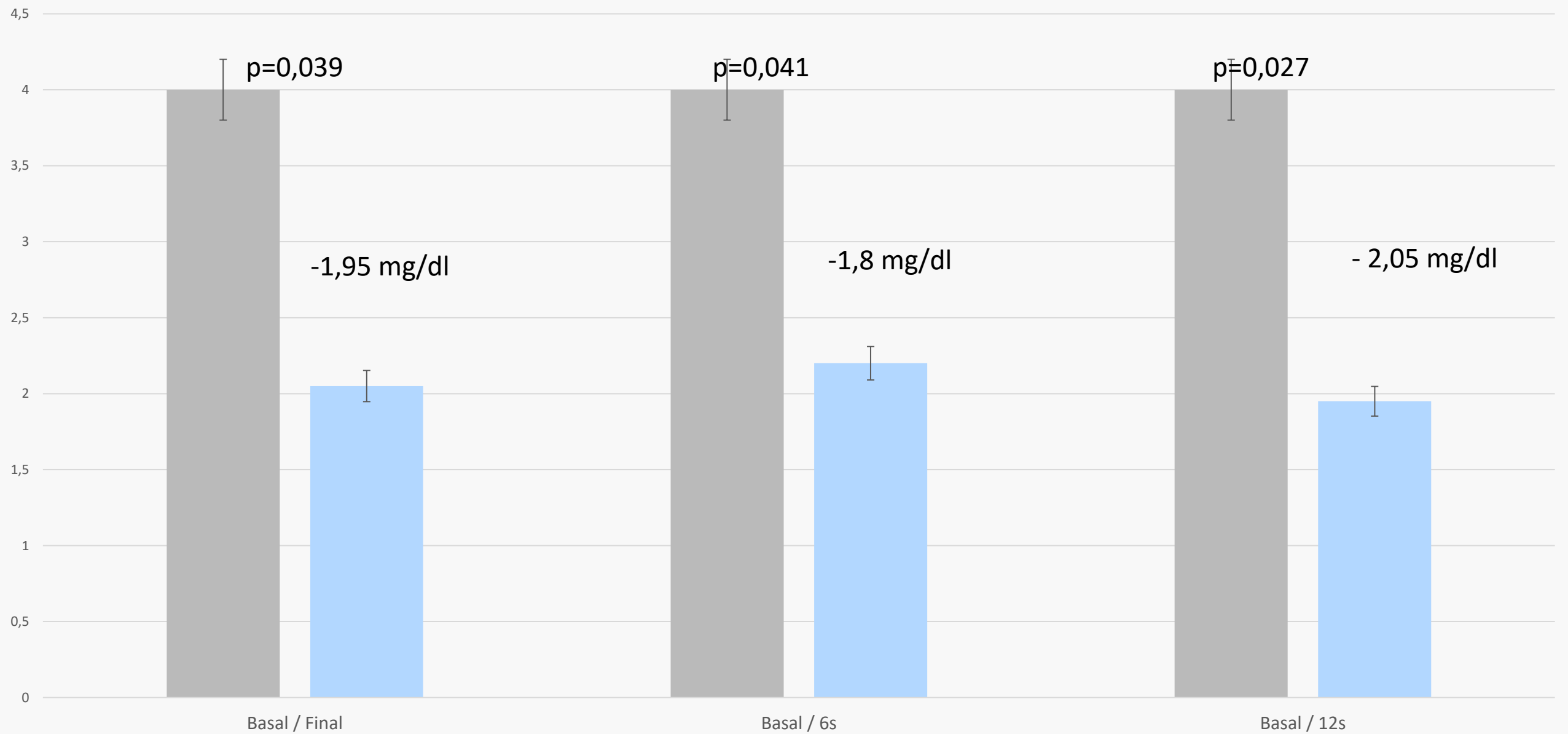
Background—
inflammation
associated

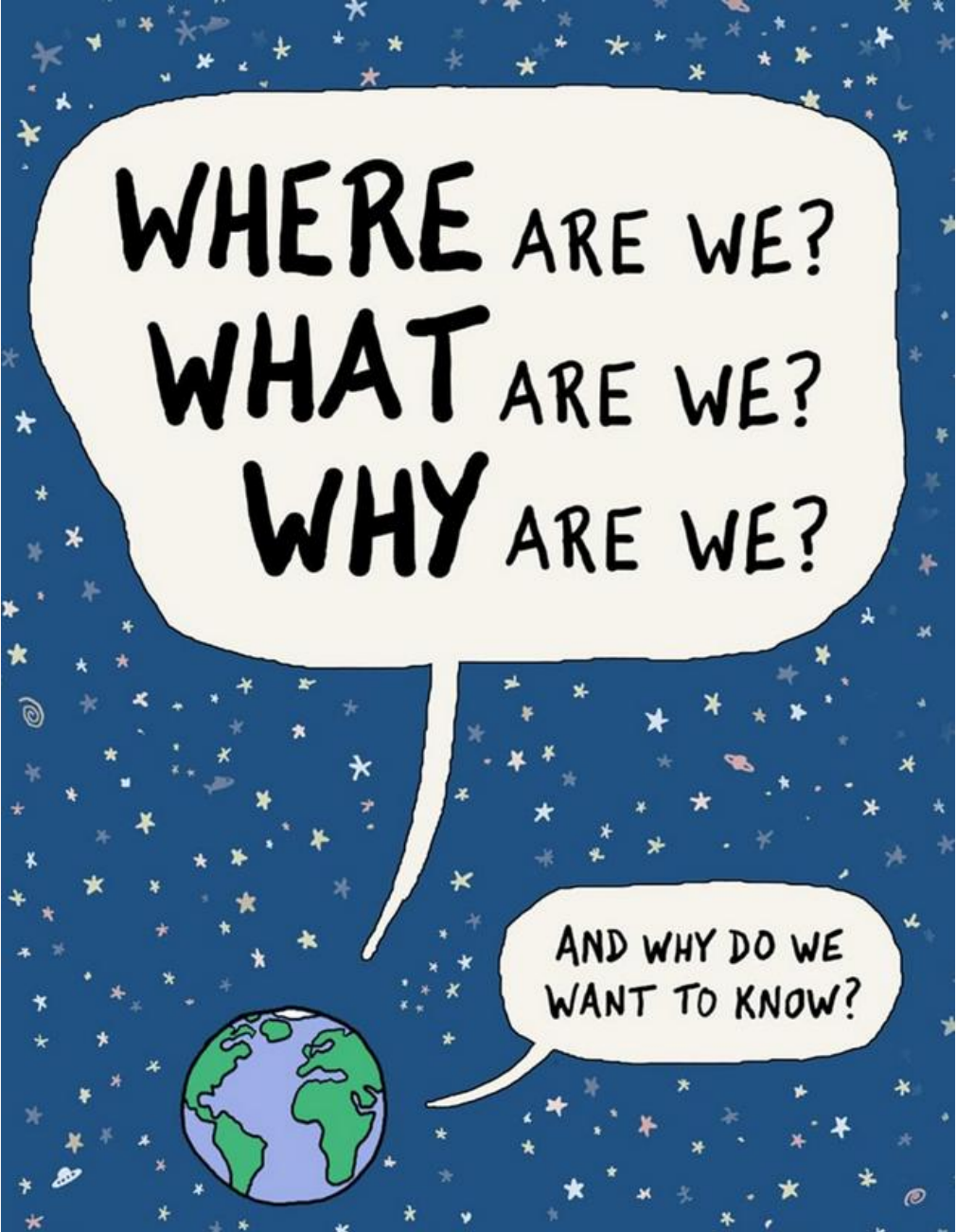
**Silvia Bleda, MD¹, Joaquin de Haro, MD¹, Cesar Varela, MD¹,
and Francisco Acin, MD, PhD¹**

systemic
response also

Medicine 2014;93(11):1144-1150. doi:10.1093/med/93.11.1144

PCR





WHERE ARE WE?
WHAT ARE WE?
WHY ARE WE?

AND WHY DO WE
WANT TO KNOW?

From the Vascular and Endovascular Surgery Society

National assessment of availability, awareness, and utilization of supervised exercise therapy for peripheral artery disease patients with intermittent claudication



Anahita Dua, MD, MS, MBA,^a Rebecca Gologorsky, MD,^b Dasha Savage, BS,^b Neil Rens, BS,^b Neil Gandhi, BS,^b Benjamin Brooke, MD,^c Matthew Corriere, MD,^d Elizabeth Jackson, MD,^e and Oliver Aalami, MD,^b *Boston, Mass; Palo Alto, Calif; Salt Lake City, Utah; Ann Arbor, Mich; and Birmingham, Ala*

Cuestionario a 900 Facultativos. Solo 135 contestaron

55% NO 5% NS/NC

40% --> Mas de la mitad no había indicado nunca una rehabilitación vascular.

El 80% de los programas asociados a CARDIOLOGIA

Availability of Supervised Exercise Programs and the Role of Structured Home-based Exercise in Peripheral Arterial Disease

G.C. Makris^{a,b,c,*}, C.R. Lattimer^{a,b}, A. Lavidia^a, G. Geroulakos^{a,b}

^a Vascular Surgery Department, Ealing Hospital, NHS Trust, London, UK

^b Vascular Surgery Department, Imperial College of London, UK

^c Alfa Institute of Biomedical Sciences, Marousi, Athens, Greece

348 Participantes.

Solo el **30%** tienen acceso a RV.

El **20%** derivarían a todos sus pacientes



FUTURO



¿QUÉ ME LLEVO A CASA?

LA REHABILITACION VASCULAR ES SEGURA Y EFECTIVA EN EL
TRATAMIENTO DE PACIENTES CLAUDICANTES

TENEMOS QUE FOMENTAR LA IMPLANTACION DE PROGRAMAS
ESPECIFICOS DE REHABILITACION VASCULAR

MUCHAS GRACIAS

