Evaluation and description of lumbar pain in adults with Marfan syndrome: MarfanLomb study

Marfan Europe Network
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Agenda

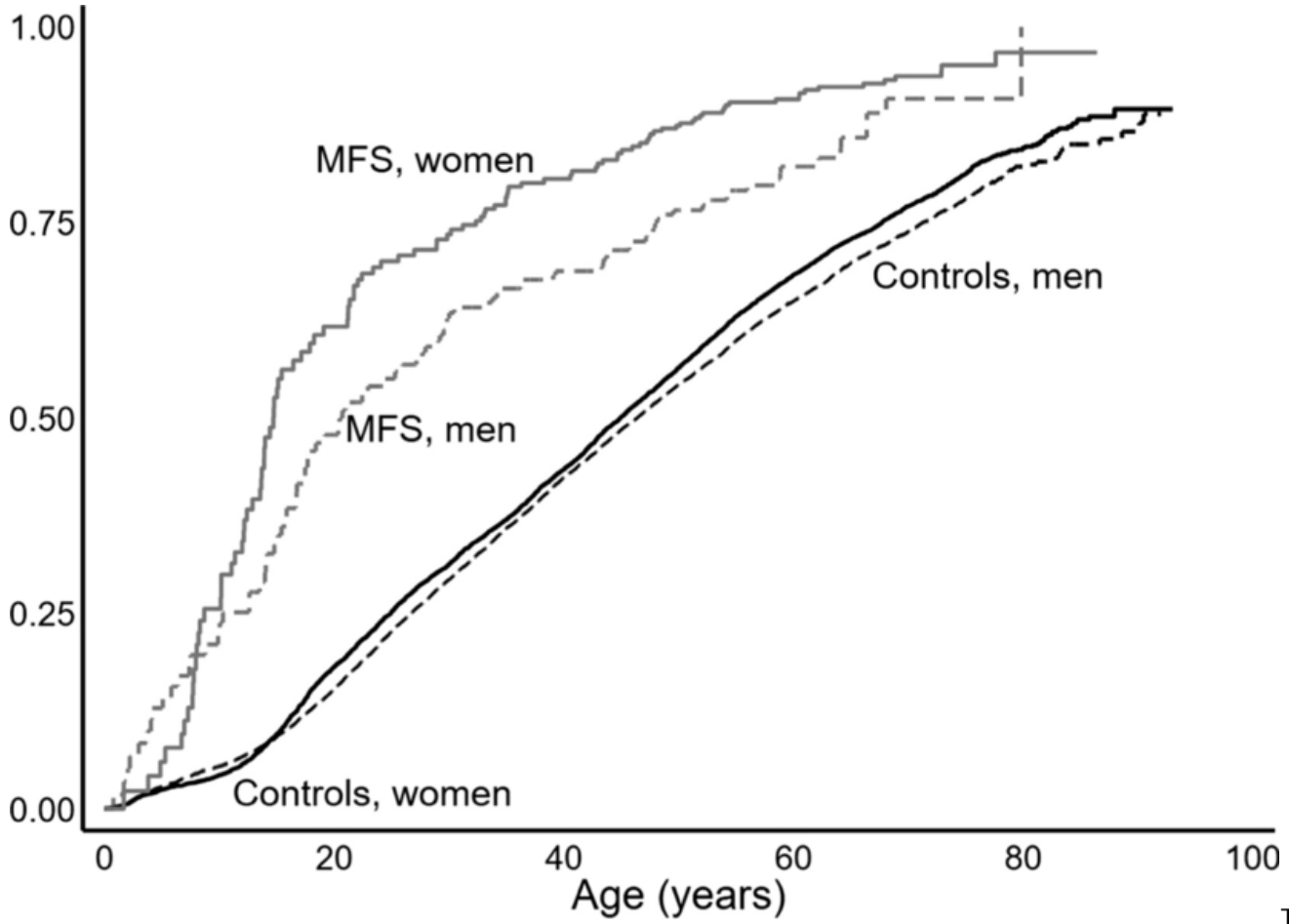
Musculoskeletal involvement in Marfan syndrom, specific focus on spine

MarfanLomb study

Burden of musculoskeletal involvement in MFS

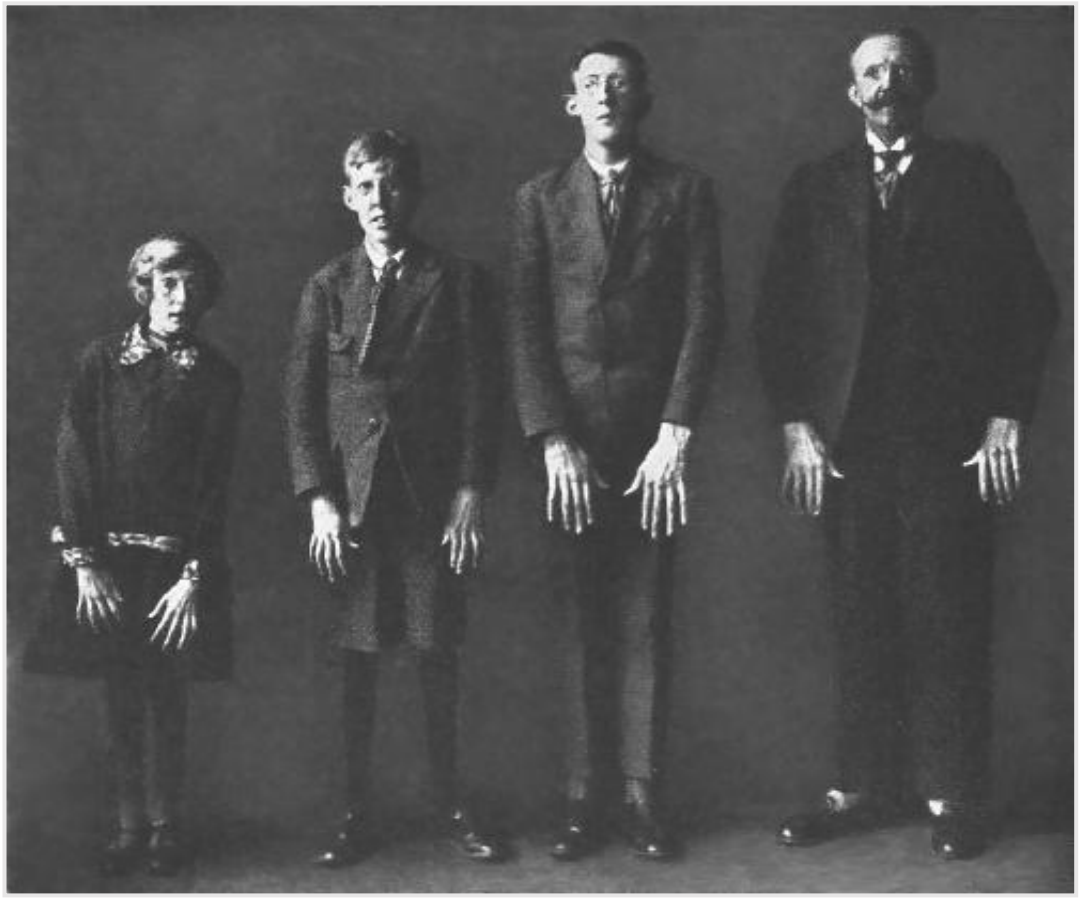
Registry
Denmark
MFS: 407 (194 F)
Controls: 40,700 (19,400 F)

Doubled risk of a musculoskeletal diagnosis
HR: 1.94 (1.69 to 2.24)

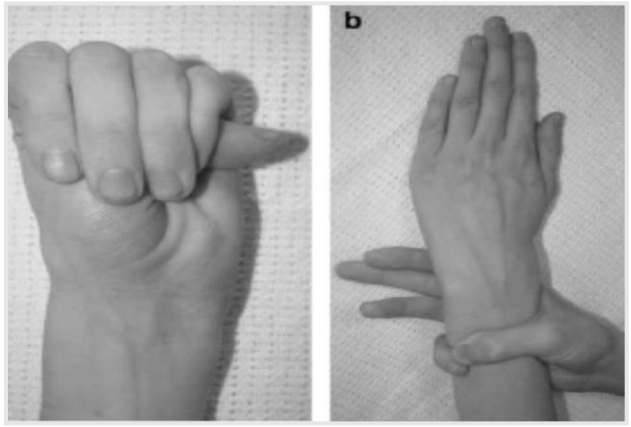


Andersen NH et al. Orphanet J Rare Dis. 2022

Non-spinal musculoskeletal involvement



Dolichostenomalia



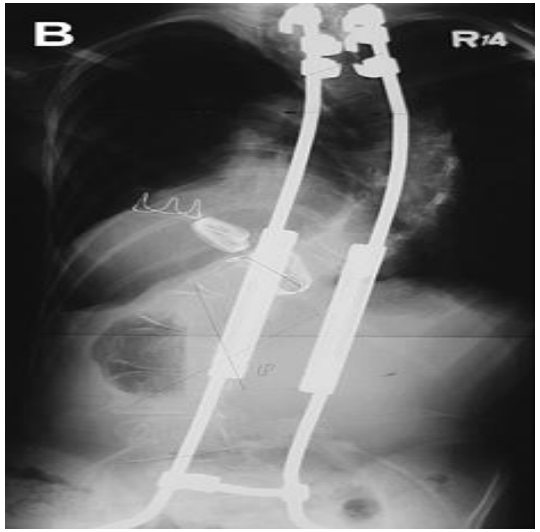
Thumb and wrist sign

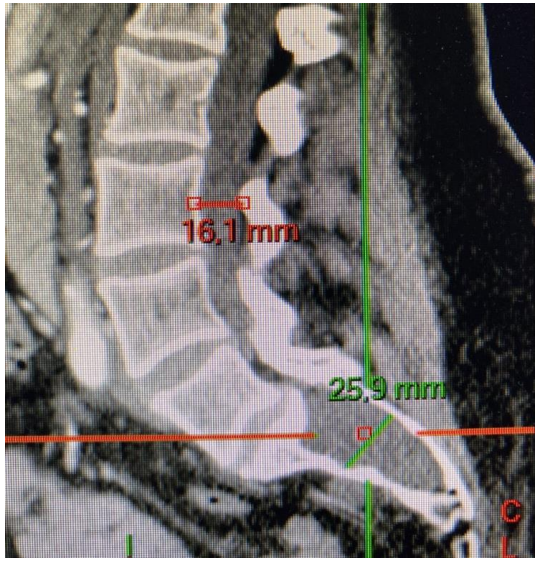
Arachnodactyly

Pes planus

Dean JC, Eur J Hum Genet, 2007

Spinal musculoskeletal involvement





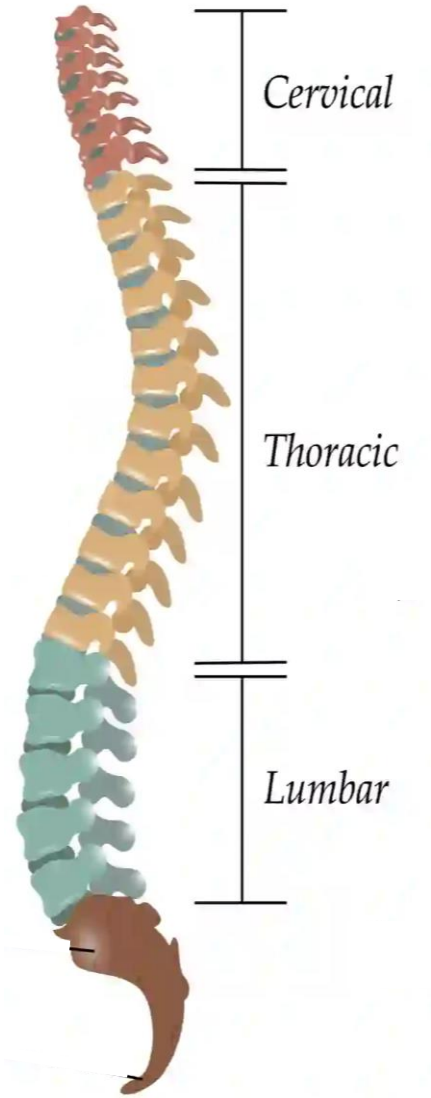
- **Spinal deformity**
  - **2/3 of the individuals with MFS**
  - **~ 10% spinal surgery (at the of puberty)**
  - All 3 segments: neck, upper back and lower back
- **Back pain x3**
- **Two main causes are specific to MFS**
  - **Spinal deformity**
  - **Dural ectasia**
- **Other causes are shared with persons without MFS**
  - « Degenerative » spinal disorders (disk disease, osteoarthritis, spinal stenosis…)

Jones et al, J Orthop Res, 2007

Spinal deformity in MFS

- **Scoliosis ~ 60%**
  - Cobb >>> 20°
  - More severe evolution in MFS
  - 19°/year in children
  - 6°/year in adolescent

- **Reversed dorsal kyphosis**
  - Dorsal lordosis ➔ « flat » back
  - Cervical and lumbar kyphosis

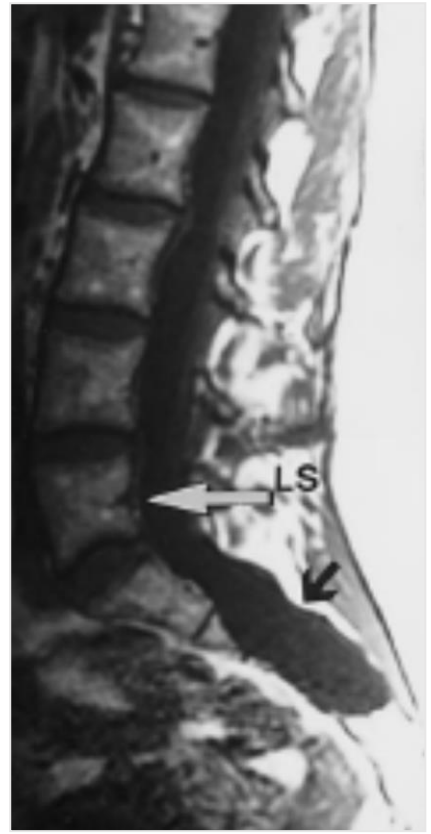


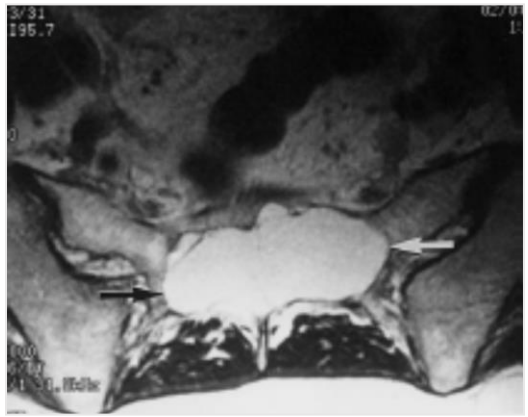
Sponseller PD et al, J Bone Joint Surg Am. 1995

Dural ectasia in MFS

- **Frequence, definition**
  - ~ 60-90 %
  - Enlarged dural sac
  - Lumbosacral level (↗ pressure of cerebrospinal fluid)

- **Two main symptoms**
  - **When standing:** headache and lower back pain
  - **When lying down:** ↘ symptoms





Weigang E et al, Clin Radiol. 2006

Agenda

Musculoskeletal involvement in Marfan syndrom, with a more specific focus on spine

MarfanLomb study

Objective and design

Hypothesis: specific painful symptoms may be associated with dural ectasia (DE) in MFS

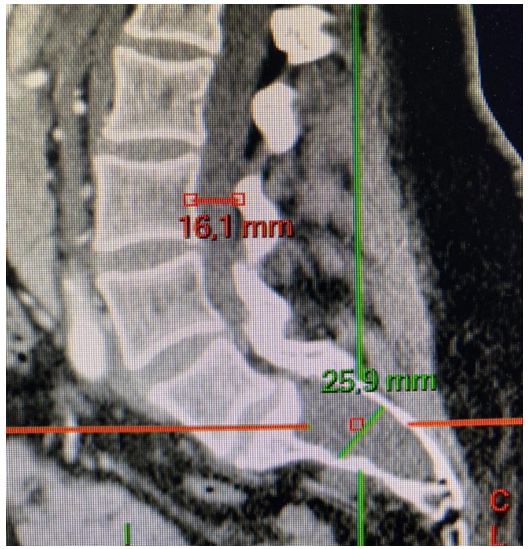
Objective: to describe and compare MFS individuals with and without DE for
- Patterns of spinal painful symptoms
- Patterns of activity limitations

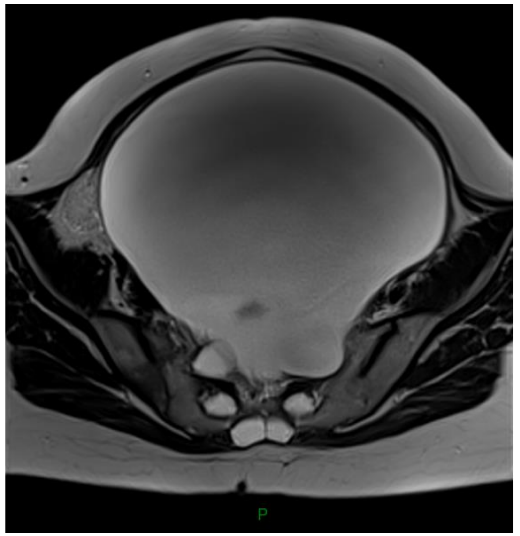
Design: comparative cross-sectional study from January to March 2022

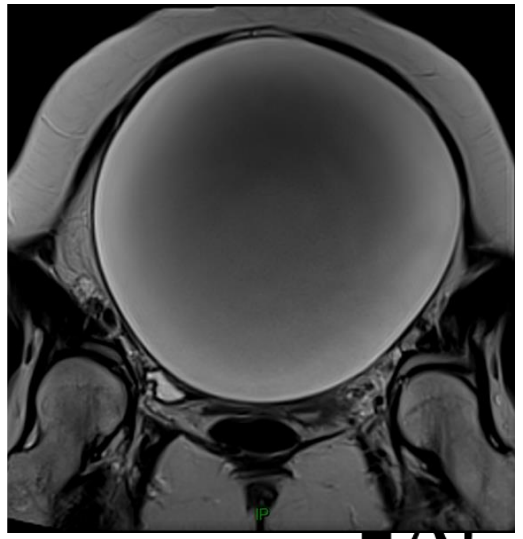
Population
- Age 18 from 55 years
- MFS diagnosed and followed at the CRMR Bichat
- FBN1+
- CT-scan available

Dural ectasia: imaging-based classification

	1 major criterion or 2 minor criteria
Major criteria	**Dural sac below S1 > dural sac above L4**
	Anterior meningocele
Minor criteria	Nerve root cyst ~ L5 > 6,5 mm
	Scalloping ~ S1 > 3,5 mm







Ahn NU, et al. Genet Med. 2000
Nguyen C, Jondeau G. Submitted manuscript. 2022

Main endpoints

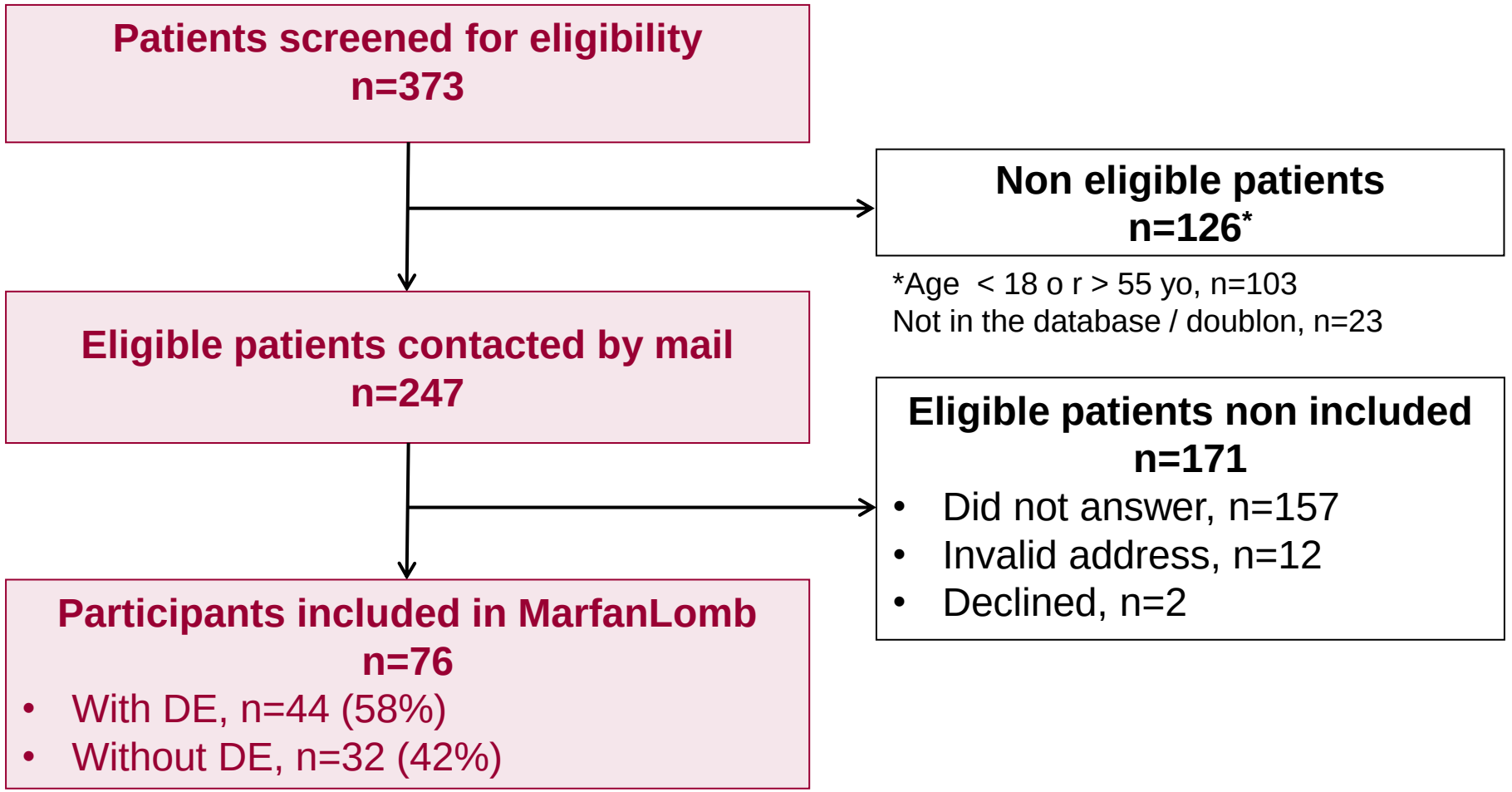
Primary endpoints

- Frequence of back pain
- Frequence of back pain when standing, trampling or coughing
- Frequence of headache when standing

Secondary endpoints

- Activity limitations: Oswestry Disability Index (ODI, 0 = none and 100 = maximal)

Flow diagram



Participants (1): demographic characteristics

	With DE n=44	Without DE n=32	All n=76
Age (years), mean (SD)	**40.7 (9.1)**	**38.5 (9.8)**	**39.7 (9.4)**
Female, n (%)	19 (43%)	17 (53%)	36 (47%)
Body mass index (kg/m²), mean (SD)	23.6 (4.1)	24.5 (5.5)	24.0 (4.7)
Higher education, n (%)	33 (75%)	22 (69%)	55 (72%)
Currently working, n (%)	34 (77%)	21 (66%)	55 (72%)

Participants (2): medical history

	With DE n=44	Without DE n=32	All n=76
SPINAL HISTORY			
Spinal surgery	**4 (9%)**	**2 (6%)**	**6 (8%)**
Scoliosis	**32 (73%)**	**24 (75%)**	**56 (74%)**
Degenerative spinal lesions	16 (36%)	9 (28%)	25 (33%)
NON-SPINAL HISTORY			
Aorta surgery	31 (70%)	15 (47%)	46 (61%)
Ascending aorta involvement	41 (93%)	31 (97%)	72 (95%)
Descending aorta involvement	12 (27%)	5 (16%)	17 (22%)
High blood pressure	11 (25%)	2 (6%)	13 (17%)
Acetabular protrusion	13 (30%)	7 (22%)	20 (26%)
Pes planus	21 (48%)	15 (47%)	36 (47%)
Pectus excavatum / carinatum	23 (52%)	15 (47%)	38 (50%)

Main results

	With DE n=44	Without DE n=32	All n=76	P-value
Back pain	39 (89%)	29 (91%)	68 (89%)	1.000
Back pain when standing	35 (80%)	26 (81%)	71 (80%)	0.625
Back pain when trampling	27 (61%)	18 (56%)	45 (59%)	1.000
Back pain when coughing	**8 (18%)**	**0 (0%)**	**8 (11%)**	**0.019**
Headache when standing	**21 (48%)**	**10 (31%)**	**31 (41%)**	**0.141**
Activity limitations (ODI, 0-100)	**18.5 (14.9)**	**15.0 (14.6)**	**17.2 (14.8)**	**0.196**

Troussier S et al. In preparation. 2022

Summary of our main findings

- Back pain is frequent in all participants ~ 90%

- In MFS individuals with DE
  - Severe vascular pattern is more frequent
  - Back pain when coughing and headache when standing are more frequent
  - Activity limitations scores are higher

➔ MFS individuals with DE display
- **A specific vascular phenotype**
- **A specific pattern of painful symptoms and activity limitations**

➔ Early detection of this population may allow tailoring more precise rehabilitation strategies targeting both vascular and spinal impairments

Thank you

Marfan Europe Network

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