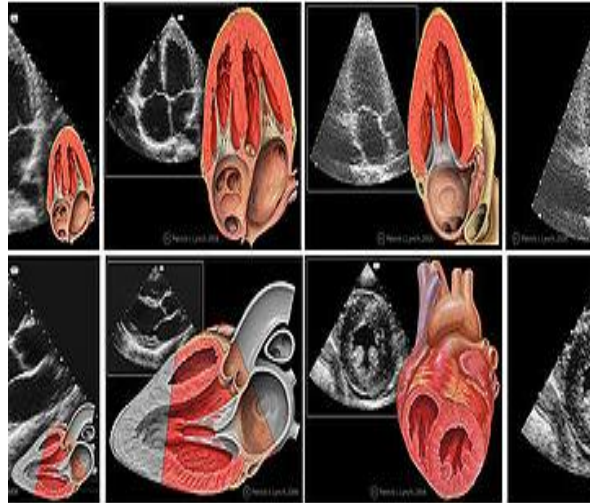


Ventricule gauche dilaté et Sport



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Stephane B, 37 ans, triathlète, automne 2009

15 h entraînement/sem Asymptomatique

- DTD VG 72 mm FeBP 45%
- IRM normale, Scintigraphie myocardique normale
- Diagnostic cardiopathie dilatée à coronaires saines posé
- IEC + BB prescrits
- Arrêt sport préconisé
- Consulte pour 2^e avis

Deux rugbymen, ethnie et gabarit identiques

- 2005 : FL, 3^e ligne
- DTD VG : 75 mm FEBP : 57%
- 2014 : FM, 3^e ligne
- DTD VG : 71 mm FeBP 55%

Diamètres ventriculaires gauches du sportif

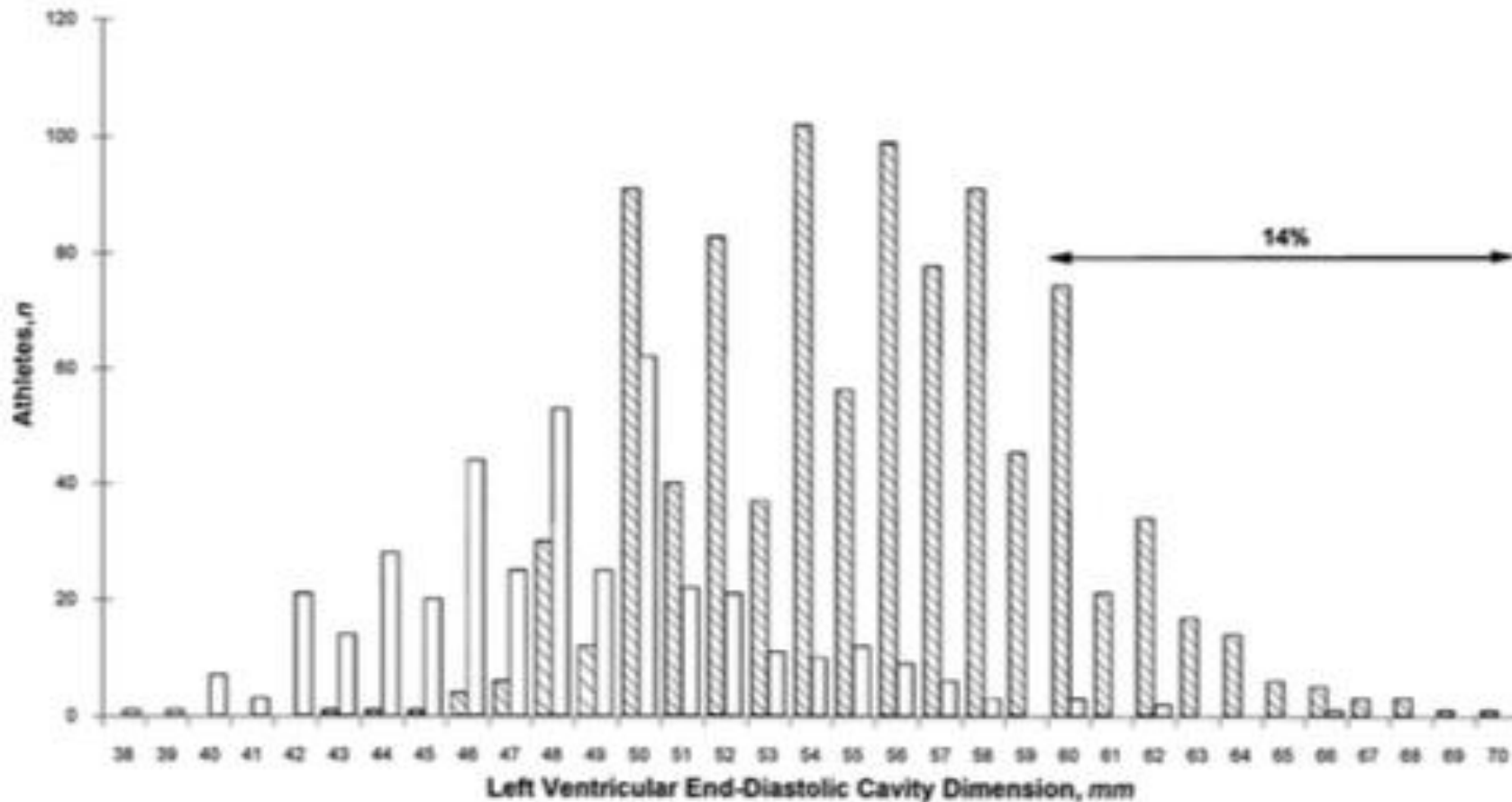


Figure 1. Distribution of left ventricular end-diastolic cavity dimensions in 1309 highly trained athletes without evidence of structural cardiovascular disease. Data are shown for female (white bars) and male (striped bars) athletes. Fourteen percent of athletes had markedly enlarged left ventricular cavities ranging in size from 60 mm to 70 mm.

Envisager le gabarit du sportif

Chevalier L et al, 2013

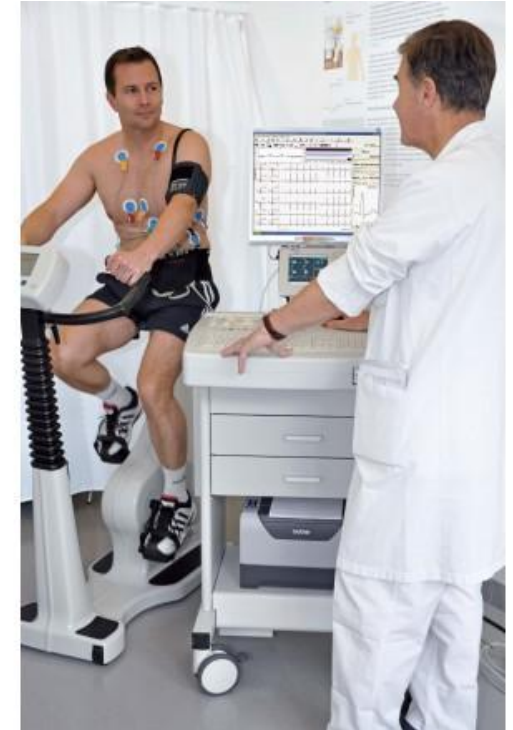
	Absolute	Indexed to BSA (/m ²)	Absolute	Indexed to BSA (/m ²)	Absolute	Indexed to BSA (/m ²)	Absolute	Indexed to BSA (/m ²)
LVIDd (mm)	59.3 ± 4.7 (51.0–72.0)	25.9 ± 2.2 (20.7–32.3)	59.4 ± 4.6 [*] (51.0–70.0)	24.5 ± 1.8 (20.7–28.0)	61.7 ± 4.8 ^c (51.0–72.0)	25.3 ± 1.7 ^c (21.2–29.4)	57.3 ± 3.8 ^d (51.0–68.5)	27.2 ± 2.1 ^f (23.1–32.3)
LVIDs (mm)	37.5 ± 4.3 (24.0–49.0)	16.4 ± 2.0 (10.1–21.5)	37.8 ± 4.4 (25.0–46.0)	15.6 ± 1.9 (10.1–19.3)	38.7 ± 4.6 ^d (24.0–49.0)	15.9 ± 1.8 ^c (10.4–19.4)	36.5 ± 3.7 (27.9–45.5)	17.5 ± 1.8 ^f (13.0–21.5)
IVSd (mm)	9.4 ± 1.7 (5.0–15.5)	4.1 ± 0.7 (2.3–6.6)	9.8 ± 1.4 (7.0–13.1)	4.1 ± 0.5 (2.9–5.2)	9.7 ± 1.7 ^a (6.0–13.9)	3.9 ± 0.8 (2.3–5.8)	9.0 ± 1.7 ^e (5.0–15.5)	4.3 ± 0.7 (2.4–6.6)
PWd (mm)	9.2 ± 1.6 (6.0–15.3)	4.0 ± 0.6 (2.8–6.4)	9.4 ± 1.5 (7.5–13.8)	3.9 ± 0.6 (2.9–5.2)	9.7 ± 1.7 ^b (7.2–15.3)	4.0 ± 0.7 (2.9–6.4)	8.7 ± 1.4 ^d (6.0–12.0)	4.1 ± 0.6 (2.8–5.7)
LVH index	0.31 ± 0.06 (0.21–0.55)		0.32 ± 0.06 (0.23–0.45)		0.32 ± 0.06 (0.22–0.55)		0.30 ± 0.05 (0.21–0.45)	
LVM (g)	224.7 ± 54.4 (108.1–378.7)	97.1 ± 19.3 (51.5–161.5)	233.4 ± 48.7 (157.4–370.8)	95.9 ± 16.4 (67.0–134.6)	250.0 ± 52.1 ^c (146.0–363.9)	102.4 ± 20.5 (55.4–152.4)	198.1 ± 48.1 ^f (108.1–378.7)	93.3 ± 19.4 (51.5–161.5)
LVM (g/m ^{2.7})		41.7 ± 9.0 (22.1–75.2)		46.5 ± 8.6 [*] (29.9–63.2)		41.6 ± 8.6 (24.0–66.2)		39.1 ± 8.6 ^f (22.1–75.2)
Aod (mm)	32.7 ± 3.1 (25.0–38.8)	14.3 ± 1.4 (11.1–17.7)	33.8 ± 3.2 (25.0–38.8)	13.9 ± 1.3 (11.5–17.2)	33.6 ± 3.2 ^c (26.7–38.5)	13.8 ± 1.4 ^c (11.1–16.8)	31.2 ± 2.4 ^f (26.5–35.8)	14.8 ± 1.3 ^e (12.8–17.7)
LAd (mm)	39.8 ± 4.0 (33.3–48.9)	17.3 ± 1.8 (13.3–21.9)	42.2 ± 2.4 (37.5–46.6)	17.4 ± 1.4 (15.0–20.4)	41.1 ± 3.7 ^c (33.3–48.9)	16.9 ± 1.6 (13.3–20.6)	37.2 ± 3.7 ^f (28.0–46.5)	17.7 ± 2.1 (13.3–21.9)
LA area (cm ²)	19.7 ± 3.2 (12.6–30.2)	8.6 ± 1.3 (5.8–11.7)	19.9 ± 2.6 (15.2–24.6)	8.2 ± 1.2 (6.0–10.4)	21.1 ± 3.3 ^c (14.2–30.2)	8.6 ± 1.3 (5.9–11.2)	18.3 ± 3.1 ^d (12.5–24.2)	8.7 ± 1.5 (5.8–11.7)
RA area (cm ²)	19.1 ± 4.4 (8.0–28.3)	8.3 ± 1.9 (4.1–12.4)	19.8 ± 4.1 (13.3–28.3)	8.2 ± 1.8 (5.3–11.1)	20.1 ± 4.4 ^a (12.4–26.1)	8.2 ± 1.8 (5.0–11.7)	17.9 ± 4.4 (8.0–25.8)	8.5 ± 2.0 (4.1–12.4)
LVEF (%)	65.3 ± 6.4 (49.0–78.0)		64.9 ± 6.4 (49.0–78.0)		65.7 ± 6.6 (52.0–78.0)		65.2 ± 6.1 (52.0–78.0)	
E wave (m/s)	0.86 ± 0.2 (0.52–1.35)		0.90 ± 0.2 (0.55–1.23)		0.84 ± 0.2 (0.52–1.34)		0.86 ± 0.2 (0.55–1.35)	
A wave (m/s)	0.48 ± 0.1 (0.22–0.97)		0.50 ± 0.1 (0.24–0.71)		0.48 ± 0.1 (0.25–0.97)		0.48 ± 0.1 (0.22–0.89)	
E/A ratio	1.9 ± 0.5 (0.7–3.7)		1.8 ± 0.4 (1.0–2.8)		1.9 ± 0.5 (0.7–3.7)		1.9 ± 0.5 (1.0–3.61)	

Data are mean ± standard deviation (min-max). Aod: end-diastolic aortic diameter; IVSd: end-diastolic interventricular septum thickness; LAd: end-systolic left atrial diameter; LA: left atrial; LVEF: left ventricular ejection fraction; LVH index: left ventricular hypertrophy index (2 × PWd/LVIDd); LVIDd: left ventricular end-diastolic internal diameter; LVIDs: left ventricular end-systolic internal diameter; LVM: left ventricular mass; PWd: end-diastolic posterior wall thickness; RA: right atrial.

Dans le doute, que faire ?

Epreuve Effort

- Aucune ischémie
- Aucune arythmie
- Performance : Mets $>$ 120% Théorique
- Intérêt de la comparaison / test antérieur



Dans le doute, que faire ?

Analyse échanges gazeux

- $VO_2 \text{ max} > 120\% \text{ Th}$
- Pouls $O_2 > 16$
- Intérêt comparaison / tests précédents



Dans le doute, que faire ?

L'échocardiographie effort

- Normalisation attendue de la FEVG
- Absence trouble cinétique segmentaire
- Travail musculaire en rapport avec niveau entraînement



Dans le doute, que faire ? : Le strain

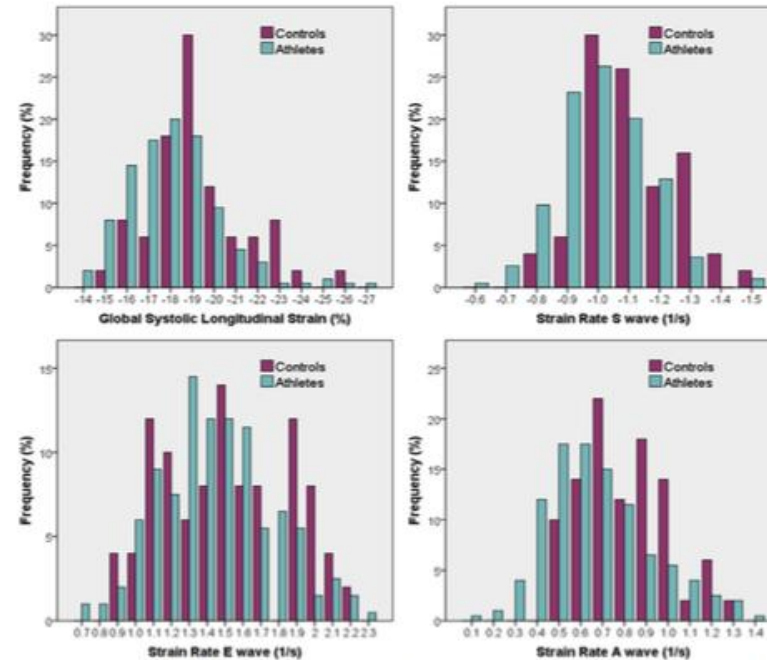


Figure 3 Distribution and range of values of strain and strain rate parameters. Data are shown separately for athletes (blue bars) and controls (purple bars).

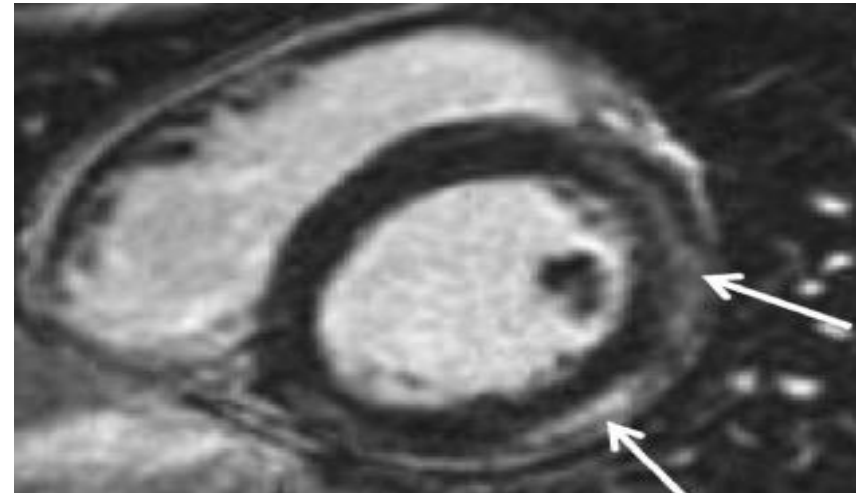
Table 5 Strain and strain rate parameters in athletes divided into different groups

Parameter	Skill (n = 55)	Power (n = 30)	Mixed (n = 34)	Endurance (n = 81)	P value
GLS (%)	-18.2 ± 2.1 (-15, -22)	-18.4 ± 2.4 (-16, -21)	-18.1 ± 2.2 (-15, -22)	-17.8 ± 2.3 (-15, -22)	.648
SRS (sec ⁻¹)	-1.08 ± 0.16 (-0.8, -1.3)	-0.98 ± 0.12 (-0.8, -1.3)	-1.03 ± 0.15 (-0.8, -1.3)	-0.96 ± 0.13 (-0.7, -1.2)	<.001
SRE (sec ⁻¹)	1.55 ± 0.33 (0.8, 2.1)	1.40 ± 0.30 (1.0, 1.9)	1.49 ± 0.31 (1.0, 1.9)	1.37 ± 0.30 (1.0, 1.9)	.012
SRA (sec ⁻¹)	0.79 ± 0.27 (0.4, 1.3)	0.63 ± 0.20 (0.3, 1.0)	0.64 ± 0.22 (0.3, 1.1)	0.62 ± 0.23 (0.3, 1.1)	<.001

Strain and strain rate parameters in athletes according to the type of sport are shown. Data are expressed as mean ± SD. The fifth and 95th percentiles are reported in parentheses. Differences between groups were evaluated with analysis of variance with post hoc Bonferroni correction.

Dans le doute, que faire ?

- **L'IRM myocardique**
- Myocardite
- Amylose
- Vascularite
- Sarcoidose



Chez notre triathlète,

- En **2009** : Epreuve Effort VO2 : 17 km/h 171/min 93% FMT 220/70 mmHg 0 anomalie VO2 max : 58 ml/kg/min Pouls O2 à 28
- Echocardiographie Effort : 400 W 2' FeVG BP au pic : 80% Aucune anomalie cinétique segmentaire PAPS basses
- Stop IEC, beta-bloquants et feu vert pour reprise Triathlon

- Suivi annuel : RAS

- En **2018** : Vélo 8 à 14 h/sem DTD VG 70 mm FEBP 54% S' 12 cm/s
330 W 2' 98% FMT 2 doublets et 3 triplets V rtd droit entre 150 et 240 W, disparaissant aux paliers supérieurs VO2 max : 55 ml/kg/min Pouls O2 à 24,5
Holter ECG effort + IRM myocardique : RAS

Chez nos 3^e lignes

FL : 2005

- 320 W 3' 95% FMT ESV disparaissent à 280 W
- VO2 max : 44 ml/kg/min (blessé depuis 6 semaines) Pouls O2 à 26,5
- Holter ECG : 2 foyers ESV, 3 doublets bimorphes sans R/T
- Aucun suivi pendant 3 ans
- **Mort subite** en match en 2009

- FM : 2014
- SLG – 16% S' 13 cm/s
- 300 W 1' 88% FMT RAS
- VO2 : 30 ml/kg/min (blessé depuis 4 semaines) Pouls O2 à 20
- Echo Effort : 300 W SLG – 19% à 200 W RAS par ailleurs
- 2018 : DTD VG 71 mm FeBP 48%
- 320 W 1' 79 % FMT 0 trouble rythme ou repolarisation Pic VO2 : 32 ml/kg/min Pouls O2 à 24,8
- Echo Effort : 270 W FeBP 70% SLG – 18% RAS
- IRM myocardique : RAS

En conclusion,

- Reconsidérer les valeurs seuils
- S'attacher aux valeurs indexées au gabarit
- Intégrer impérativement l'évaluation à l'**effort** dans le bilan (y compris holter ECG effort)
- Dans les formes limites (DTD VG > 55 mm F, > 65 mm H) **surveillance annuelle nécessaire**