



IDM pendant le sport: des spécificités?

5 décembre 2018

JM GUY

St Priest en Jarez

Infarctus et sport : combien ?

[Eur Heart J](#). 2016 Registry on acute cardiovascular events during endurance running races: the prospective RACE Paris registry. [Gerardin B](#)¹ et al GRCI

- 512 000 (+500 000) coureurs
- 1/ 30 000 mais 1/50 000



[Eur J Cardiovasc Prev Rehabil](#). 2009 Sports-related acute cardiovascular events in a general population: a French prospective study. [Chevalier L](#)¹

900 décès /an
1200 IDM /an

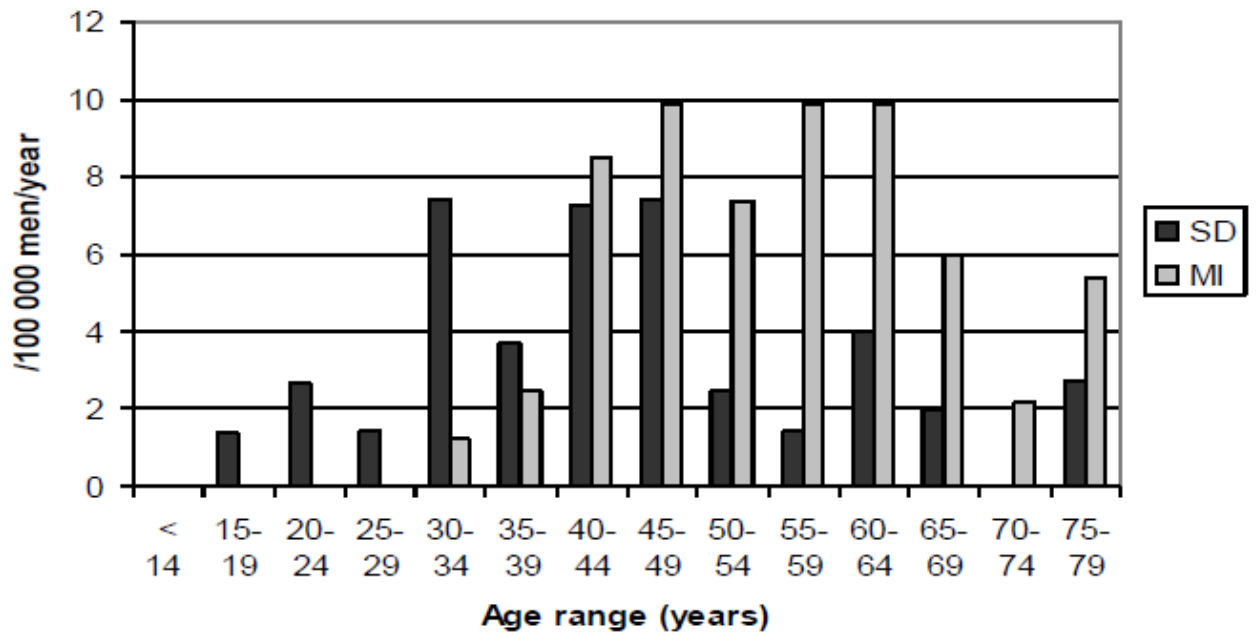


Infarctus et sport : combien ?

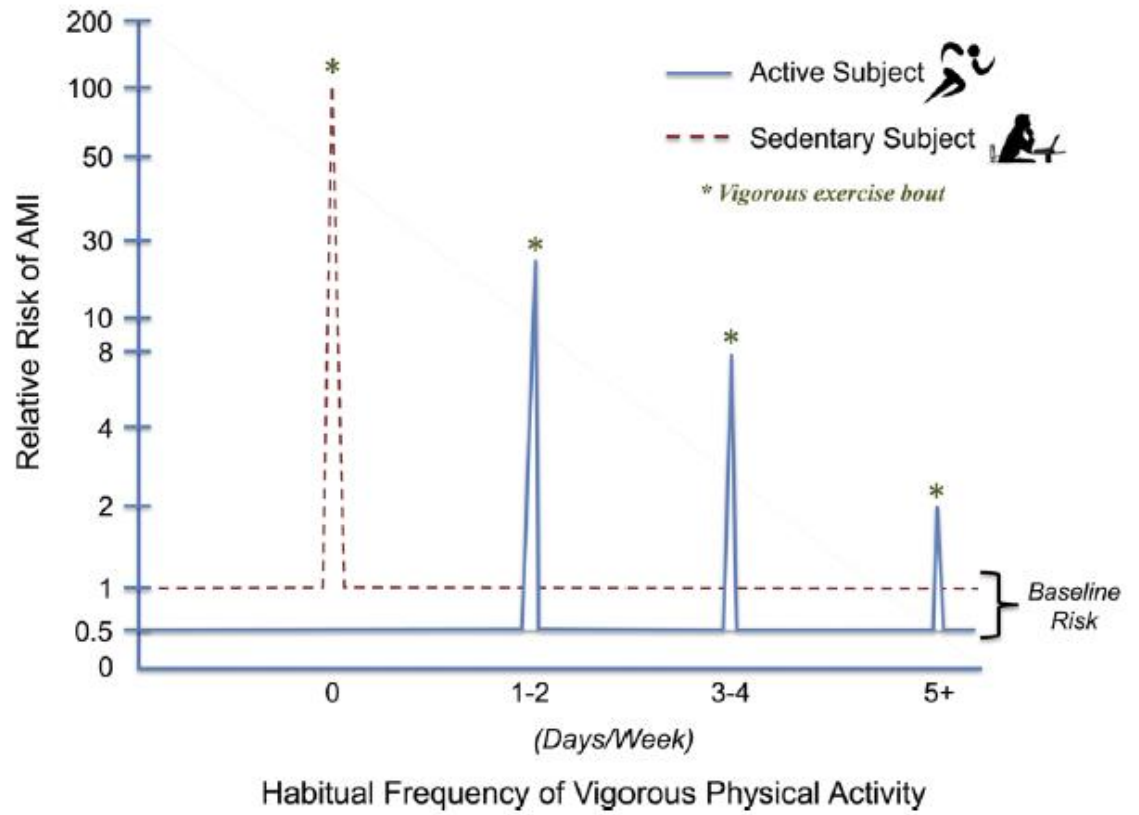
Registre prospectif français

[Comprehensive Assessment of Coronary Artery Disease in Sports-Related Sudden Cardiac Arrest.](#) Karam N et al. Circulation. (2018)

- 13 400 accidents coronariens aigus
- 154 accidents secondaires à une pratique sportive
 - 1,15 % des accidents soit 1400 IDM/an



Qui et Quand ?



Circumstances of cardiac arrest during sports activity recorded on video

Alessandro Zorzi, Alberto Cipriani and Domenico Corrado



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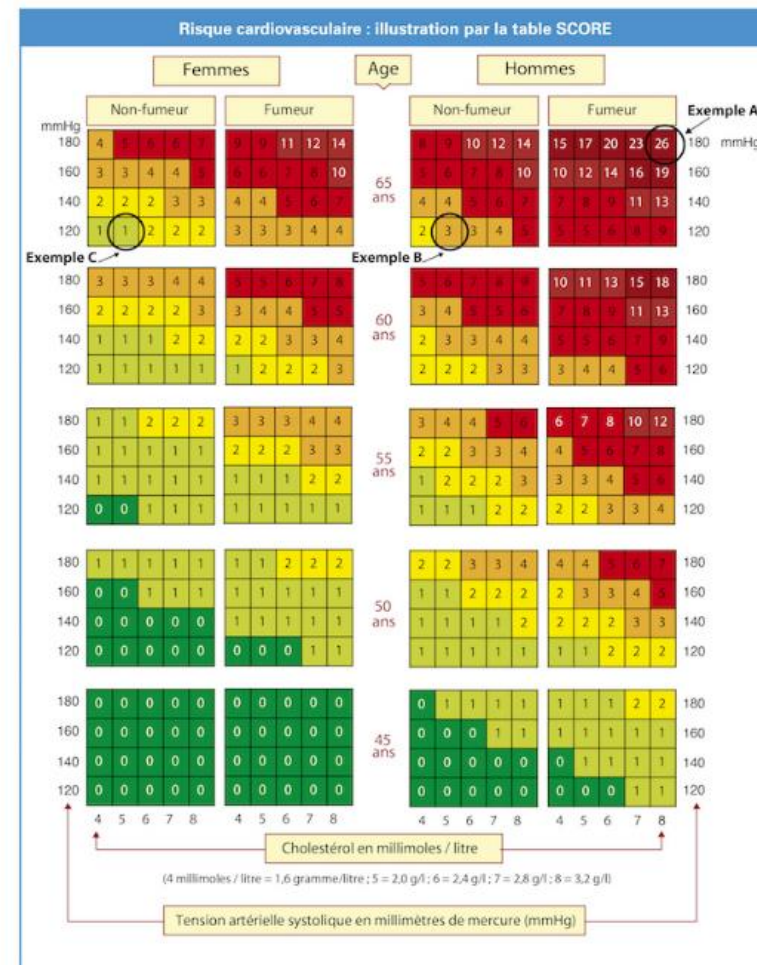
Quand ?

Year	Place	Name	Age	Sport	Elite	Competition	Outcome	Circumstances of loss of consciousness
2003	France	M.V.F.	28	Soccer	Yes	Yes	Death	Walking
2004	Brazil	S.O.D.S.	30	Soccer	Yes	Yes	Death	Standing, shortly after a run
2005	Portugal	M.F.	25	Soccer	Yes	Yes	Death	Walking
2007	Spain	A.P.	23	Soccer	Yes	Yes	Syncope ^a	Walking, shortly after a run
2008	Spain	R.D.L.R.	23	Soccer	Yes	Yes	Syncope	Walking, shortly after a run
2009	Belgium	A.V.L.	21	Soccer	Yes	Yes	ICD shock	Walking
2010	Spain	M.A.G.T.	31	Soccer	Yes	Yes	Resuscitated	Slow running
2010	Sudan	E.I.	26	Soccer	Yes	Yes	Death	Standing
2012	England	F.M.	23	Soccer	Yes	Yes	Resuscitated	Walking, shortly after a run
2012	Italy	P.M.M.	25	Soccer	Yes	Yes	Death	Slow running, shortly after a run
2013	USA	T.G.	52	Basketball	No	No	Resuscitated	Walking, shortly after a run
2013	Russia	?	17	Volleyball	No	Yes	Death	Walking
2015	Argentina	C.G.	27	Soccer	Yes	Yes	Death	Walking
2015	USA	C.C.	17	Volleyball	No	Yes	Resuscitated	Walking
2016	Romania	P.E.	26	Soccer	Yes	Yes	Death	Standing
2016	Tanzania	I.M.K.	19	Soccer	Yes	Yes	Death	Kneeling after a tackle, shortly after a run
2017	Austria	A.N.	20	Soccer	Yes	Yes	Death	Walking
2017	USA	T.S.	?	Basketball	Yes	Yes	Resuscitated	Sitting in the bench
2017	Sri Lanka	R.R.G.	39	Basketball	No	Yes	Death	Walking, shortly after a run
2018	Croatia	B.B.	25	Soccer	Yes	Yes	Death	Walking, shortly after a run
2018	India	L.A.	23	India	No	No	Death	Standing
2018	France	M.G.	23	Cycling	Yes	Yes	Death	Downhill cycling
2018	USA	Z.U.	27	Basketball	Yes	Yes	Death	Fast running

- Pas d'antécédents coronariens : 93,9 %
- FRCV connus : 57,8 %

Karam N et al. Circulation. (2018)

	n	Sports-Related SCA	Non-Sports-Related SCA	p Value*
		n=83	n=249	
Age, y	332	52.0 (41.8–60.1)	52.0 (41.4–60.1)	
Male sex	332	81 (97.6)	243 (97.6)	
Medical history				
Known heart disease	322	12 (14.6)	65 (27.1)	0.02
Known coronary artery disease	322	5 (6.1)	45 (18.8)	<0.01
Risk factors				
Current smoking	298	18 (24.0)	117 (50.2)	<0.01
Diabetes mellitus	317	4 (4.9)	41 (13.1)	0.04
Hypercholesterolemia	317	22 (27.2)	80 (33.9)	0.19
Hypertension	317	22 (27.2)	63 (26.7)	0.98
Characteristics of cardiac arrest				
Initial shockable rhythm	327	68 (86.1)	182 (73.4)	0.02
ST elevation (ECG after ROSC) †	280	35 (47.9)	102 (49.3)	0.70
Angiographic data				
Normal angiogram	332	24 (28.9)	72 (28.9)	1.00
Obstructive coronary lesion	332	57 (68.7)	168 (67.5)	0.81
Coronary lesion location	225			0.32
Single-vessel disease		31 (54.4)	77 (45.8)	
Multivessel disease		26 (45.6)	91 (54.2)	
Chronic coronary occlusion	329	13 (15.7)	51 (20.7)	0.28
Presumed culprit lesion	332	45 (54.2)	105 (42.2)	0.04
Associated with chronic CAD	150	42 (93.3)	226 (90.8)	0.27
Associated with MVD	150	19 (42.2)	50 (47.6)	0.33
Location	150			0.71
Left main		3 (6.7)	5 (4.8)	
Left anterior descending		29 (64.4)	61 (58.1)	
Circumflex		4 (8.9)	21 (20.0)	
Right coronary		9 (20.0)	18 (17.1)	
Outcome				
Survival at hospital discharge	327	52 (65.8)	110 (44.4)	<0.01
Survival with CPC 1 and 2	318	45 (60.0)	102 (42.0)	<0.01

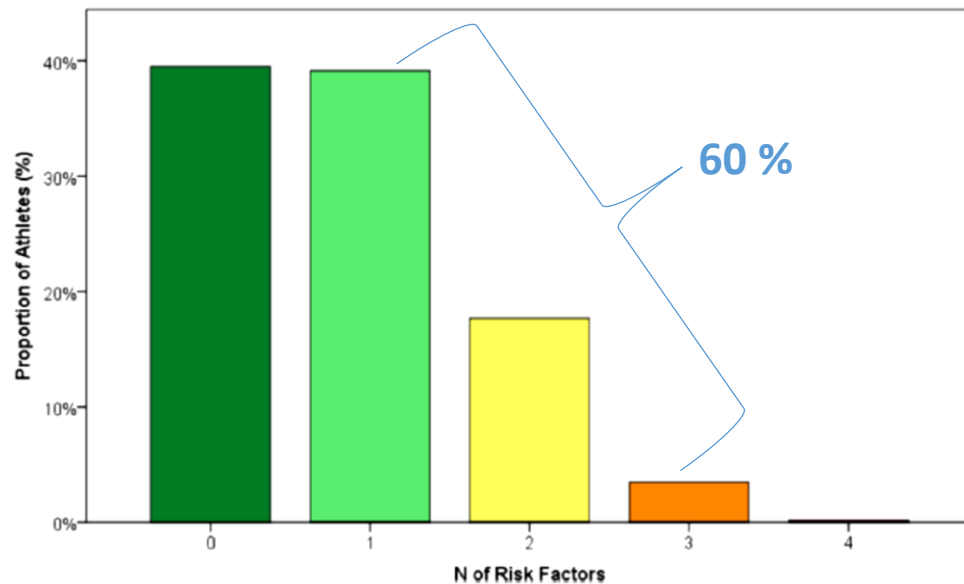
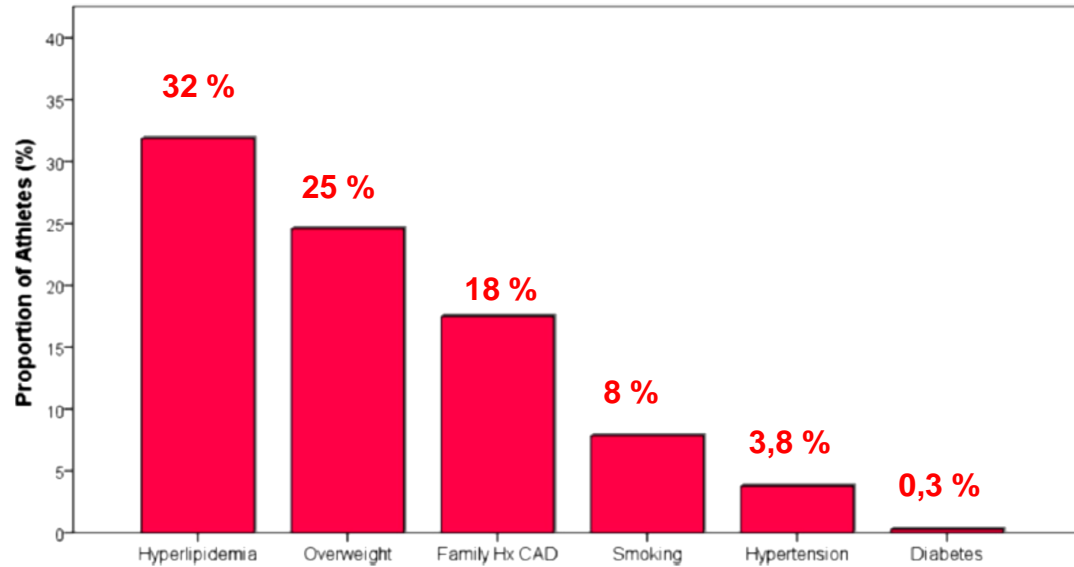


Et les athlètes ?

1058 athlètes – 15-45 ans
Niveau olympique – 28 disciplines
En carrière depuis 6 ans
4 catégories de sports

FRCV

- Tabac > 1 cig/j
- Obésité abdo. (tour taille > 94 cm H et > 80 cm F)
- Famille : 1^{er} degré < 55 ou 65 ans
- HTA : PAS > 140 et/ou PAD > 90 mmHg
- Diabète : GAJ > 126 mg/dL
- Dyslipémie : LDLc > 115 mg/dL



D'Ascenzi F. B J Sports Med 2018

L'accident cardio-vasculaire et sport.....



?



?



L'environnement
Fièvre +++
Autres facteurs
.....

Hémorrhéologie

(El Sayed M. *Sports Med.* 2005)

• A l'exercice

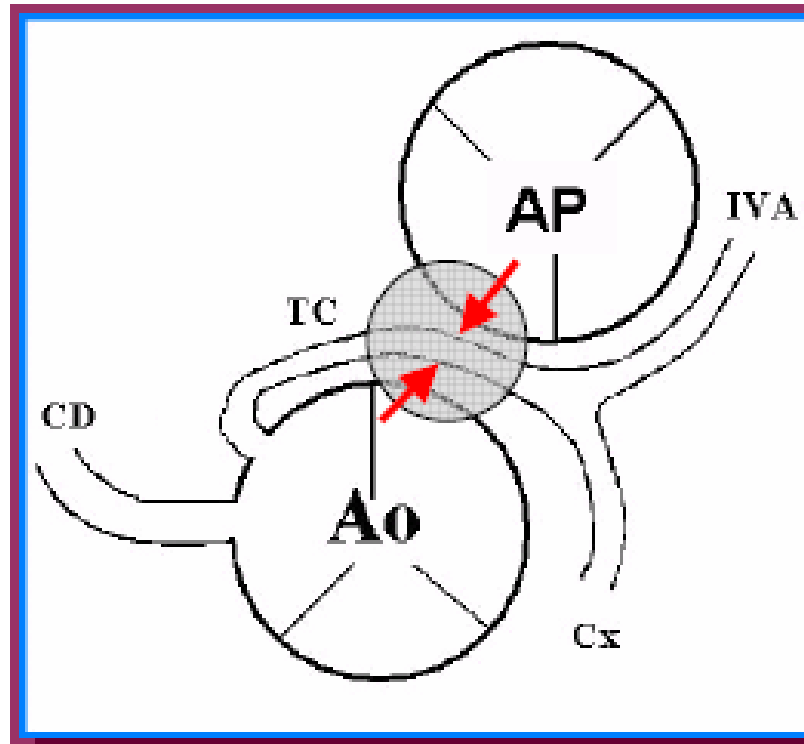
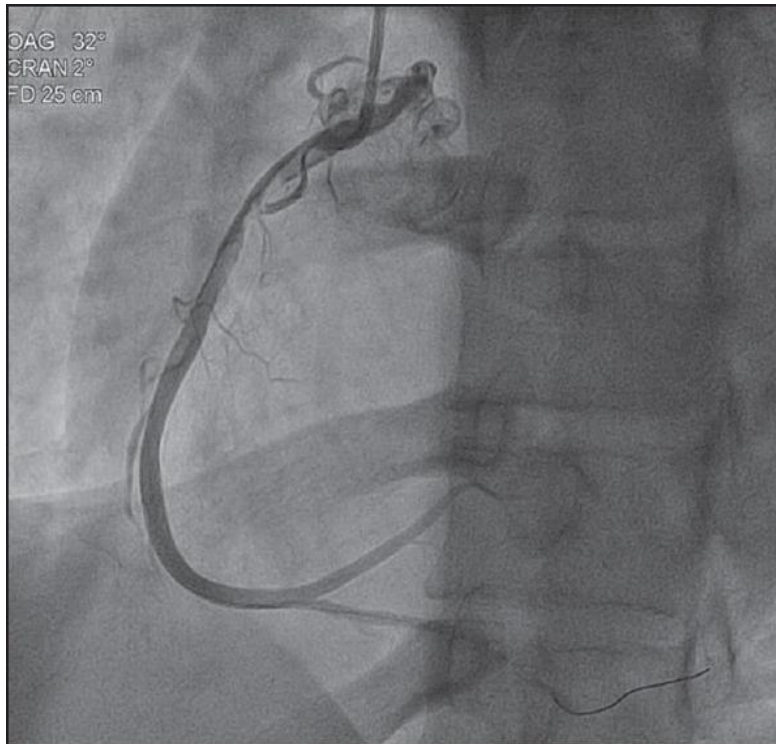
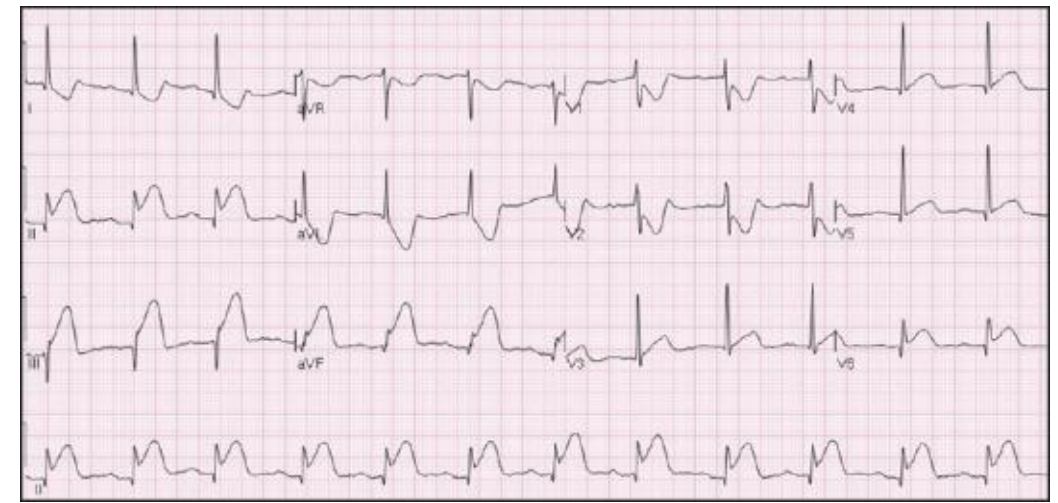
- Augmentation de la viscosité plasmatique
 - Sans variation de l'hématocrite
 - Augmentation de la rigidité des hématies
-
- Variations d'autant plus importantes que l'exercice est
 - prolongé (> 20 min.)
 - Intense (> 55% Fc max.)
 - Retour à la normale en 1 heure en moyenne

Vandewalle H et al. Int J Sports Med 1988

A l'entraînement

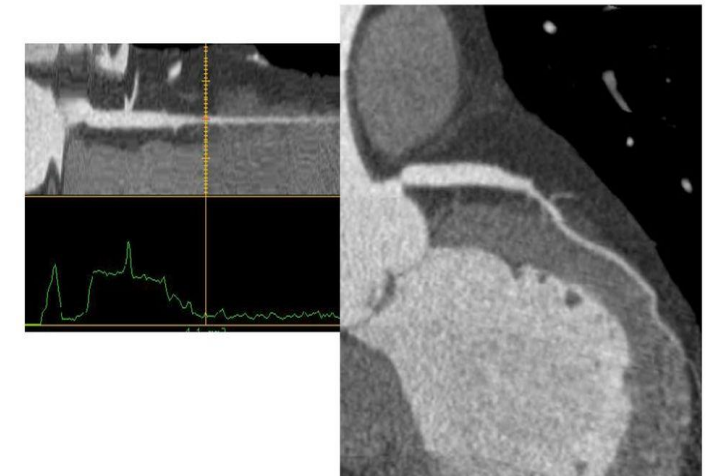
- Diminution de la viscosité plasmatique (fibrinogène, γ -globulines)
- Diminution de l'agrégation et de la rigidité globulaire
- Études longitudinales : effets apparaissent après 3 semaines d'entraînement (Ernst et al. *J Sports Cardiol* 1985)

Comment ? Causes rares

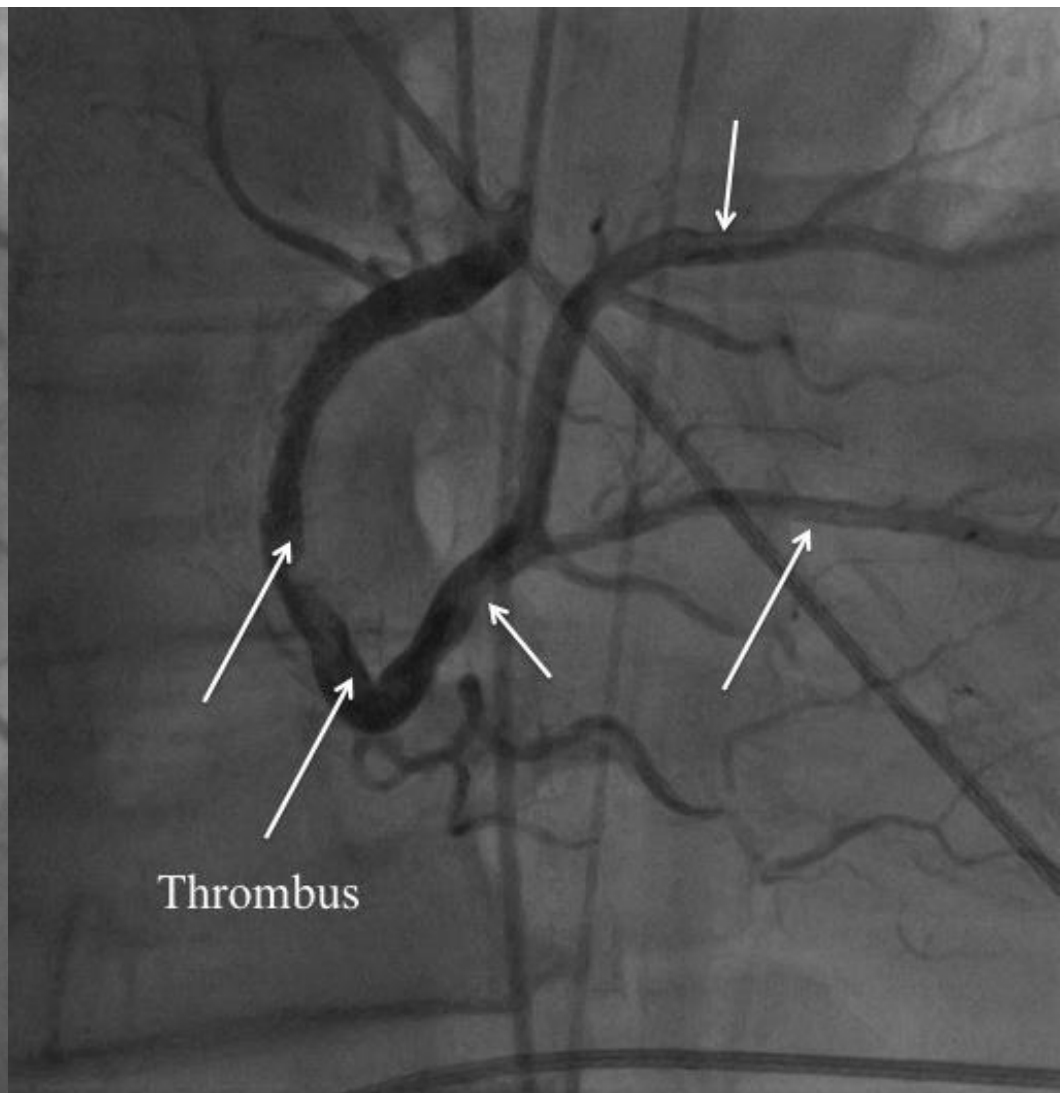
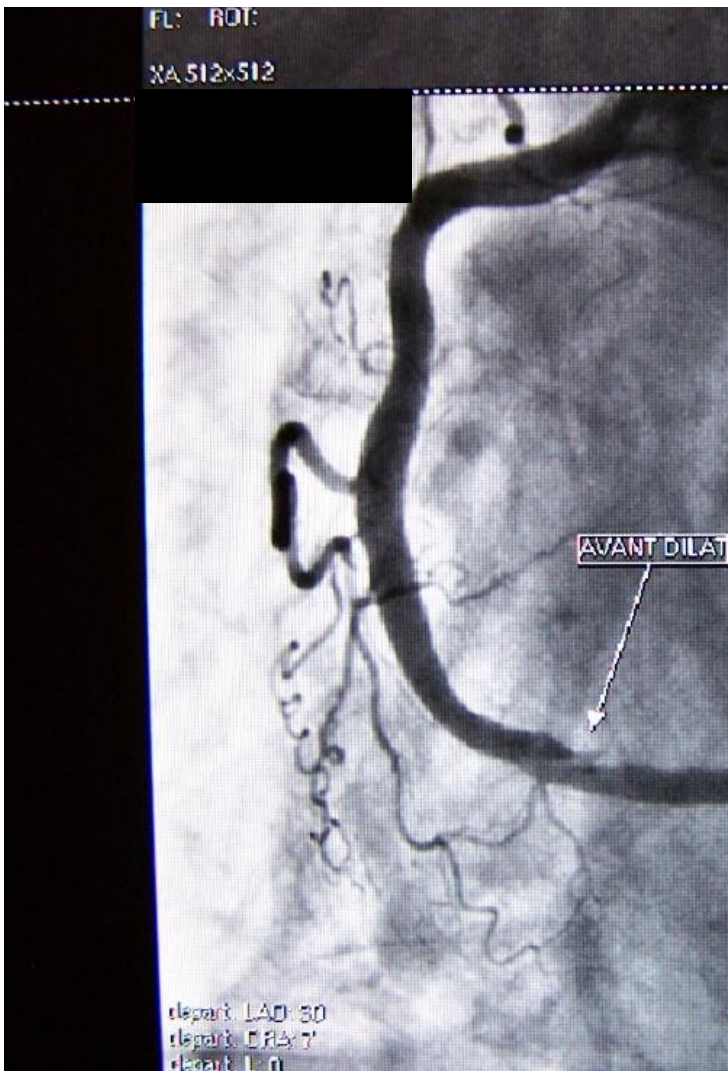


Anatomie du réseau

Coronaires



Trajet ou pont intra myocardique



Plus souvent !

HEMODYNAMIQUES

*Géométrie de la plaque
Pression intracoronaire
Rapport systole/diastole*

MECANIQUES

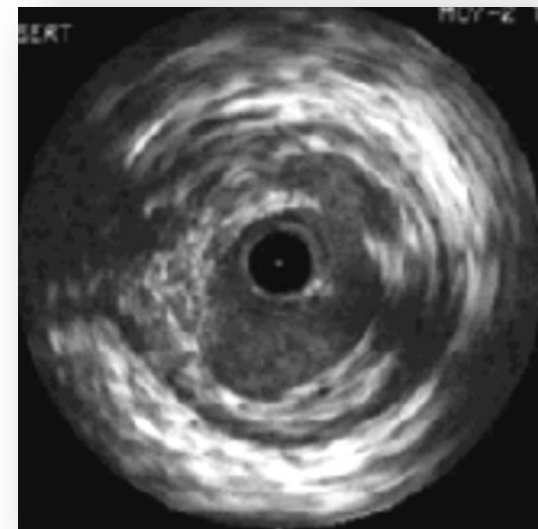
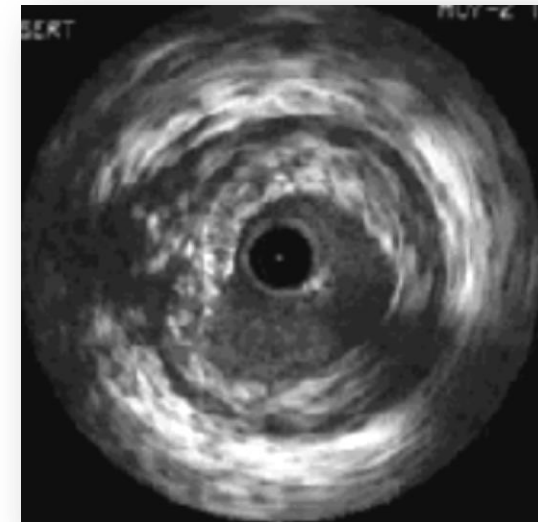
*Shear stress
Forces mécaniques transmuraux
Flexions et compressions
des artères*

*Erosion et rupture de
plaque instable*

Exercice intense

ENDOTHELIUM

*Inflammation
Cytokines
Stress oxydatif
Vasoregulation
coronaire*



Running: the risk of coronary events

Prevalence and prognostic relevance of coronary atherosclerosis in marathon runners

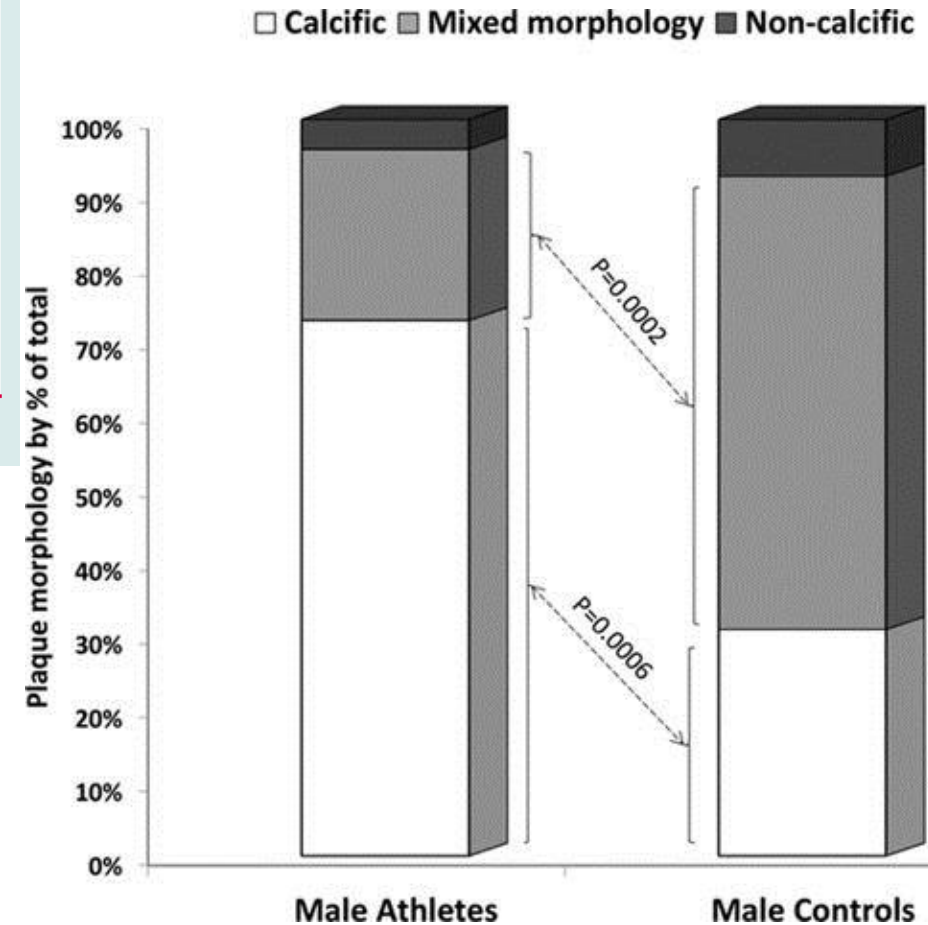
Möhlenkamp S et al. EJM 2008;29:1903.

Table 2 Distribution of coronary artery calcification (CAC) measures in the three groups

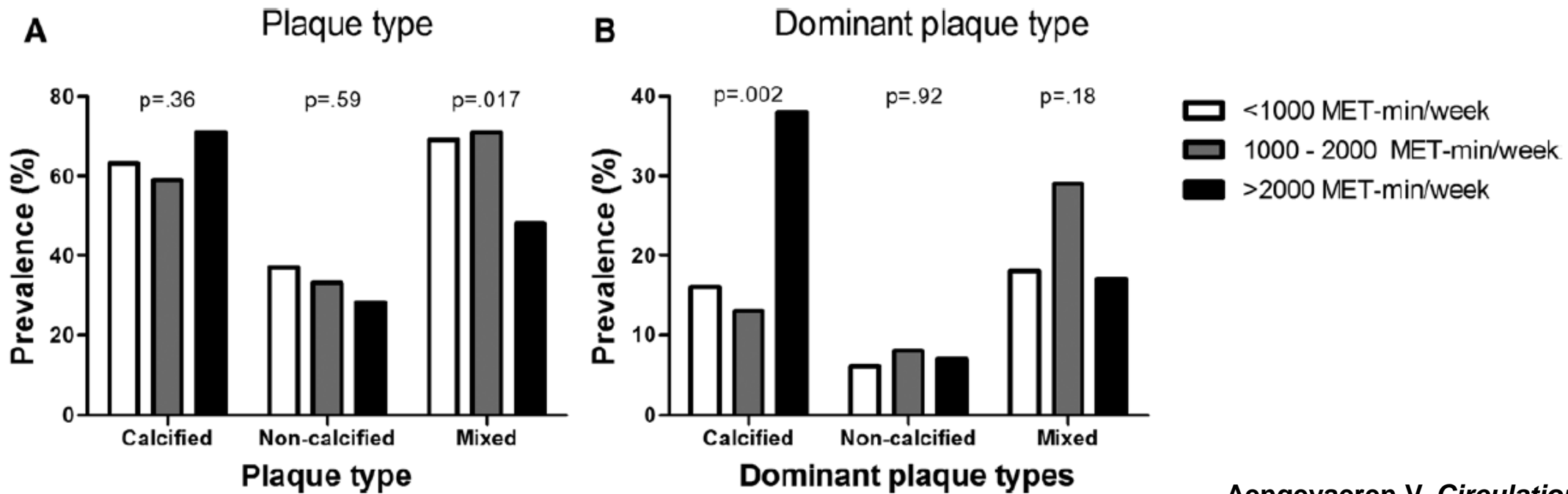
	Participants of the Heinz Nixdorf Recall Study			P-value group I vs. group II	P-value group I vs. group III
	Marathon runners (group I)	Age-matched controls (8:1) (group II)	Controls matched for age and risk factors (2:1) (group III)		
log ₂ (CAC + 1) (mean ± SD)	4.1 ± 3.6	4.9 ± 3.3	3.8 ± 3.4	0.28	0.02
CAC (Q1/median/Q3)	0/36/217	3/38/187	0/12/78	0.36	0.02
zero CAC (%)	28.7	18.4	31.5	0.01	0.50
CAC >75th percentile (%)	25.0	24.2	14.8	0.85	0.01
CAC 0 to <10	40.74	34.61	48.61	0.52	0.02
CAC 10 to <100	23.15	29.05	29.63		
CAC 100 to <400	23.15	22.80	13.43		
CAC ≥ 400	12.96	13.54	8.33		

Comparisons in continuous or binary measures adjusted for matching factors (age for group I/group II, age, body mass index, Framingham risk, smoking status for group I/group III).

Prevalence of Subclinical Coronary Artery Disease in Masters Endurance Athletes With a Low Atherosclerotic Risk Profile, Volume: 136, CIRCULATION



la plaque et activité physique et sportive



Aengevaeren V. *Circulation* 2017

« En résumé, la prévision des évènements coronariens aigus, lors de l'exercice reste complexe voire utopique ! »

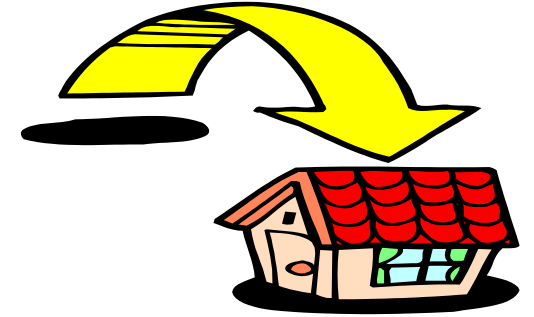


Même chez le sportif la réadaptation est utile ?

- 71 % symptomatologie avant !
- 50 % Appel Urgence !
- Champion de « l'inobservance »!



High-intensity, sport-specific cardiac rehabilitation training of a 22-year-old competitive cyclist after spontaneous coronary artery dissection Nicholas Weber,



- IDM sport encore sous estimé ...
- Risques d'évènement coronarien: Homme , âge, faible entrainement , intensité de l'exercice .
- Ne pas négliger la prise en charge des FRCVasc.
- Lésions angiographiques particulières mais aussi des lésions chroniques habituelles
- Coronarien connu - sportif ?