



Westcliffe Cardiology Service
Shipley

The athlete's heart, AF and exercise: Good, bad or therapy?

Dr Andreas Wolff



HRC2010

3rd – 6th October 2010

Hilton Birmingham Metropole Hotel, Birmingham, UK

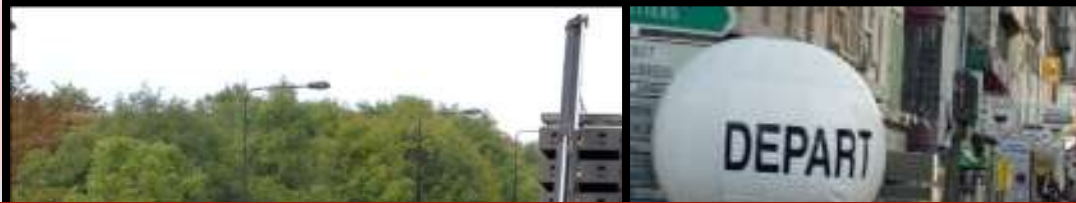
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14 August 2010 Last updated at 01:19



Rise of the Mamils (middle-aged men in lycra)

By Dominic Casciani
BBC News



Dominic Casciani (middle) with fellow Mamils

Flashy sports cars are out, now no mid-life crisis is complete without a souped-up road bike. Why?



Common questions:

- I am really fit but now I have developed AF. Have I done myself damage by exercising?
- How much exercise is damaging?
- Is the treatment of AF any different for athletes?
- Do I have to stop exercising?
- What's my outlook?



“What fits your busy schedule better, exercising one hour a day or being dead 24 hours a day?”

BMJ 1998;316:1784 (Published 13 June 1998)

Paper

Lone atrial fibrillation in vigorously exercising middle aged men: case-control study

Jouko Karjalainen (jouko.karjalainen@pp.inet.fi), internist^a, Urho M Kujala, chief physician^b, Jaakko Kaprio, senior researcher^c, Seppo Sarna, associate professor^c, Matti Viitasalo, cardiologist^d

Lone atrial fibrillation in vigorously exercising middle aged men: casecontrol study¹

- 300 top Finnish orienteers vs 495 controls
- Mean age 47 vs 49 years
- Subjects with risk factors for AF were excluded
- 10 year follow up
- Lone AF developed **5.8 times more frequent** in athletes than in the control group
- Mean age at 1st episode of AF was 52 years with an average of 36 years of training

¹Karjalainen J et al. BMJ 1998; 310: 1784-85

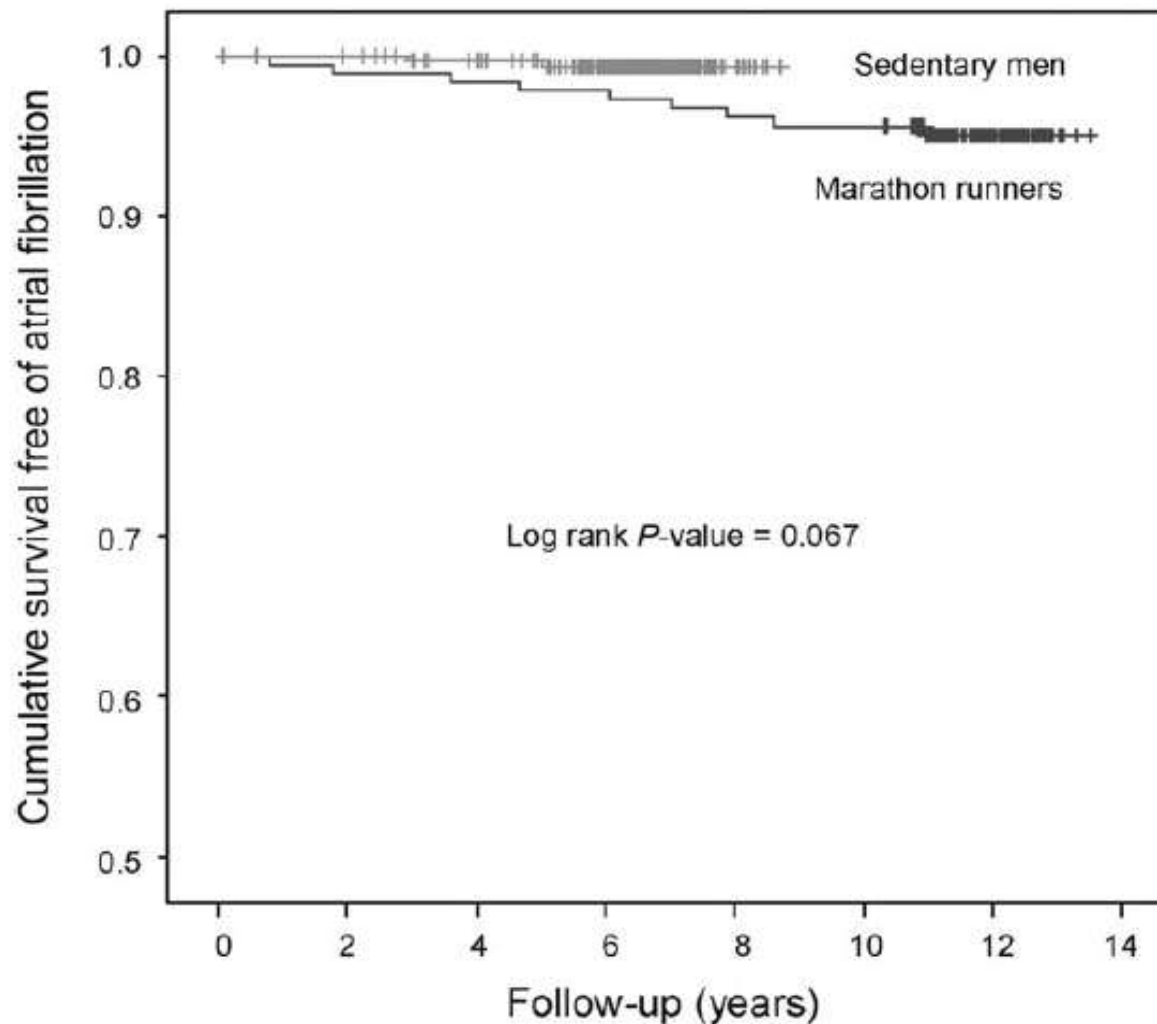


Figure 2 The Kaplan-Meier survival curves for cumulated survival free of lone atrial fibrillation in sedentary men and marathon runners.

Annual incidence rate:
 Marathon runners:
 0.43/100
 Control subjects:
 0.11/100

Meta-analysis of the risk to develop atrial fibrillation comparing athletes with the general population

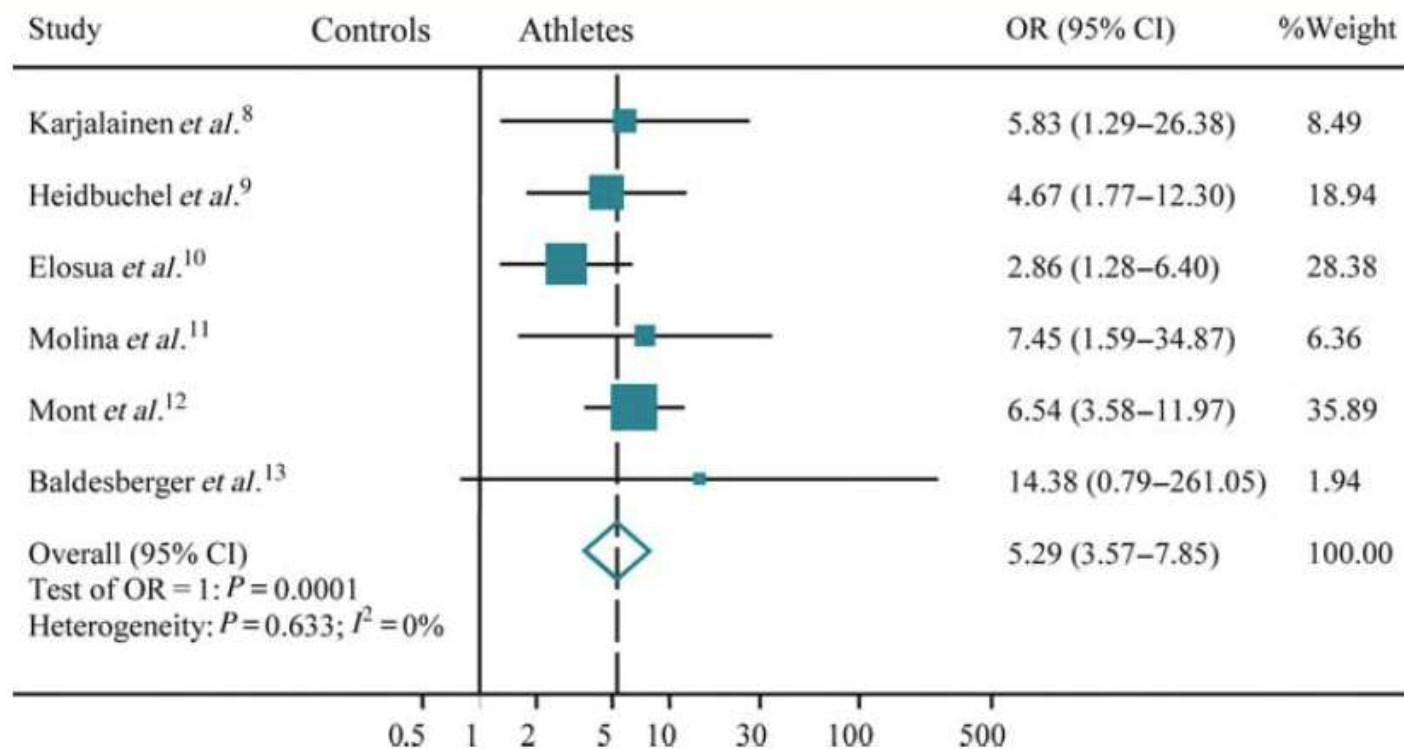
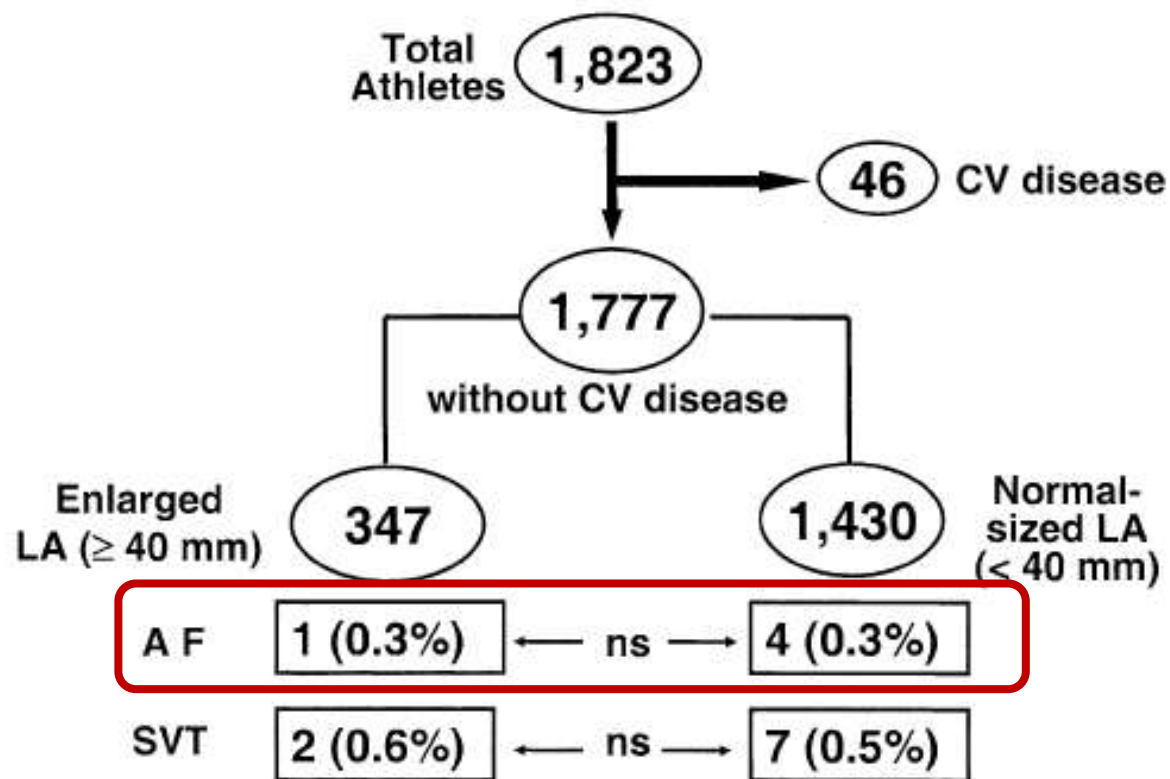


Figure 2 Meta-analysis of AF risk in athletes compared with controls.

Who are we looking at?

- Master athletes with a long history of sports participation
- Young athletes in their prime
- Former elite athletes
- Difference between sport disciplines
- What constitutes being an athlete?
 - Competition achievements
 - Target times
 - Average daily energy expenditure

Prevalence and clinical significance of left atrial remodelling in elite athletes



Mean age:
24 years

Figure 3. Prevalence of supraventricular tachyarrhythmias (i.e., paroxysmal atrial fibrillation or supraventricular tachycardia) before or at initial evaluation in our institute with respect to left atrial (LA) dimension, as assessed by echocardiography in 1,777 athletes. AF = paroxysmal atrial fibrillation; CV = cardiovascular; SVT = supraventricular tachycardia.

Sinus node disease and arrhythmias in the long-term follow-up of former professional cyclists

Sylvette Baldesberger¹, Urs Bauersfeld², Reto Candinas¹, Burkhardt Seifert³, Michel Zuber⁴, Manfred Ritter⁵, Rolf Jenni⁶, Erwin Oechslin⁶, Pia Luthi¹, Christop Scharf¹, Bernhard Marti⁷, and Christine H. Attenhofer Jost^{1*}

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At the average age of 66 years 10% of former Swiss professional cyclists had developed atrial fibrillation

Who is affected?

- Master athletes with a long history of sports participation
- Former elite athletes
- Endurance sports
- Men

How much is too much?



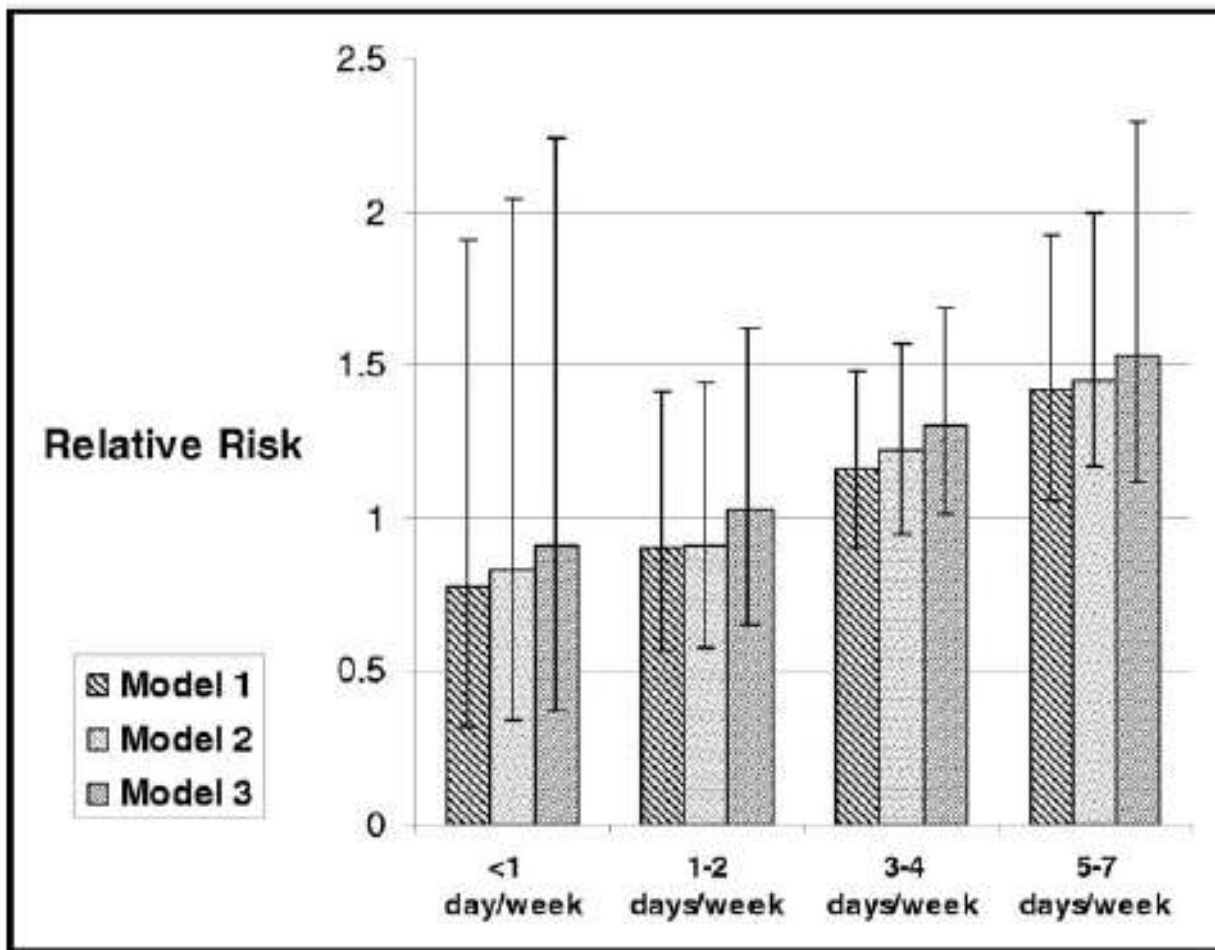


Figure 3. RR of AF according to jogging frequency at 3 years.

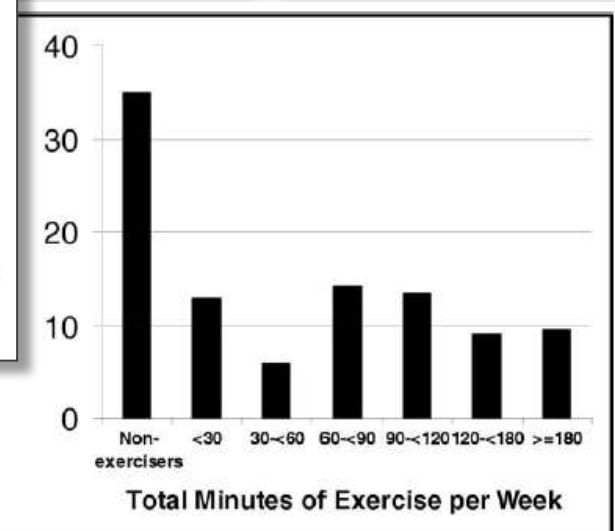


Figure 1. Distribution of total exercise time per week (minutes).

Association of cumulative lifetime physical activity and development of lone atrial fibrillation

Table 5 Adjusted odds ratios and 95% confidence intervals of lone atrial fibrillation for cumulated moderate and heavy physical activity, height, and left atrial anteroposterior diameter

	Odds ratio (95% confidence interval)	P-value
Cumulated moderate and heavy physical activity		
0–2077 h	1	
2078–9318 h	5.60 (1.59–19.75)	0.0075
≥9319 h	15.11 (3.75–60.83)	0.0001

Do you have to stop exercising?

Why is AF more common in athletes?

- Athlete's Heart:
 - Increased vagal tone
 - Bradycardia (slow heart beat)
 - Changes to the electrical recovery period
 - Increased heart muscle mass
 - Heart chamber enlargement
 - Fibrosis

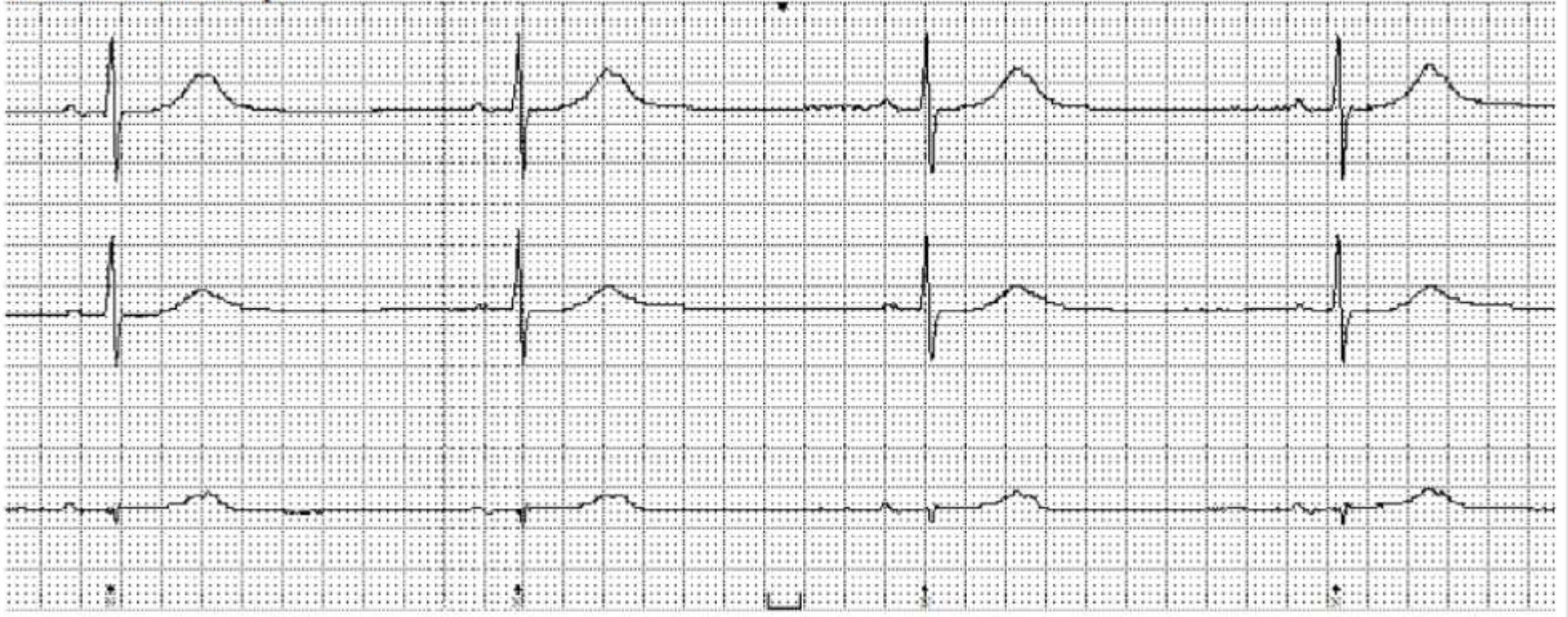


The athlete's heart: is big beautiful?

R J Shephard

Br. J. Sports Med. 1996;30;5-10
doi:10.1136/bjism.30.1.5

17:25:00 Min HR = 29 bpm



Vagal AF appears considerably more common in athletes with AF compared with the general AF population: 33 -75% of AF episodes in reported studies.

Left atrial remodelling in competitive athletes

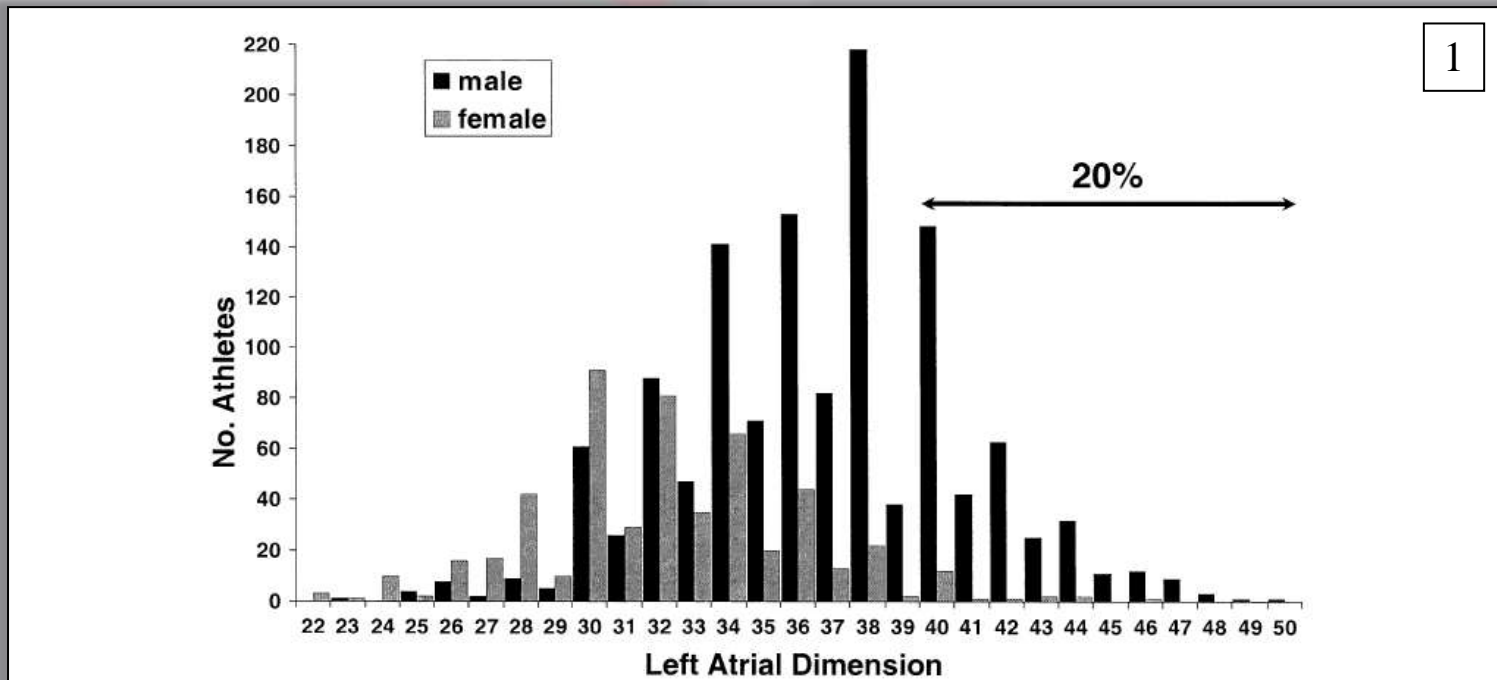


Figure 1. Distribution of transverse left atrium dimensions in 1,777 highly trained athletes. Data are shown separately for female (grey bars) and male (black bars) athletes. Twenty percent of athletes had an enlarged left atrium (range, 40 to 50 mm), including 2% with an atrial dimension ≥ 45 mm.

	Group I			All		
	Sinus (n=27)	LAF (n=6)	P value	Sinus (n=63)	LAF (n=9)	P value
LVD diastolic (mm)	55 \pm 5	54 \pm 3	NS	54 \pm 4	53 \pm 3	NS
IVS diastolic (mm)	10 \pm 1	10 \pm 1	NS	10 \pm 1	10 \pm 2	NS
LVPW diastolic (mm)	10 \pm 1	10 \pm 2	NS	10 \pm 1	10 \pm 1	NS
LVEF (%)	60 \pm 6	53 \pm 7	NS	58 \pm 6	53 \pm 6*	0.016
LAD systolic (mm)	42 \pm 5	46 \pm 6	0.12	43 \pm 5	48 \pm 6	0.013
LAA systolic (cm ²)	24.9 \pm 3.6	27.6 \pm 3.9	0.14	24.8 \pm 3.9	31.3 \pm 6.1 [†]	<0.001

Data are expressed as mean \pm SD, unless otherwise specified. IVS, interventricular septum; LAA, left atrial area; LAD, left atrial diameter; LAF, lone atrial fibrillation; LVD, left ventricular diameter; LVEF, left ventricular ejection fraction; LVPW, left ventricular posterior wall; NS, not significant. *Data of eight participants.

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Table 5 Adjusted odds ratios and 95% confidence intervals of lone atrial fibrillation for cumulated moderate and heavy physical activity, height, and left atrial anteroposterior diameter.

	Odds ratio (95% confidence interval)	P-value
Cumulated moderate and heavy physical activity		
0-2077 h	1	
2078-9318 h	5.60 (1.59-19.75)	0.0075
≥ 9319 h	15.11 (3.75-60.83)	0.0001
Height		
155-164.9 cm	1	
165-176.9 cm	13.54 (2.47-74.30)	0.0027
177-195 cm	23.23 (2.48-217.56)	0.0050
Left atrial anteroposterior diameter (mm)	1.40 (1.17-1.67)	0.0003

3

Treatment of atrial fibrillation does not differ greatly in athletes

- Antiarrhythmic medication as 1st line:
 - (Beta-blockers)
 - Flecainide, Propafenone
 - Dronedarone
 - Sotalol
 - Disopyramide
- Ablation therapy

Symptoms and course of paroxysmal atrial fibrillation in athletes: a 9-year follow up

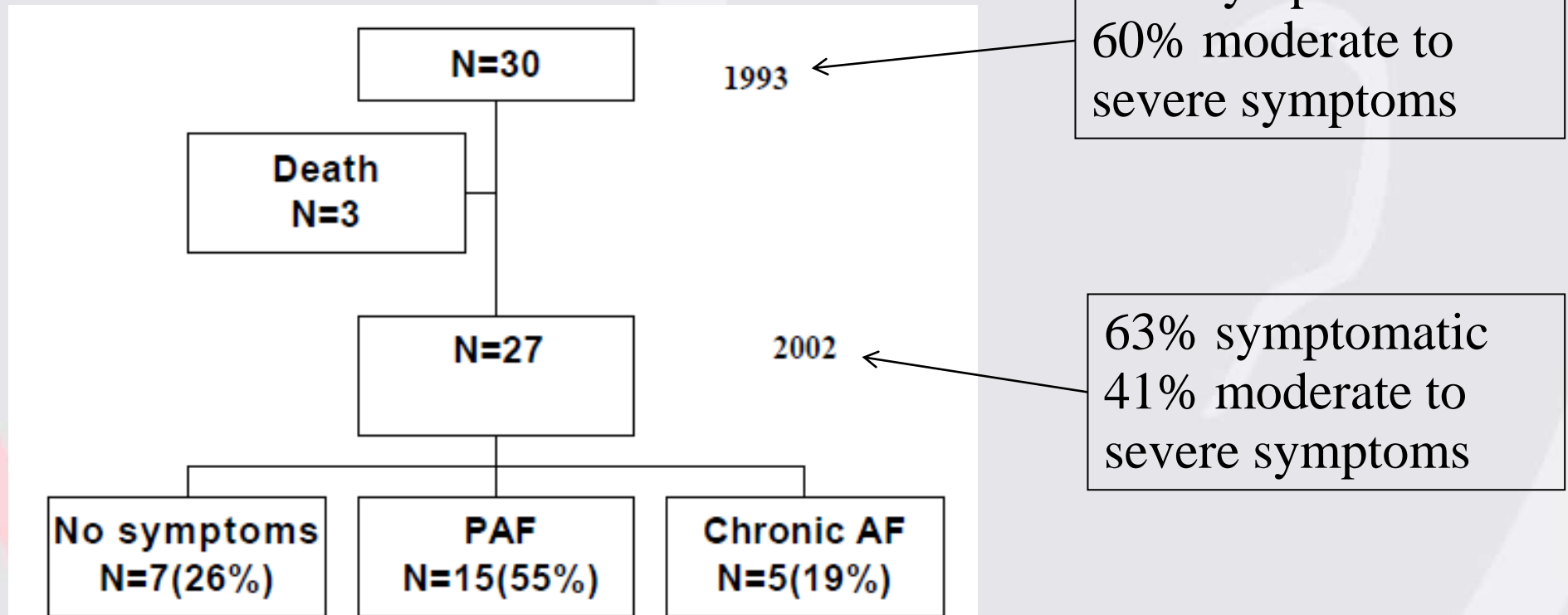
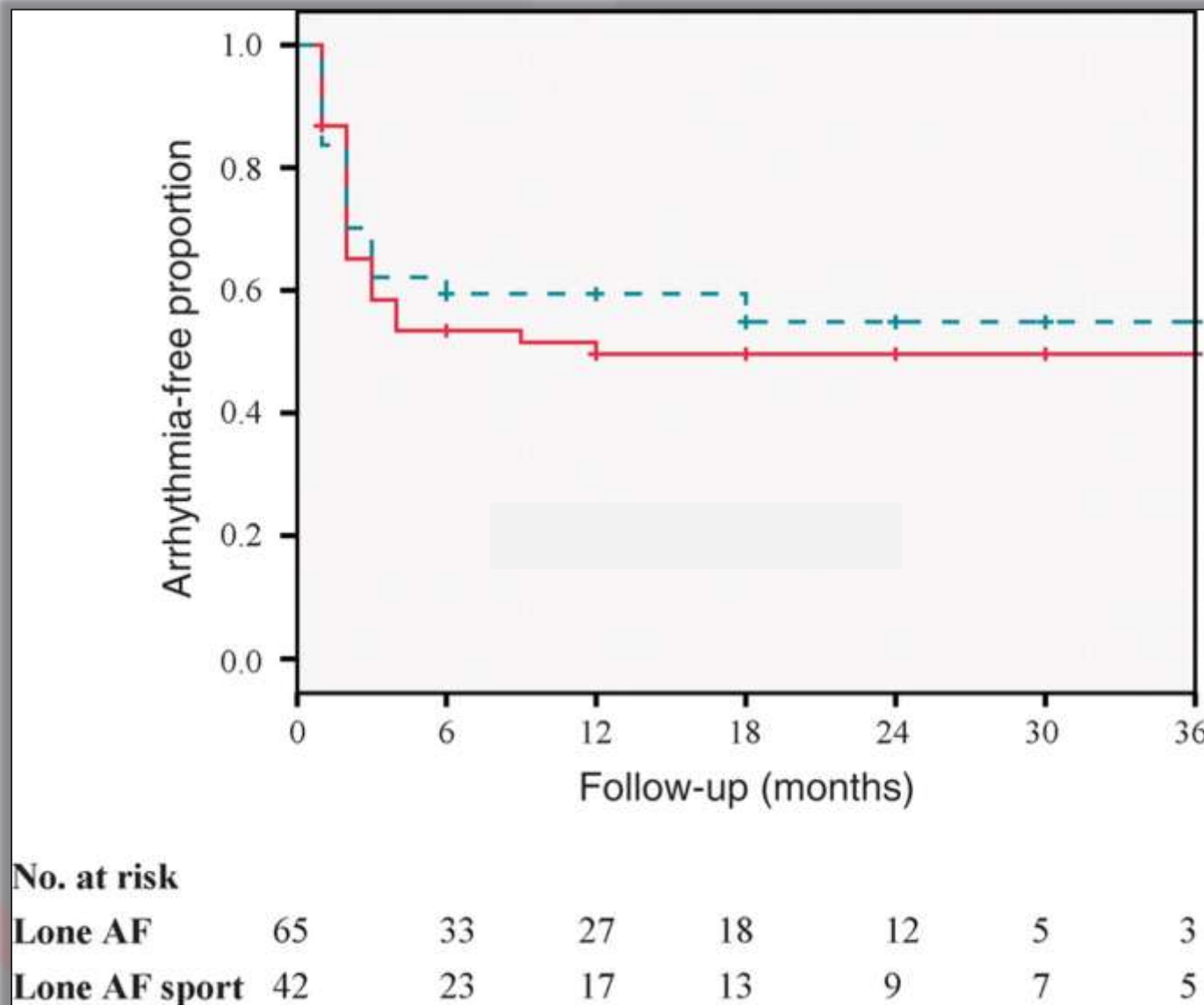
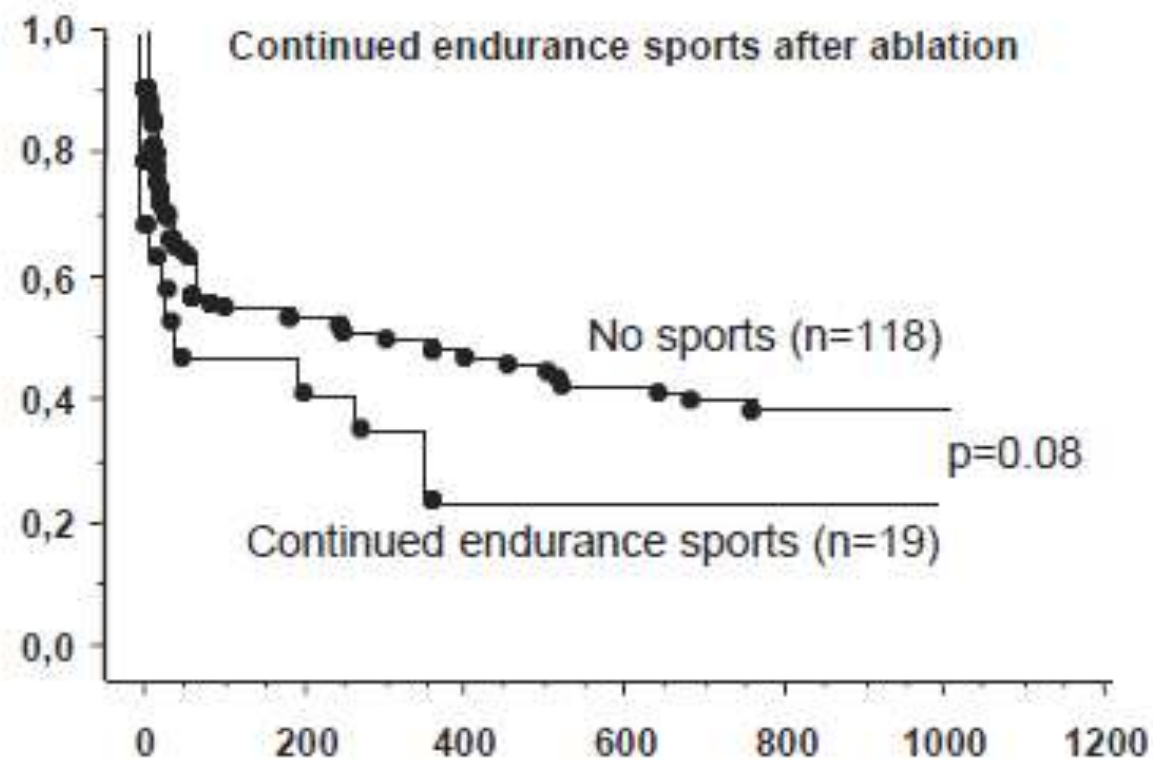


Figure 1 Distribution of athletes with paroxysmal atrial fibrillation 1993–2002.

Kaplan–Meier curves for long-term freedom from recurrent arrhythmias after a single ablation procedure in the lone AF sport group (dashed line) and patients with lone AF and no history of exercise activity (solid line).





At risk	d0	d360	d720	Time (days)
No sports	118	49	29	
Cont'd Endurance	19	6	3	

Fig. 2. Kaplan-Meier curves showing development of AF in 19 patients who continued endurance sports after ablation, vs. 118 patients who did not.

Longterm follow-up of former professional cyclists

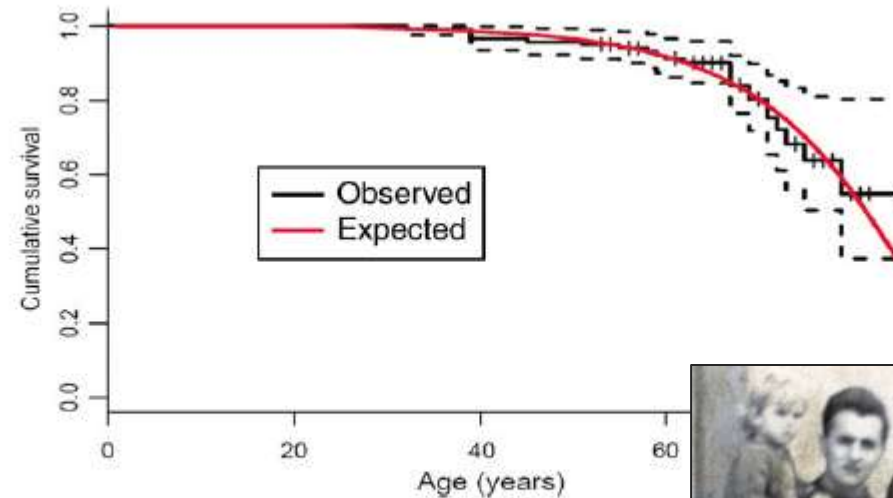


Figure 1 Survival curve of former athletes participating in the Tour de Suisse compared with a reference population. The dotted lines represent a 95% pointwise confidence interval.



Lone atrial fibrillation in vigorously exercising middle aged men: casecontrol study¹

- 300 top Finnish orienteers vs 495 controls
- Lone AF developed in 5.3% of orienteers vs 0.9% in control group
- Lower mortality rate in orienteers: 1.7% vs 8.5% in control group

¹Karjalainen J et al. BMJ 1998; 310: 1784-85

Summary

- Atrial Fibrillation is up to 5 times more common in endurance athletes than in the general population.
- This seems to be confined to serious athletes who train most days of the week for decades.
- Despite this associated risk life expectancy is prolonged in most endurance athletes.
- Changes associated with the athlete's heart are likely to be the cause of atrial fibrillation.
- The treatment of AF in athletes is similar to that in non-athletes.
- Sport restriction is advisable.

Thank you.

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