

Sportadviezen bij patiënten met atriumfibrilleren NVHV

J.A.Snoek
17-09-2019

Inleiding

- Sportarts Isala Zwolle
- 2 dagen sportgeneeskunde
- 2 dagen hartrevalidatie
- Thesis: Cardiac Rehabilitation: How much pain for the optimal gain?



• @aernoutsnoek



livv
zorg.dichtbij | consument | zorgprofessional
Mobiel alarm | Mobiel ECG | Wat doen wij?
UITLEG

ECG reading showing heart rhythm
Medtronic RIVA-SIT
Heter monitor

Wat gebeurt er?

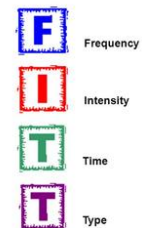
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Ex

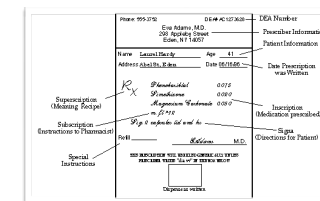
3

Beweegrecept

FITT Principle



- Please start this PowerPoint in slide show mode for interactivity.
- Click on each letter to see the definition of each component.



Quiz

- Hoeveel liter bloed stroomt er, bij benadering, per minuut door het hart bij 10km/uur hardlopen?
 - A 10 liter
 - B 20 liter
 - C 40 liter

Quiz

- Hoeveel liter bloed stroomt er, bij benadering, per minuut door het hart bij 10km/uur hardlopen?
 - A 10 liter
 - B 20 liter
 - C 40 liter
- De dosis-respons relatie tussen het ontwikkelen van atriumfibrilleren en de hoeveelheid beweging is
 - A lineair progressief
 - B U-vormig
 - C J-vormig
 - D Anders

Quiz

- Hoeveel liter bloed stroomt er, bij benadering, per minuut door het hart bij 10km/uur hardlopen?
 - A 10 liter
 - B 20 liter
 - C 40 liter
- De dosis-respons relatie tussen het ontwikkelen van atriumfibrilleren en de hoeveelheid aan hoog intensieve sportbeoefening is
 - A lineair progressief
 - B U-vormig
 - C J-vormig
 - D Anders
- De belangrijkste reden voor het ontwikkelen van AF bij sport lijkt te zijn?
 - A Vergrote atria
 - B Atriale fibrose
 - C Verhoogde tonus nervus vagus

Coumel's componenten van aritmogenese

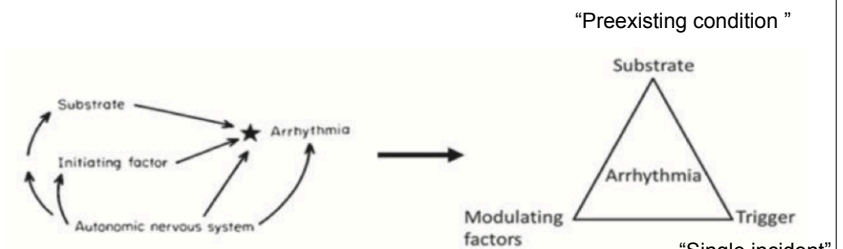
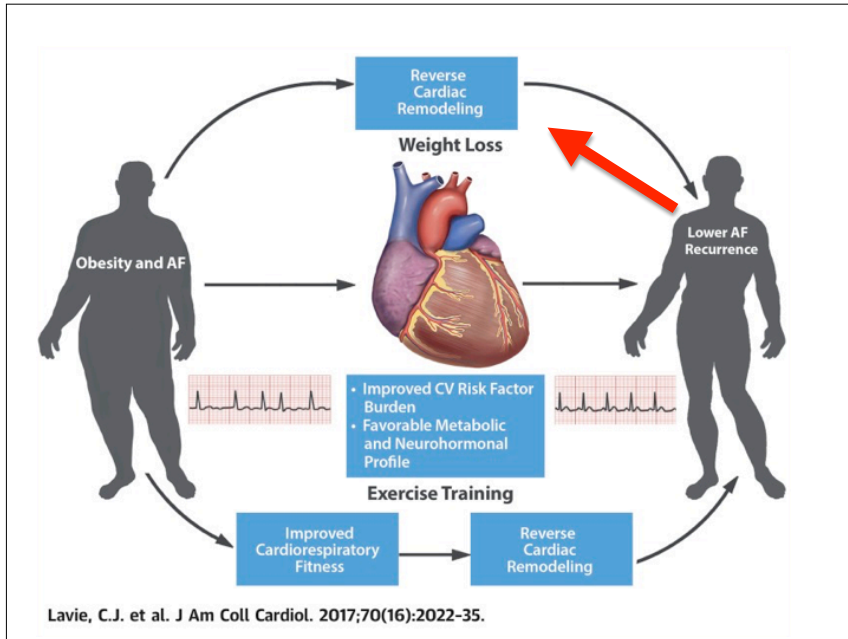


Figure. Left: Coumel's three components of arrhythmogenesis.³ Right: adjusted triangle of arrhythmia.



Sport categorieën

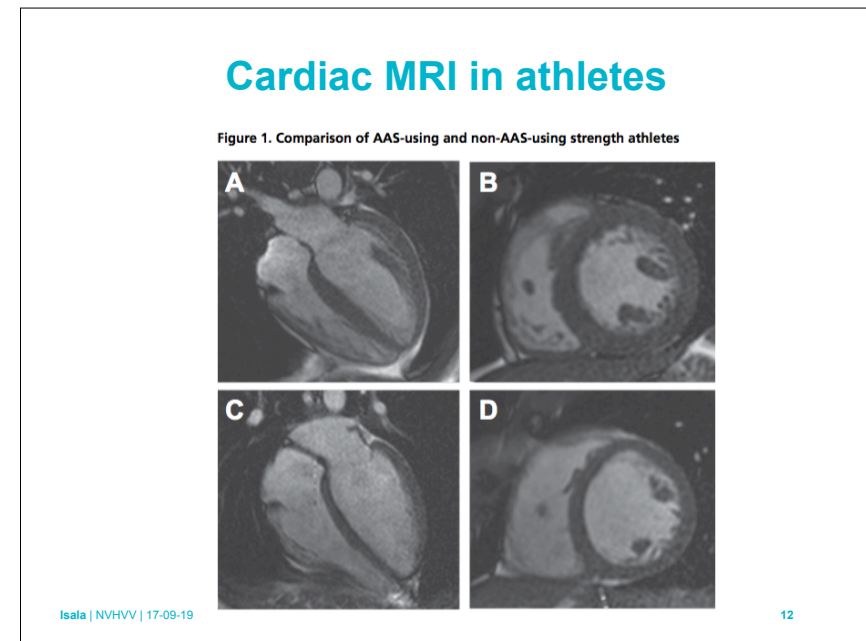
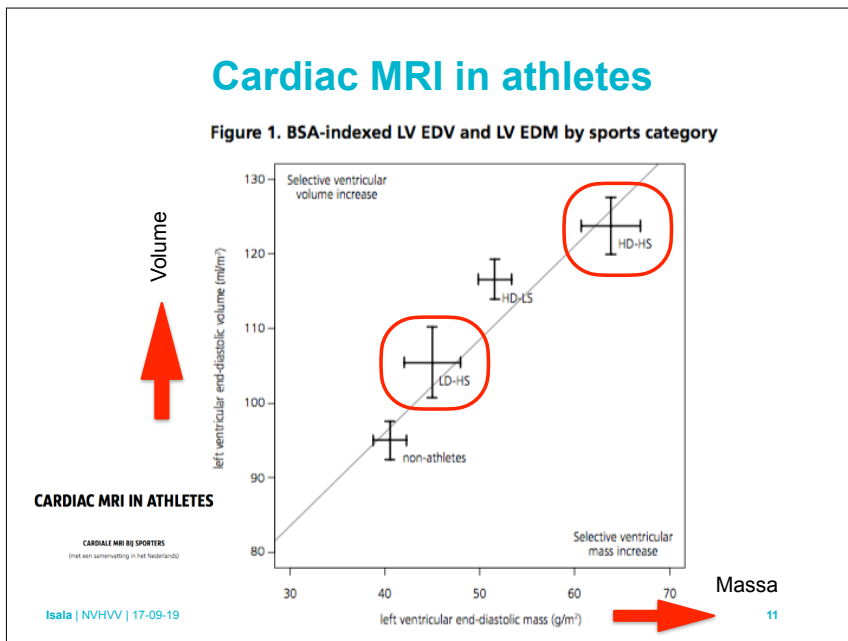
Excentrisch

		DYNAMIC		
		LOW (LD)	MODERATE (MD)	HIGH (HD)
STATIC	LOW (LS)	billiards curling golf rifery	baseball table tennis volleyball	field hockey football (soccer) racket sports long-distance running
	MODERATE (MS)	archery auto racing equestrian	surfing rugby sprint running	swimming basketball mid-distance running
	HIGH (HS)	weightlifting powerlifting judo water skiing	downhill skiing wrestling snowboarding	cycling rowing duathlon/triathlon speed skating

Table based on Mitchell et al.³³ Sports included in the Cardiac MRI in Athletes Study are indicated in bold

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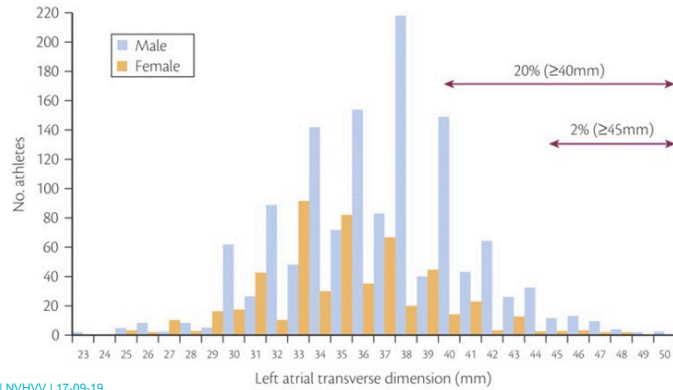
10



Prevalence and Clinical Significance of Left Atrial Remodeling in Competitive Athletes

Antonio Pelliccia, MD,* Barry J. Maron, MD,† Fernando M. Di Paolo, MD,* Alessandro Biffi, MD,* Filippo M. Quattrini, MD,* Cataldo Pisicchio, MD,* Alessandra Roselli, MD,* Stefano Caselli, MD,* Franco Culasso, PhD‡

Rome, Italy; and Minneapolis, Minnesota



13

Cardiac output

Athlet → 6000 O₂ ml/min → 40 Liter
 Normaal → 3000 O₂ ml/min → 20 Liter
 CHF → 1500 O₂ ml/min → 10 Liter
 10km/h hardlopen ~ 3000 ml/min

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14

Risk of arrhythmias in 52 755 long-distance cross-country skiers: a cohort study

Kasper Andersen^{1*}, Bahman Farahmand^{2,3}, Anders Ahlbom², Claes Held¹, Sverker Ljunghall¹, Karl Michaëlsson⁴, and Johan Sundström¹



European Heart Journal (2013) 34, 3624–3631
 doi:10.1093/eurheartj/eh1188



Table 1 Baseline characteristics and incidence of any arrhythmias

	n skiers	n cases	PYAR	Incidence rate of any arrhythmias (95% CI)/10 000 PYAR
	52 755	919	513 496	17.9 (16.8–19.1)
Age (years)				
15–24	6258	30	64 867	4.6 (3.2–6.6)
25–34	17 288	106	169 553	6.3 (5.2–7.6)
35–44	12 086	131	119 665	10.9 (9.2–13.0)
45–54	11 328	264	108 401	24.4 (21.6–27.5)
55–64	4546	245	41 101	59.6 (52.6–67.6)
65+	1249	143	10 962	130.4 (110.7–153.7)



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15

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Table 3 Risk of secondary outcomes by finishing time group

	Atrial fibrillation (n = 681, PYAR = 514 550)	Bradyarrhythmias (n = 119, PYAR = 516 905)	Other SVT (n = 105, PYAR 516 9908)	VT/VF/CA (n = 90; PYAR = 517 057)
>240%	1.00 (ref.)	1.00	1.00 (ref.)	1.00 (ref.)
200–240%	1.02 (0.82–1.28)	1.44 (0.81–2.59)	1.65 (0.94–2.91)	1.46 (0.78–2.72)
160–200%	0.98 (0.79–1.22)	1.29 (0.72–2.31)	1.09 (0.60–1.99)	1.03 (0.54–1.96)
100–160%	1.20 (0.93–1.55)	1.85 (0.97–3.54)	1.38 (0.71–2.69)	1.19 (0.57–2.52)
Per category	1.04 (0.96–1.13)	1.16 (0.95–1.40)	0.98 (0.81–1.19)	0.99 (0.79–1.22)

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16

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doi:10.1093/eurheartj/ehs188

Table 4 Risk of secondary outcomes by number of completed races

	Atrial fibrillation (n = 681, PYAR = 514 550)	Bradyarrhythmias (n = 119, PYAR = 516 905)
1	1.00 (ref.)	1.00 (ref.)
2	1.22 (0.99–1.51)	1.23 (0.70–2.16)
3–4	1.27 (1.02–1.57)	1.76 (1.05–2.94)
≥5	1.29 (1.04–1.61)	2.10 (1.28–3.47)
Per category	1.09 (1.02–1.17)	1.29 (1.10–1.52)

Samenvatting

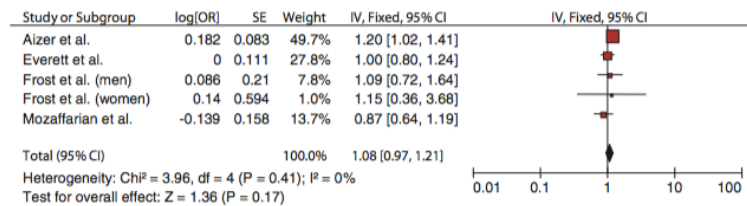
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- Atriumfibrilleren is de meest voorkomende ritmestoornis bij sporters
- AF lijkt gerelateerd aan leeftijd en aantal keer finishen duurwedstrijd (of is dat hetzelfde?)

Normaal ECG

Regular Physical Activity and Risk of Atrial Fibrillation A Systematic Review and Meta-analysis

Peter Ofman, MD, MSc; Owais Khawaja, MD; Catherine R. Rahilly-Tierney, MD, MPH; Adelqui Peralta, MD; Peter Hoffmeister, MD; Mathew R. Reynolds, MD, MSc; J. Michael Gaziano, MD, MPH; Luc Djousse, MD, MPH, ScD

(*Circ Arrhythm Electrophysiol.* 2013;6:252-256.)



Number of patients: 43.672

Samenvatting

- Hoog statische, hoog dynamische sporten geven de grootste toename van hartspiermassa en volume
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- Atriumfibrilleren is de meest voorkomende ritmestoornis bij sporters
- AF lijkt gerelateerd aan leeftijd en aantal keer finishen duurwedstrijd (of is dat hetzelfde?)
- Regelmatig bewegen leidt niet tot meer AF

Normaal ECG

Is the risk of atrial fibrillation higher in athletes than in the general population? A systematic review and meta-analysis

Jawdat Abdulla* and Jens Rokkedal Nielsen



Europace (2009) 11, 1156–1159
doi:10.1093/europace/eup197

Table 1 Characteristics of the included studies

Author/publication year	Type of athletes	Age (years) mean \pm SD (athletes vs. controls)	Men (%)	Cases of AF/athletes	Cases of AF/controls
Karjalainen et al. ⁸	Orienteers	48 \pm 6 (46 \pm 7 vs. 50 \pm 5)	100	12/228 (5%)	2/212 (0.9%)
Heidbuchel et al. ⁹	Mixed sports	55 \pm 10 (53 \pm 9 vs. 60 \pm 10)	88	25/31 (81%)	50/106 (48%)
Elosua et al. ¹⁰	Mixed sports	43 \pm 12 (NA)	69	16/31 (51%)	35/129 (27%)
Molina et al. ¹¹	Marathon runners	45 \pm 10 (39 \pm 9 vs. 50 \pm 13)	100	9/183 (5%)	2/290 (0.7%)
Mont et al. ¹²	Mixed sports	48 \pm 10 (NA)	100	83/120 (69%)	24/96 (25%)
Baldesberger et al. ¹³	Cyclists	67 \pm 7 (67 \pm 7 vs. 67 \pm 6)	100	6/62 (10%)	0/62 (0%)
Total studies (n = 6)	Mixed sports	51 \pm 9	93	151/655 (23%)	113/895 (12.5%)

AF, atrial fibrillation, NA, not available, n, number.

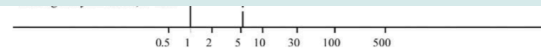


Figure 2 Meta-analysis of AF risk in athletes compared with controls.

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Number of patients: 650

21

Emerging risk factors and the dose–response relationship between physical activity and lone atrial fibrillation: a prospective case–control study



Europace (2016) 18, 57–63
doi:10.1093/europace/euv216

Naiara Calvo^{1,2}, Pablo Ramos^{1,2}, Silvia Montserrat^{1,2}, Eduard Guasch^{1,2}, Blanca Coll-Vinent^{1,2}, Mònica Domenech^{2,3}, Felipe Bisbal^{1,2}, Sara Hevia², Silvia Vidorreta², Roger Borrás², Carles Falces^{1,2}, Cristina Embid^{1,2,4}, Josep Maria Montserrat^{1,2,4}, Antonio Berrueto^{1,2}, Antonio Coca^{1,2,3}, Marta Sitges^{1,2}, Josep Brugada^{1,2}, and Lluís Mont^{1,2*}

Methods:

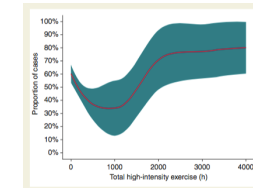
- Prospective, observational cross-sectional study

- Lone AF

- 2:1 matched on age and gender

- Exclusion criteria (> 60 year; CVD; HT; DM; COPD; liver, thyroid infectious or inflammatory disease, drug or alcohol abuse)

- Endpoint: Physical activity (modified version Minnesota Leisure Time Physical Activity Questionnaire)



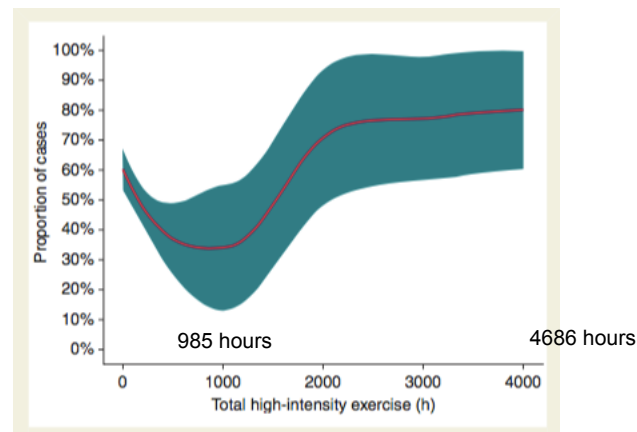
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22

Emerging risk factors and the dose–response relationship between physical activity and lone atrial fibrillation: a prospective case–control study



Europace (2016) 18, 57–63
doi:10.1093/europace/euv216



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23

Physical activity, resting heart rate, and atrial fibrillation: the Tromsø Study

Bente Morseth^{1,2,3*}, Sidsel Graff-Iversen^{1,4}, Bjarne K. Jacobsen¹, Lone Jørgensen^{5,6}, Audhild Nyrrnes¹, Dag S. Thelle^{4,7,8}, Peter Vestergaard^{9,10}, and Maja-Lisa Løchen^{1,11}



European Heart Journal
doi:10.1093/eurheartj/ehw059

Methods:

- Prospective, observational longitudinal study

- Participants 20.484

- Mean follow-up 20 jaar

Results

- AF 750 (1.83/1000 person years in men; 1.07/1000 person years in women)

Conclusion

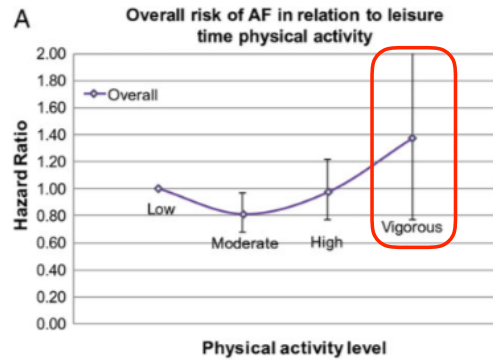
- Association Leisure Time Physical Activity \rightarrow AF J shape

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24

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European Heart Journal
doi:10.1093/eurheartj/ehw059

Atrial fibrillation in athletes and the interplay between exercise and health

Andre La Gerche^{1,2} and Christian Marc Schmied^{3*}



European Heart Journal
doi:10.1093/eurheartj/ehw059

Table 2 Levels of evidence

Level of evidence	Description
Level of evidence A	Data derived from multiple randomized clinical trials or meta-analyses.
Level of evidence B	Data derived from a single randomized clinical trial or large non-randomized studies.
Level of evidence C	Consensus of opinion of the experts and/or small studies, retrospective studies, registries.

sen et al.

Samenvatting

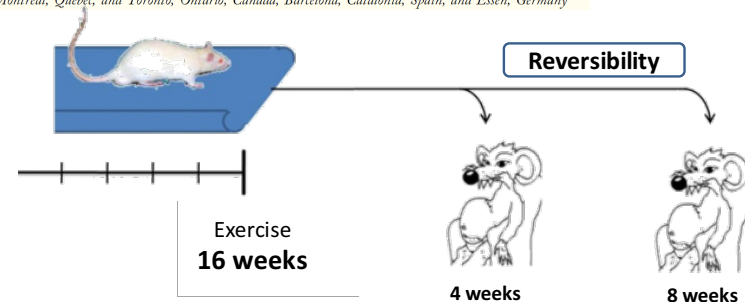
- Hoog statische, hoog dynamische sporten geven de grootste toename van hartspiermassa en volume
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- Atriumfibrilleren is de meest voorkomende ritmestoornis bij sporters
- AF lijkt gerelateerd aan leeftijd en aantal keer finishen duurwedstrijd (of is dat hetzelfde?)
- Regelmatig bewegen leidt niet tot meer AF
- Veel bewegen lijkt tot meer AF te leiden

Mechanisme

Atrial Fibrillation Promotion by Endurance Exercise

Demonstration and Mechanistic Exploration in an Animal Model

Eduard Guasch, MD,*† Begoña Benito, MD,*†‡ Xiaoyan Qi, PhD,* Carlo Cifelli, PhD,§ Patrice Naud, PhD,* Yanfen Shi, PhD,* Alexandra Mighiu, BSc,§ Jean-Claude Tardif, MD,* Artavazd Tadevosyan, MSc,* Yu Chen, MSc,* Marc-Antoine Gillis, MSc,* Yu-Ki Iwasaki, MD,* Dobromir Dobrev, MD,|| Lluís Mont, MD,§¶ Scott Heximer, PhD,§ Stanley Nattel, MD* Montreal, Quebec, and Toronto, Ontario, Canada; Barcelona, Catalonia, Spain; and Essen, Germany

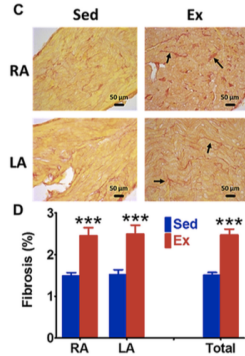


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Montreal, Quebec, and Toronto, Ontario, Canada; Barcelona, Catalonia, Spain; and Essen, Germany

Atriale fibrose



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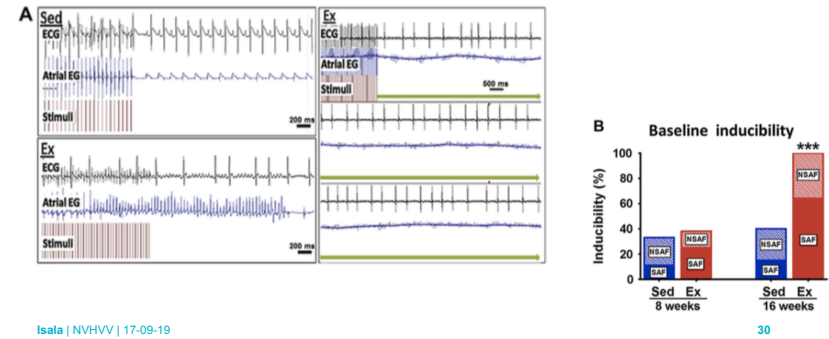
29

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AF inducibility



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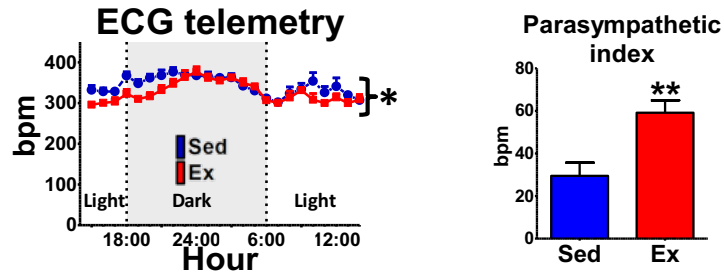
30

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Vagal tone enhancement



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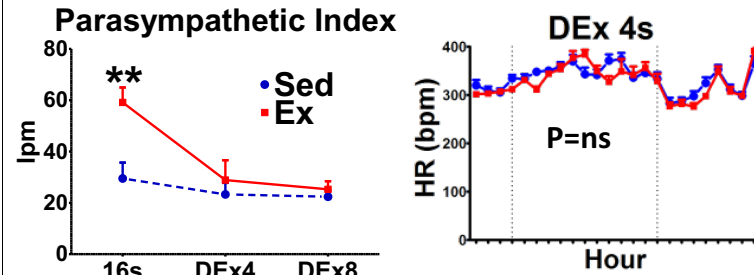
31

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Autonomic reversibility



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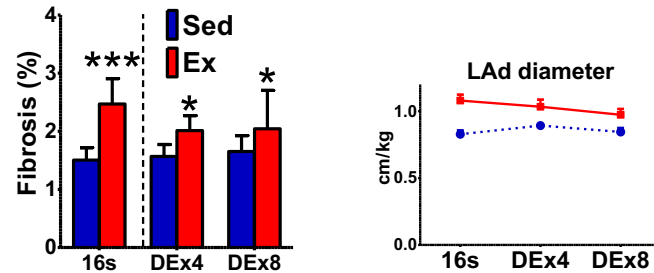
32

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No structural reversibility



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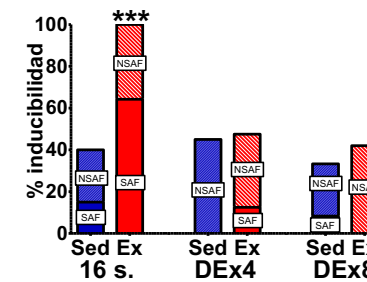
33

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Regression AF inducibility



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34

Samenvatting

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- Atria > 40 mm worden bij 20% van de sporters gezien
- Atriumfibrilleren is de meest voorkomende ritmestoornis bij sporters
- AF lijkt gerelateerd aan leeftijd en aantal keer finishen duurwedstrijd (of is dat hetzelfde?)
- Regelmatig bewegen leidt niet tot meer AF
- Veel bewegen lijkt tot meer AF te leiden
- U of J vormige curve bij relatie volume sport en AF
- Tonus nervus vagus neemt toe door sport en daarmee ook de gevoeligheid voor AF
- Detraining zorgt voor minder vagale tonus en lagere gevoeligheid AF (bij ratten)

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35

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Policy statement

European Journal of
Preventive
Cardiology



Aerobic exercise intensity assessment and prescription in cardiac rehabilitation: a joint position statement of the European Association for Cardiovascular Prevention and Rehabilitation, the American Association of Cardiovascular and Pulmonary Rehabilitation and the Canadian Association of Cardiac Rehabilitation

Alessandro Mezzani^{1,6}, Larry F Hamm^{2,6}, Andrew M Jones³,
Patrick E McBride⁴, Trine Moholdt⁵, James A Stone⁶,
Axel Urhausen⁷ and Mark A Williams⁸

European Journal of Preventive Cardiology
20(3) 442–467
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DOI: 10.1177/2047487312460484
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36

Preventive Cardiology

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Table 5. Evidence-based prescribable aerobic exercise intensity in cardiac patient groups

	Exercise intensity domains			
	Light to moderate	Moderate to high	High to severe	Severe to extreme
Stable angina pectoris	√ ^a	√ ^a	√ ^a	
Chronic CAD (no residual ischaemia)	√	√	√	√
PCI	√	√	√	
Pacemaker	√	√		
ICD	√	√		
Chronic AF	√ ^b	√ ^b		
CABG	√	√	√	
Valve repair/replacement	√	√		
CHF	√	√	√	
LVAD	√			
Heart transplantation	√ ^c	√ ^c	√ ^c	

The grey areas identify intensity domains for which no scientific evidence is available in a specific population;

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RESEARCH ARTICLE

Cardiovascular exercise and burden of arrhythmia in patients with atrial fibrillation - A randomized controlled trial

Ane Katrine Skielboe^{1*}, Thomas Quaade Bandholm^{2,3,4}, Stine Hakmann¹, Malene Mourier³, Thomas Kallemose², Ulrik Dixen¹

PLOS ONE

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RESEARCH ARTICLE

Cardiovascular exercise and burden of arrhythmia in patients with atrial fibrillation - A randomized controlled trial

Ane Katrine Skielboe^{1*}, Thomas Quaade Bandholm^{2,3,4}, Stine Hakmann¹, Malene Mourier³, Thomas Kallemose², Ulrik Dixen¹

50% RPE **80% RPE**

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[NVHVV | 17-09-19] 39

Sportadviezen

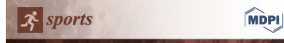
Table 2. Hospital admissions during follow-up for LI and HI physical exercise.

	Low intensity	High intensity	
Recurrent AF	17 (89.5%)	13 (68.4%)	P = 0.465 ^a
Ablation	0 (0%)	3 (26.3%)	
Antiarrhythmic medical treatment	2 (10.5%)	0 (0%)	
Heart failure, n (%)	0 (0%)	1 (5.3%)	
Pacemaker implantation	0 (0%)	0 (0%)	
Stroke	0 (0%)	0 (0%)	
Total	19 (100%)	19 (100%)	

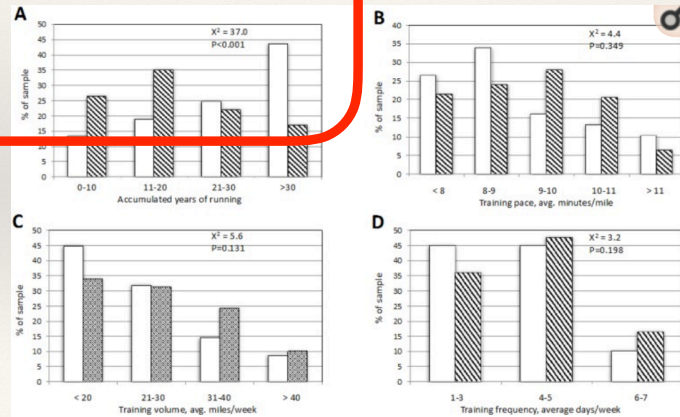
Data presented as mean (SD) and number (%)

[NVHVV | 17-09-19] 40

An Assessment of Training Characteristics Associated with Atrial Fibrillation in Masters Runners



Sports (Basel) 2019, Jul, 7(7): 179. PMID: PMC681262
Published online 2019 Jul 23. doi: 10.3390/sports7070179 PMID: 31340437



Exercise-based cardiac rehabilitation for adults with atrial fibrillation (Review)

Risom SS, Zwisler AD, Johansen PP, Sibillitz KL, Lindschou J, Gluud C, Taylor RS, Svendsen JH, Berg SK

Authors' conclusions

Due to few randomised patients and outcomes, we could not evaluate the real impact of exercise-based cardiac rehabilitation on mortality or serious adverse events. The evidence showed no clinically relevant effect on health-related quality of life. Pooled data showed a positive effect on the surrogate outcome of physical exercise capacity, but due to the low number of patients and the moderate to very low-quality of the underpinning evidence, we could not be certain of the magnitude of the effect. Future high-quality randomised trials are needed to assess the benefits and harms of exercise-based cardiac rehabilitation for adults with atrial fibrillation on patient-relevant outcomes.

QoL: no clinical relevant effect Low quality

Few patients Positive effect on CRF

Editorial group: Cochrane Heart Group.
Publication status and date: New, published in Issue 2, 2017.
Isala | NVHV | 17-09-19

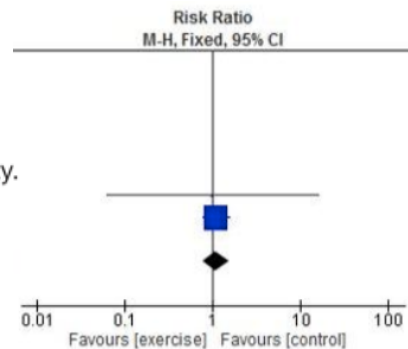


Exercise-based cardiac rehabilitation improves exercise capacity and health-related quality of life in people with atrial fibrillation: a systematic review and meta-analysis of randomised and non-randomised trials



Neil A Smart,¹ Nicola King,² Jeffrey D Lambert,³ Melissa J Pearson,¹ John L Campbell,³ Signe S Risom,^{4,5} Rod S Taylor⁶

Figure 2 All-cause mortality.

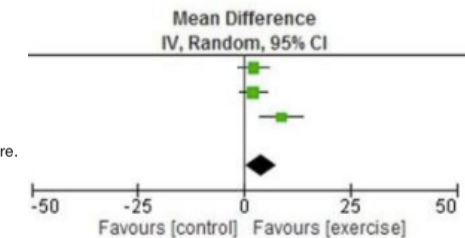


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Figure 4 Change in SF-36 mental component score.

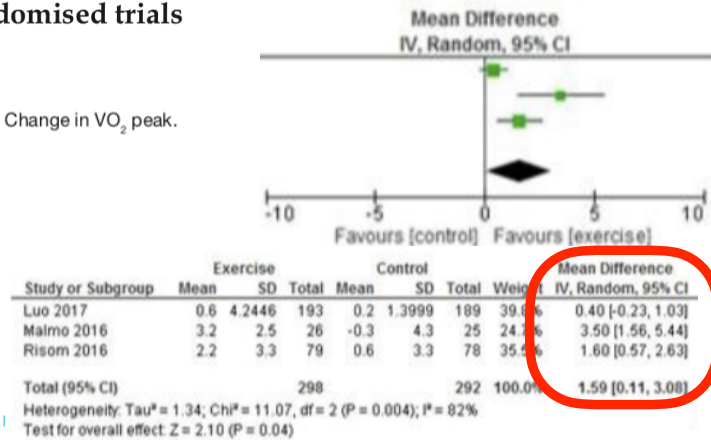


Exercise-based cardiac rehabilitation improves exercise capacity and health-related quality of life in people with atrial fibrillation: a systematic review and meta-analysis of randomised and non-randomised trials

openheart

Neil A Smart,¹ Nicola King,² Jeffrey D Lambert,³ Melissa J Pearson,¹ John L Campbell,³ Signe S Risom,^{4,5} Rod S Taylor^{2,6}

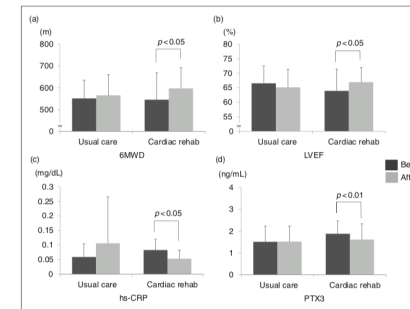
Figure 6 Change in VO₂ peak.



Exercise-based cardiac rehabilitation for patients with catheter ablation for persistent atrial fibrillation: A randomized controlled clinical trial

European Journal of
Preventive
Cardiology

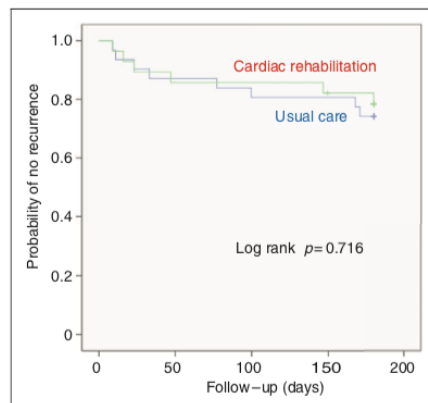
Michitaka Kato¹, Michio Ogano², Yuji Mori³, Kaito Kochi³, Daisuke Morimoto³, Kazuya Kito³, Fumi Nihei Green⁴, Toshiya Tsukamoto¹, Akira Kubo¹, Hisato Takagi⁵ and Jun Tanabe²



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Samenvatting

- Hoog statische, hoog dynamische sporten geven de grootste toename van hartspiermassa en volume
- Atria > 40 mm worden bij 20% van de sporters gezien
- Atriumfibrilleren is de meest voorkomende ritmestoornis bij sporters
- AF lijkt gerelateerd aan leeftijd en aantal keer finishen duurwedstrijd (of is dat hetzelfde?)
- Regelmatig bewegen leidt niet tot meer AF
- Veel bewegen lijkt tot meer AF te leiden
- U of J vormige curve bij relatie volume sport en AF
- Tonus nervus vagus neemt toe door sport en daarmee ook de gevoeligheid voor AF
- Detraining zorgt voor minder vagale tonus en lagere gevoeligheid AF (bij ratten)

Samenvatting 2

- Licht tot matig intensief en matig tot hoog intensief is veilig
- Trainen op 80% RPE lijkt geen toename van AF te geven
- HR lijkt geen verbetering te geven in mortaliteit (echter erg weinig onderzoek)
- HR lijkt wel een verbetering te geven in kwaliteit van leven en de fitheid te verhogen

Beweegrecept

Maak dit recept uit van de voorschrift:
uw naam

1.23456.78.001

EXERCITIË-VOORSCHRIFT BIJ DE FARMACIE

Maak dit recept uit van de voorschrift:
uw naam

Maak dit recept uit van de voorschrift:
uw naam

Frequency
Intensity
Time
Type

hier komen uw gegevens

GENEESMIDDELENVOORSCHRIFT

Beweegrecept

- Basis is NNGB
- Frequentie
 - voorkeur voor meerdere malen per week
- Intensiteit
 - matig tot hoog intensief (BORG 12-15)
- Tijd
 - 3-4 uur (?)
- Type
 - Voorkeur kracht, circuittraining of spelsporten

Quiz

- Hoeveel liter bloed stroomt er, bij benadering, per minuut door het hart bij 10km/uur hardlopen?
 - A 10 liter
 - B 20 liter
 - C 40 liter
- De dosis-respons relatie tussen het ontwikkelen van atriumfibrilleren en de hoeveelheid aan hoog intensieve sportbeoefening is
 - A Lineair progressief
 - B U-vormig
 - C J-vormig
 - D Anders
- De belangrijkste reden voor het ontwikkelen van AF bij sport lijkt te zijn?
 - A Vergrote atria
 - B Atriale fibrose
 - C Verhoogde tonus nervus vagus



Sportadviezen bij patiënten met atriumfibrilleren

Dank voor jullie aandacht!

J.A.Snoek
17-09-2019

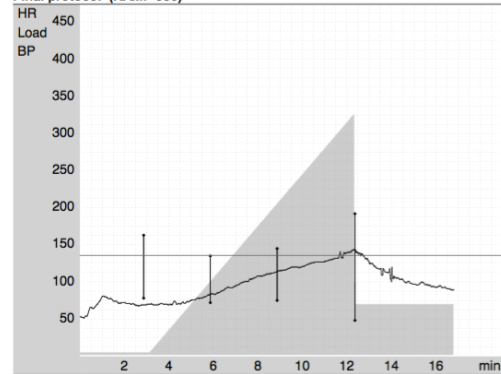
Casus

- ❖ Man, 64 jaar
- ❖ Wielrenner 6 uur per week
- ❖ Achteruitgang conditie na griep
- ❖ Lucht tekort, vooral bij duurtraining
- ❖ Geen POB, palpitations of duizeligheid

54

Casus

Final protocol (RAMP 350)



Summary

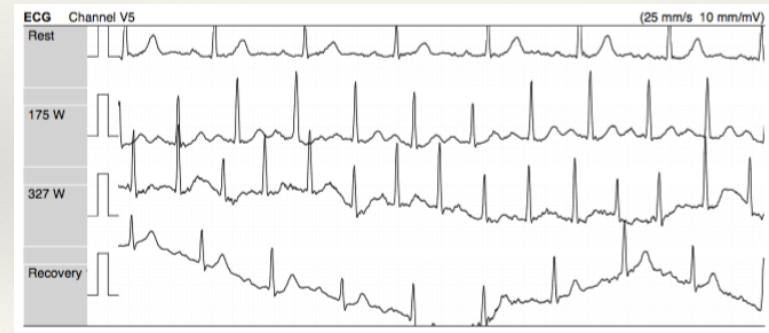
Duration total	16:49	min
Duration stress	9:21	min
Duration recovery	4:28	min
Max. load	327	W
% of target 166 W	196	%
HR peak	144	1/min
% of target 136	105	%
BP rest	163 / 78	mmHg
BP max.	192 / 48	mmHg
HRxBP, max.	27456	
MET, maximum	14.4	

Evaluation data

PWC	W	W / kg	Ref. value
170			
150			
130	288	3.5	1.5 (231 %)
max. 143	327	3.9	

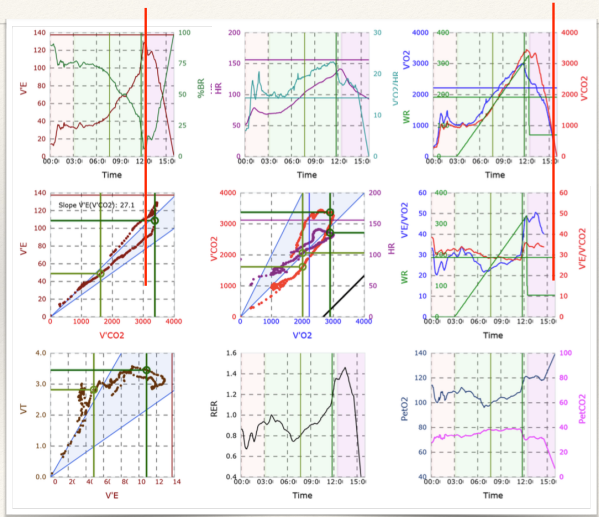
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Casus

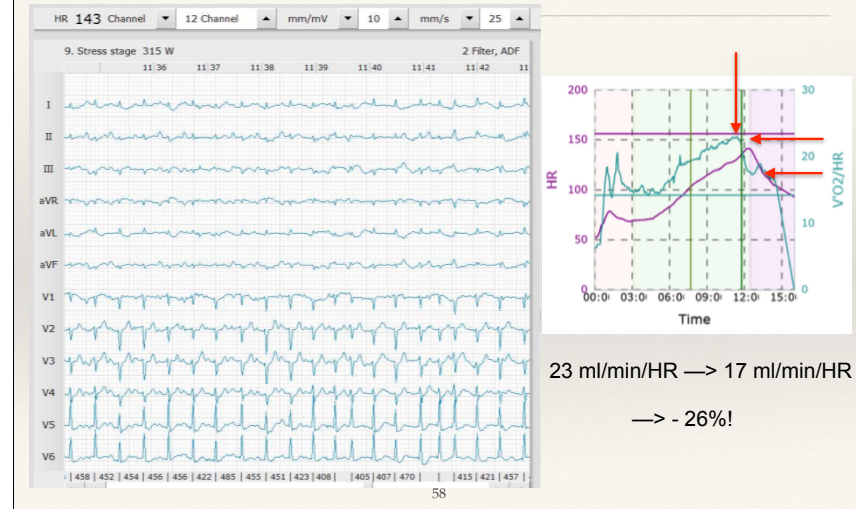


56

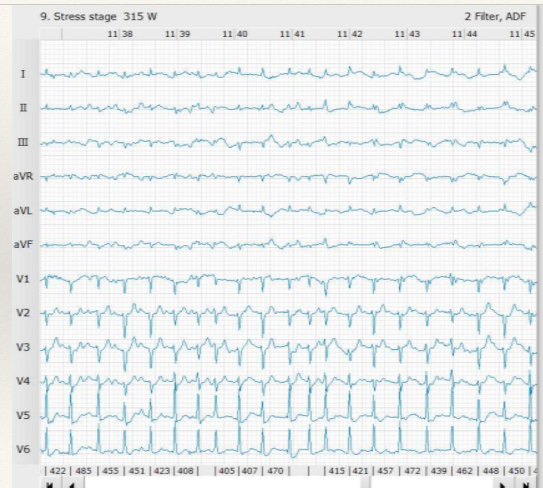
Casus



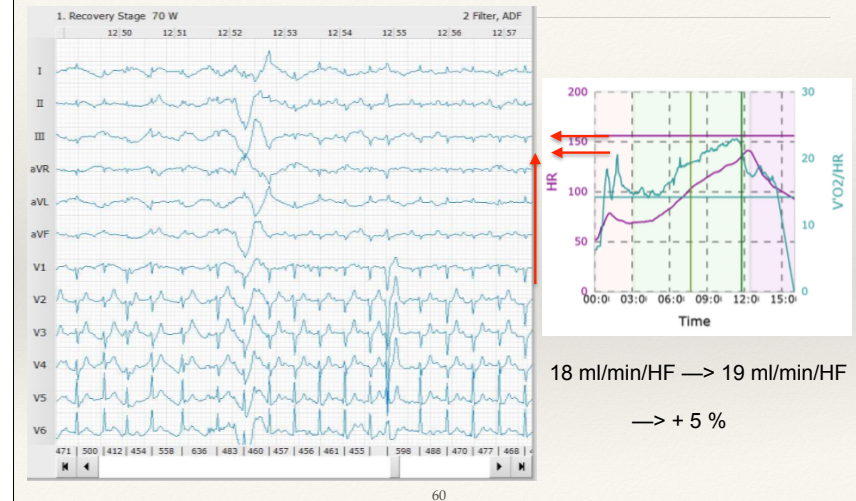
Casus



Casus



Casus



Casus

- ❖ Echo cor: goede LVEF, zonder kleppathologie
- ❖ Holter: geen AF, frequente PAC en atriale tachycardie
- ❖ Myocardscan gb