Intensité de l’exercice en 2021: les nouvelles recommandations

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Conflits d’intérêts

Pas de conflits d’intérêt avec cette présentation

Conflits d’intérêt des 5 dernières années

- Astra Zeneca
- Novartis
- Sanofi
- Servier
- We Health

ESC European Society of Cardiology
European Journal of Preventive Cardiology
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POSITION PAPER
Cardiac rehabilitation

Eur J Prev Cardiol. 2022 Feb 19;29(1):230-245

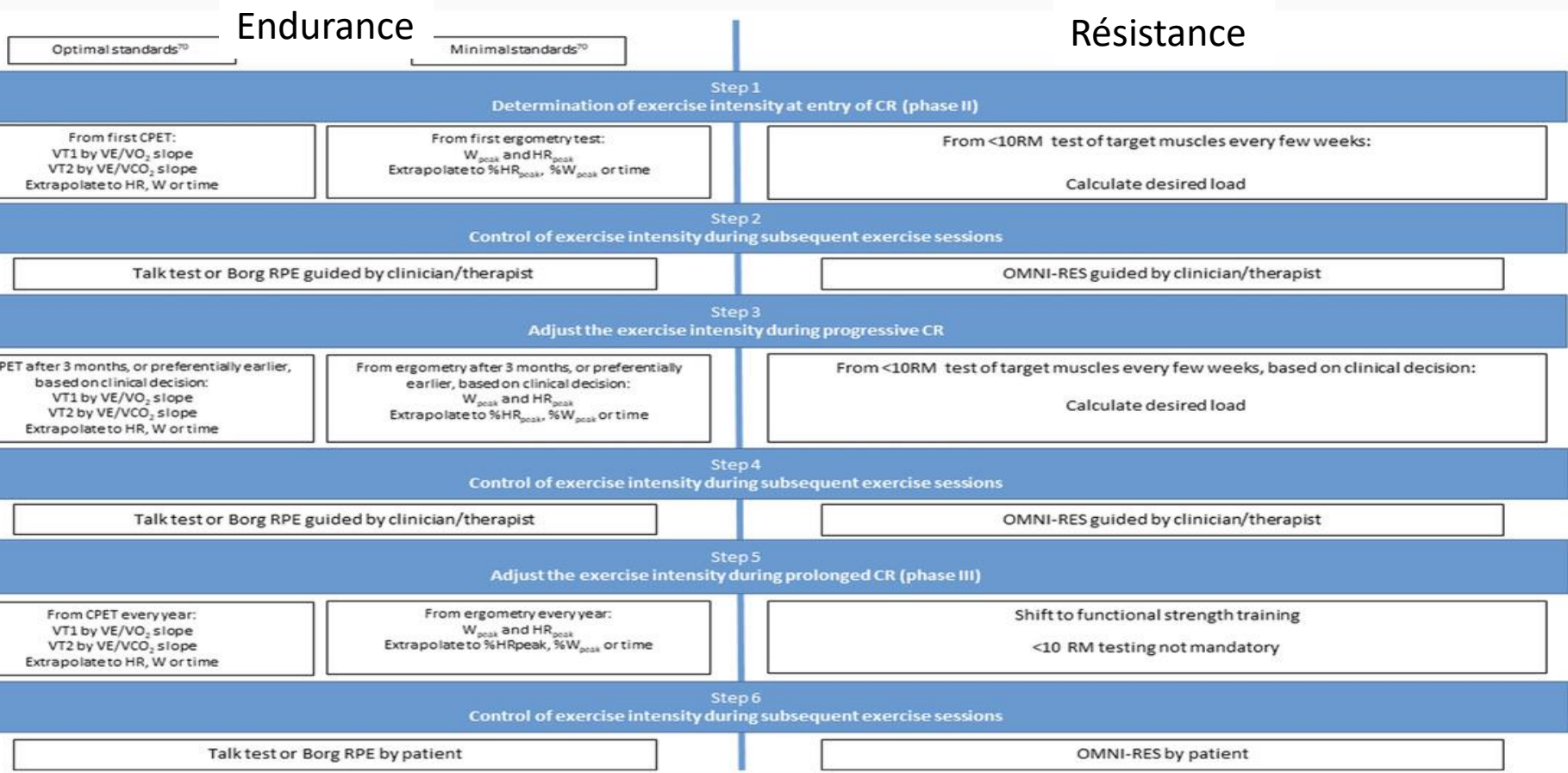
Exercise intensity assessment and prescription in cardiovascular rehabilitation and beyond: why and how: a position statement from the Secondary Prevention and Rehabilitation Section of the European Association of Preventive Cardiology

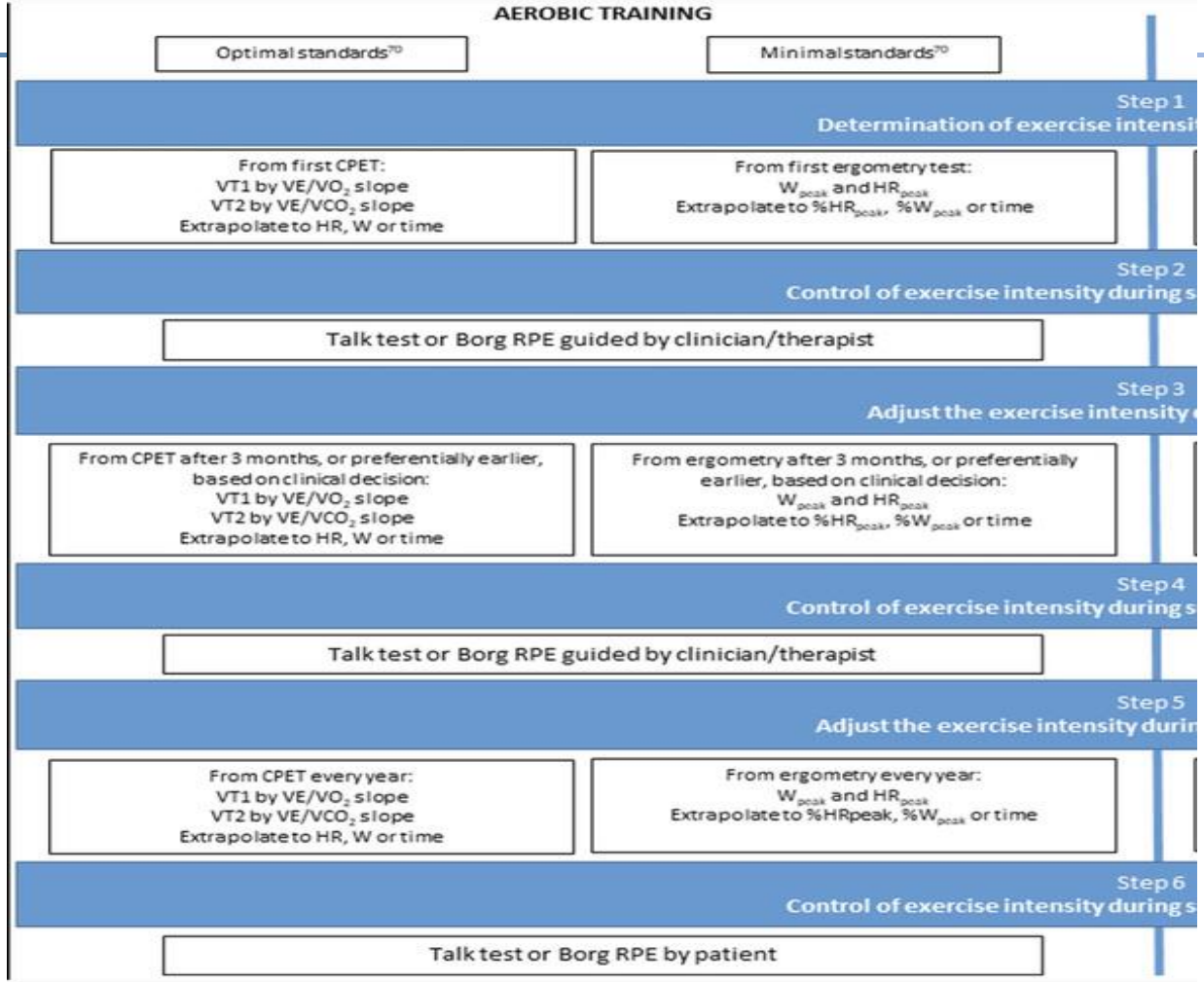
Dominique Hansen[1,2]*, Ana Abreu[3], Marco Ambrosetti[4].

F requence
I ntensité
T ype
T ime (Durée)

Classification of aerobic exercise intensity[17]

Intensity	VO_2max (%)	HRmax (%)	HRR (%)	RPE scale	Training zone
Low intensity, light exercise	<40	<55	<40	10–11	Aerobic
Moderate intensity exercise	40–69	55–74	40–69	12–13	Aerobic
High intensity	70–85	75–90	70–85	14–16	Aerobic + lactate
Very high intense exercise	>85	>90	>85	17–19	Aerobic + lactate + anaerobic


Endurance
Résistance
Optimal standards[70]
Minimal standards[70]
Step 1
Determination of exercise intensity at entry of CR (phase II)
From first CPET:
VT1 by VE/VO2 slope
VT2 by VE/VCO2 slope
Extrapolate to HR, W or time
From first ergometry test:
Wpeak and HRpeak
Extrapolate to %HRpeak, %Wpeak or time
From <10RM test of target muscles every few weeks:
Calculate desired load
Step 2
Control of exercise intensity during subsequent exercise sessions
Talk test or Borg RPE guided by clinician/therapist
OMNI-RES guided by clinician/therapist
Step 3
Adjust the exercise intensity during progressive CR
From CPET after 3 months, or preferentially earlier, based on clinical decision:
VT1 by VE/VO2 slope
VT2 by VE/VCO2 slope
Extrapolate to HR, W or time
From ergometry after 3 months, or preferentially earlier, based on clinical decision:
Wpeak and HRpeak
Extrapolate to %HRpeak, %Wpeak or time
From <10RM test of target muscles every few weeks, based on clinical decision:
Calculate desired load
Step 4
Control of exercise intensity during subsequent exercise sessions
Talk test or Borg RPE guided by clinician/therapist
OMNI-RES guided by clinician/therapist
Step 5
Adjust the exercise intensity during prolonged CR (phase III)
From CPET every year:
VT1 by VE/VO2 slope
VT2 by VE/VCO2 slope
Extrapolate to HR, W or time
From ergometry every year:
Wpeak and HRpeak
Extrapolate to %HRpeak, %Wpeak or time
Shift to functional strength training
<10 RM testing not mandatory
Step 6
Control of exercise intensity during subsequent exercise sessions
Talk test or Borg RPE by patient
OMNI-RES by patient


AEROBIC TRAINING
Optimal standards[70]
Minimal standards[70]
Step 1
Determination of exercise intensi
From first CPET:
VT1 by VE/VO2 slope
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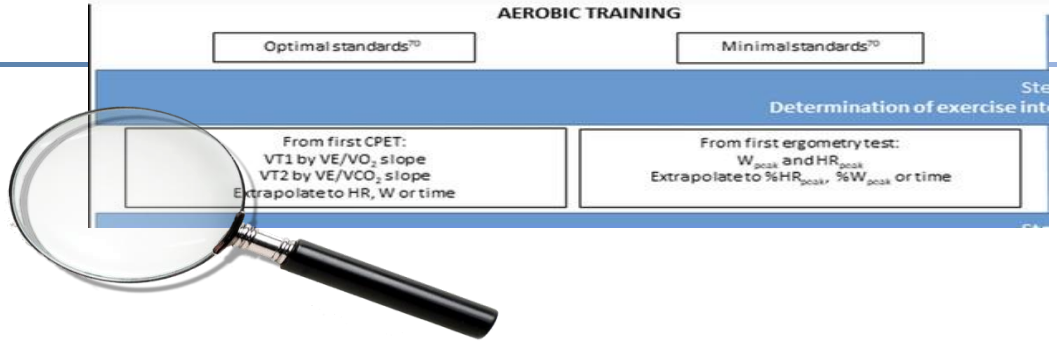


AEROBIC TRAINING

Optimal standards[70]

Minimal standards[70]

From first CPET:
VT1 by VE/VO_2 slope
VT2 by VE/VCO_2 slope
Extrapolate to HR, W or time

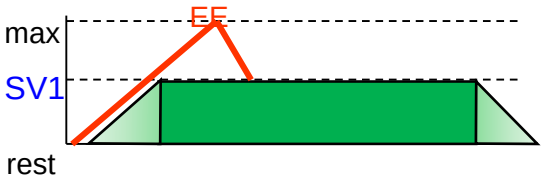
From first ergometry test:
W_{peak} and HR_{peak}
Extrapolate to $\%HR_{peak}$, $\%W_{peak}$ or time

Endurance

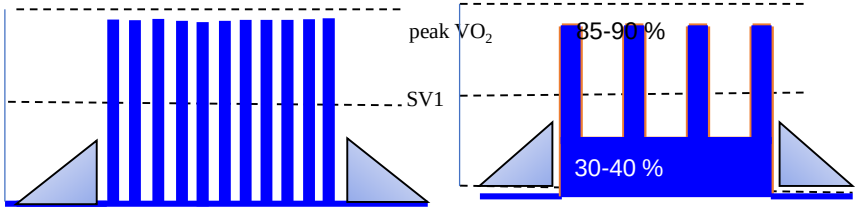
+ 10 % dépense énergétique

+ 1 ml/kg/min capacités effort

Continu

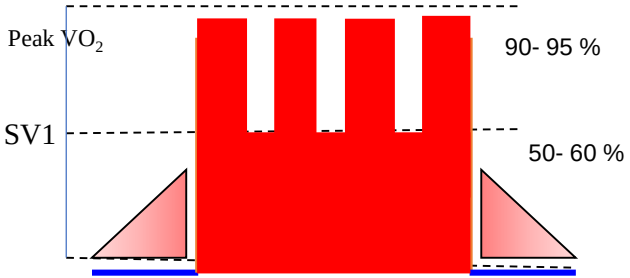


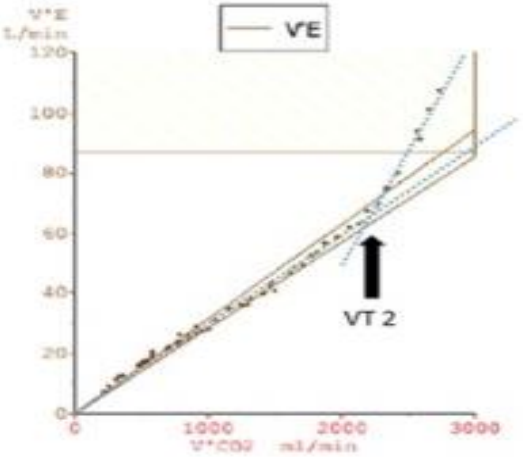
Interval

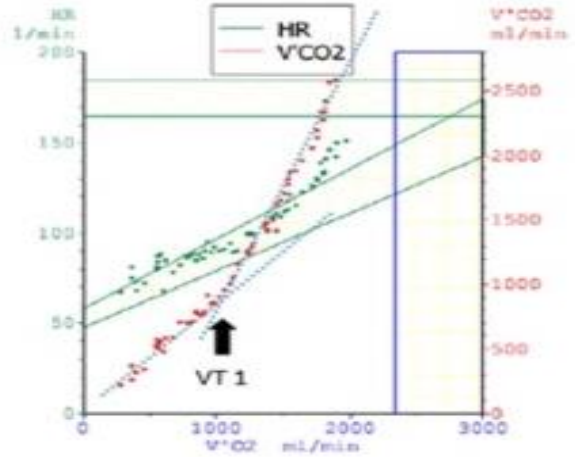


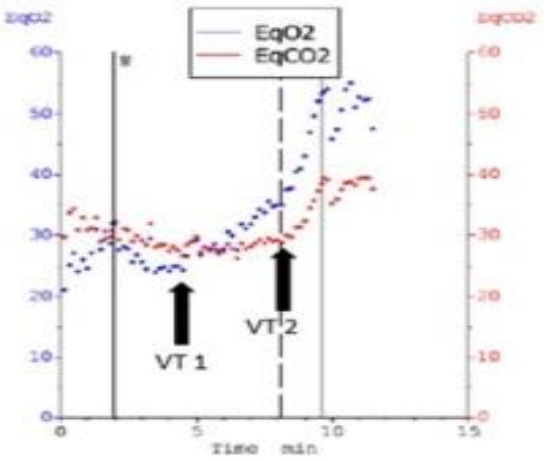
3 -6 js /semaine
Modéré à intense

HIIT




V'E
V'E
l/min
120
100
80
60
40
20
0
0
1000
2000
3000
V'CO2 ml/min
VT 2


HR
V'CO2
HR
1/min
200
150
100
50
0
V'CO2
ml/min
3500
3000
2500
2000
1500
1000
500
0
0
1000
2000
3000
V'CO2 ml/min
VT 1

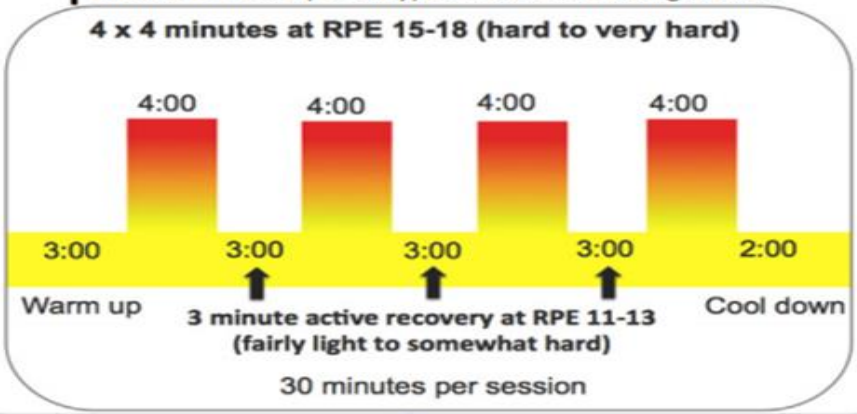

EqO2
EqCO2
EqO2
60
50
40
30
20
10
0
EqCO2
60
50
40
30
20
10
0
0
5
10
15
Time min
VT 1
VT 2

HIIT

STEP 1: **Measure or Estimate HRmax**
From maximal exercise test or prediction equation

STEP 2: **Calculate HR target zone**
Establish zone from 85 to 95% HRmax

STEP 3: **Validate HR target zone during exercise training**
Start 4-minute high intensity interval at RPE 15 (Hard)
Finish high intensity interval at RPE 17-18 (Very Hard)
Check HR throughout using HR monitor
For the first high intensity interval, allow the entire 4-minute period to reach the HR target zone.
For subsequent high intensity intervals (i.e. 2nd, 3rd, and 4th), allow 2-minutes (halfway) to reach the HR target zone.

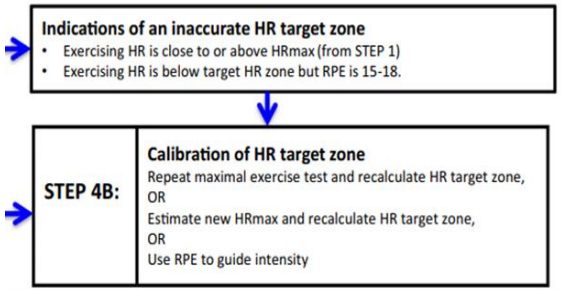


STEP 4A: **Validated HR target zone**
If HR remains in target HR zone during validation.
OR if there is an indication of inaccurate HR target zone arises, go to Step 4B.

Estimation FC max :
Sans β- : 211-(0,64 x age)
Avec β- : 164- (0,7 x age)

Début des 4 min a Borg 15 jusqu'à 17-18
Vérifier FC est dans zone désirée
Récupération à Borg 11-13
Pour suivants se donner 2 min pour atteindre la zone de FC

Taylor I. Prog Cardiovasc Diseas (2019) 62 140–146



Si FC inadaptée:

- FC proche de FC max
- FC en dessous de zone FC avec Borg > 15

Causes :

- EE n'atteint pas FC max
- Medicaments (β-)

Re-calibration de zone de FC éventuellement en refaisant EE
Ou travailler uniquement en Borg

Taylor I. Prog Cardiovasc Diseas (2019) 62 140–146

Benefits and Risks of High-Intensity Interval Training in Patients With Coronary Artery Disease

John C. Quindry, PhD[a,b,*], Barry A. Franklin, PhD[c,d], Matthew Chapman, MS[b], Reed Humphrey, PhD[e], and Susan Mathis, MS[b]

(Am J Cardiol 2019;123:1370–1377)

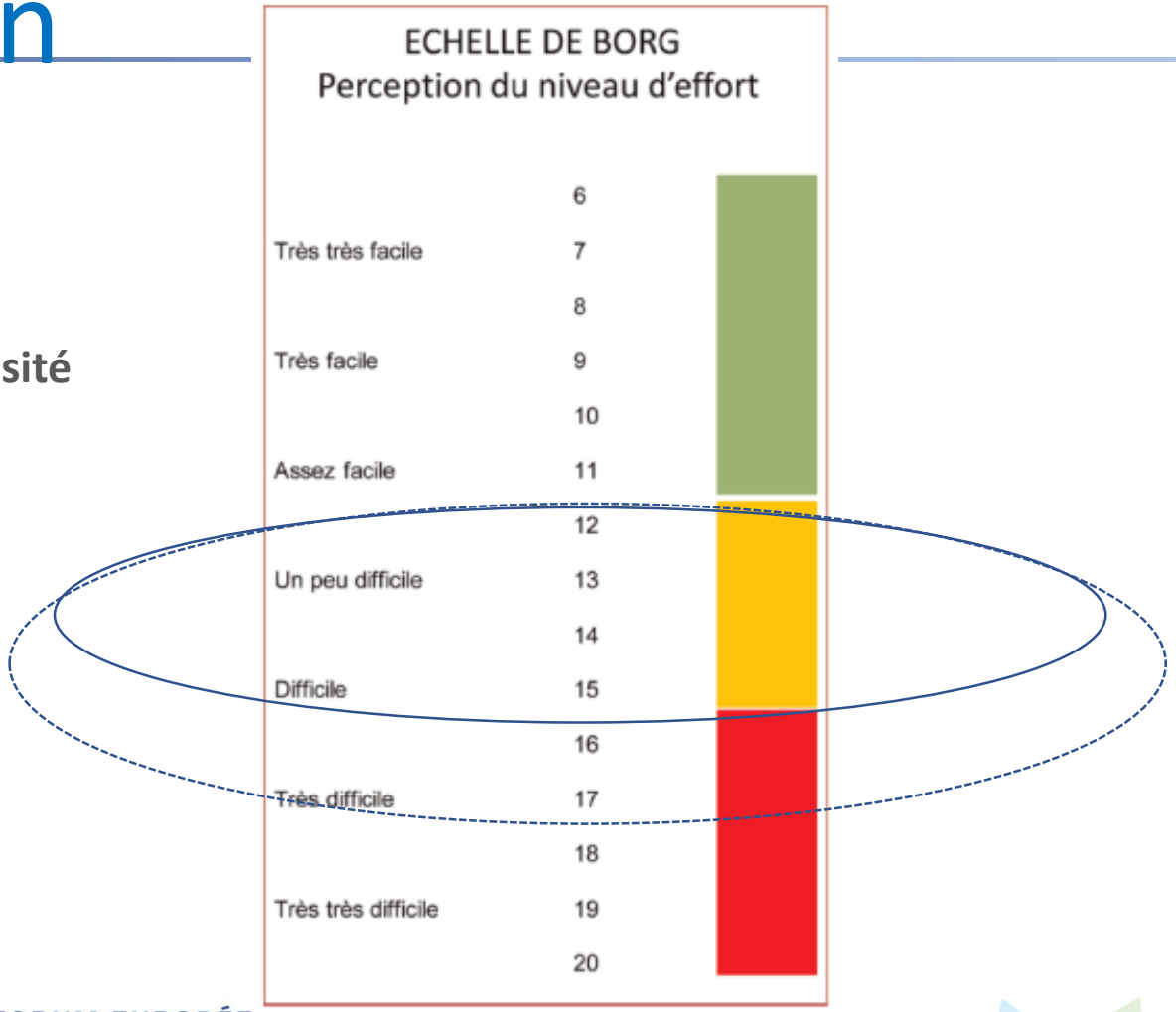
HIIT-MICT comparison for short-term rehabilitation outcomes		
HIIT = MICT	HIIT > MICT	HIIT < MICT
• Resting HR • Resting/Exercise BP • Body composition • Blood glucose control • Blood lipid modification	• **VO_2max** • **Sub-maximal exercise performance** • **Cardiac performance (possibly)**	• **Unsupervised exercise adherence**

- **Safety ?**

Le match continue …

Progression

Augmentation durée et intensité
5 à 10 %/ semaine

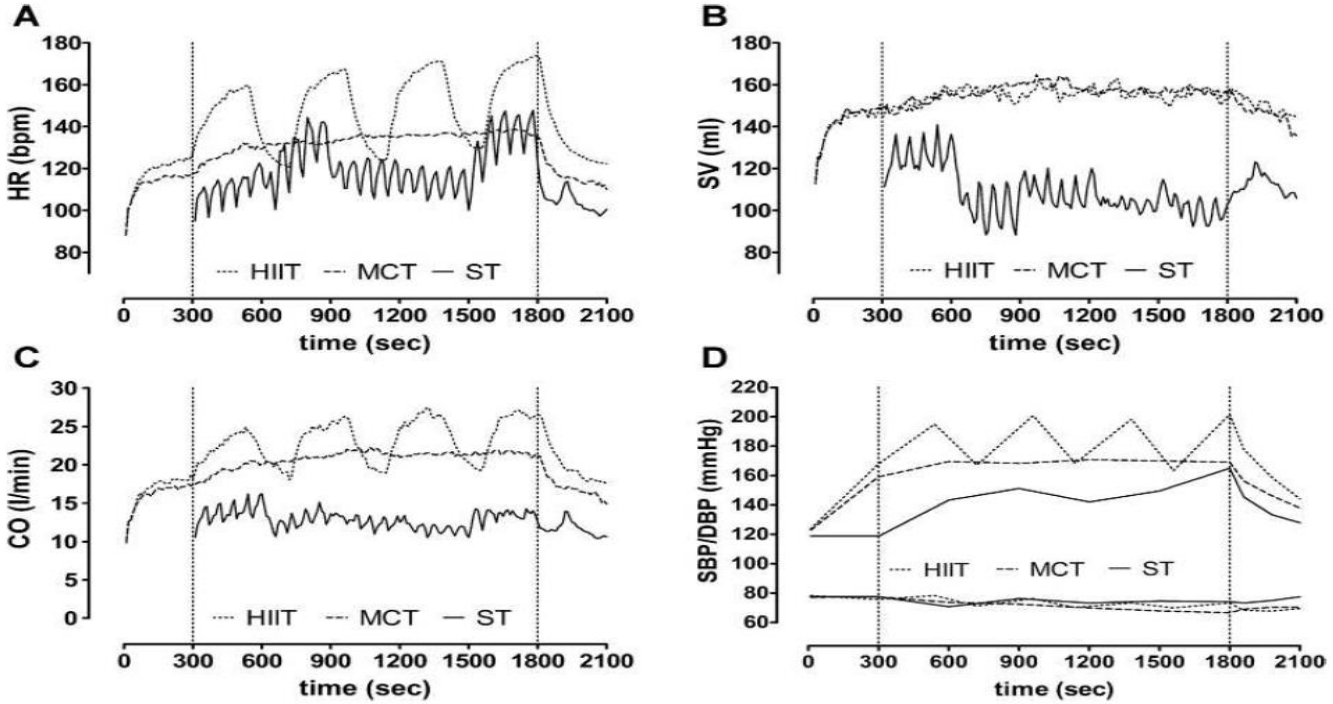


Take home messages
Intensités de entraînement aérobie doit optimiser la dépense énergétique (par intensité, durée)
Utilisation des seuils (VT et VT2) pour la détermination de l'intensité est préférable aux autres modalités
La sélection de l'intensité doit être décidée avec le patient après discussion et explications
L'echelle de Borg peut être utilisée en alternative et pour suivre l'entraînement
Progression : ajustement du temps d'exercice avant l'intensité, réévaluation des capacités pour ajuster l'entraînement

MCT, HIIT, Resistance ?

European Journal of Applied Physiology (2019) 119:1513–1523

24 young



Fréquence : 3/ semaine

Personnalisation

Intensité :

- 30 à 70 % 1-RM membres sup
- 40 à 80 % 1-RM membres inf

- 12 à 15 répétitions


STRENGTH TRAINING
Step 1
intensity at entry of CR (phase II)
From <10RM test of target muscles every few weeks:
Calculate desired load
Step 2
during subsequent exercise sessions
OMNI-RES guided by clinician/therapist
Step 3
tensity during progressive CR
From <10RM test of target muscles every few weeks, based on clinical decision:
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Shift to functional strength training
<10 RM testing not mandatory
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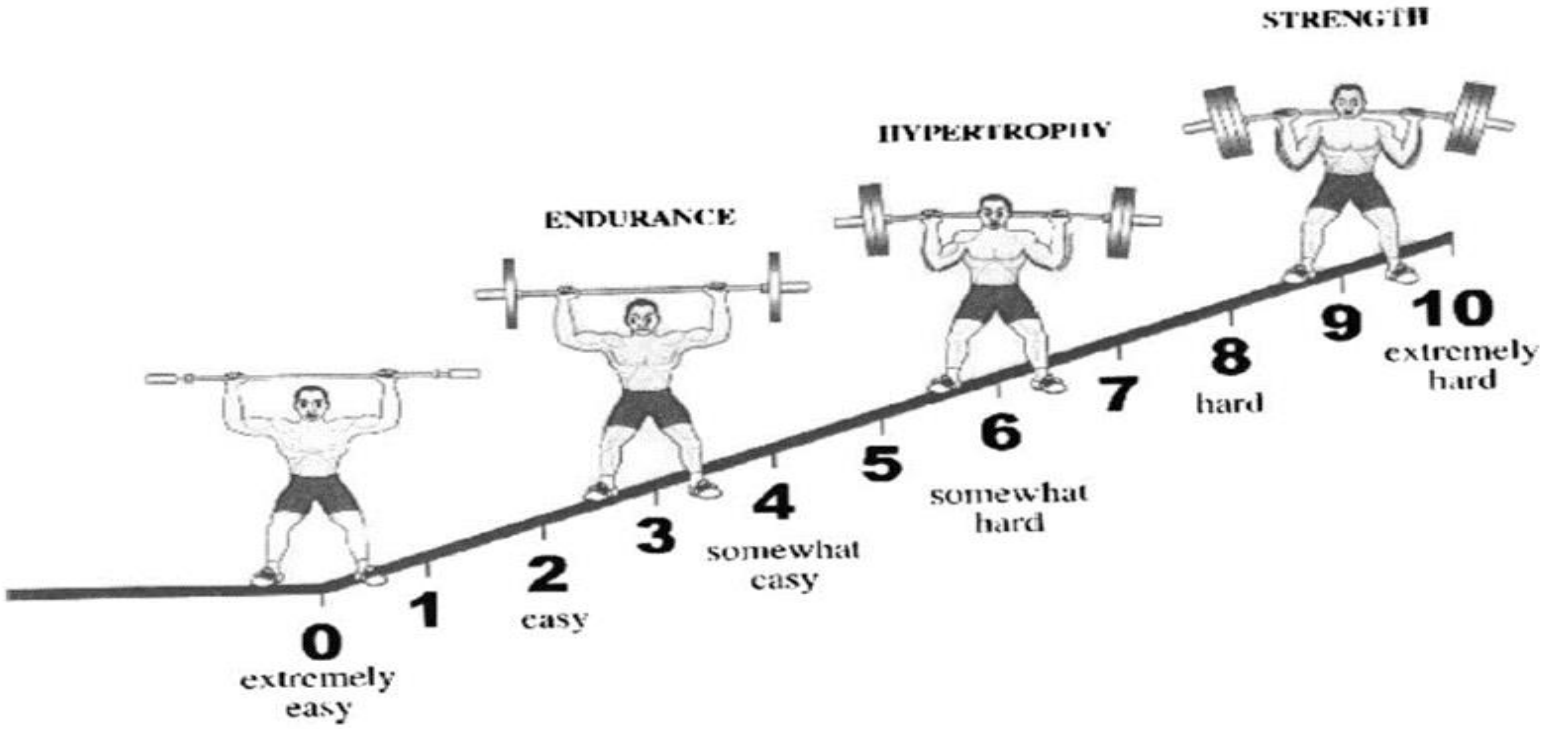
OMNI-RES by patient

OMNI-RES


STRENGTH
HYPERTROPHY
ENDURANCE
0
extremely easy
1
2
easy
3
4
somewhat easy
5
6
somewhat hard
7
8
hard
9
10
extremely hard

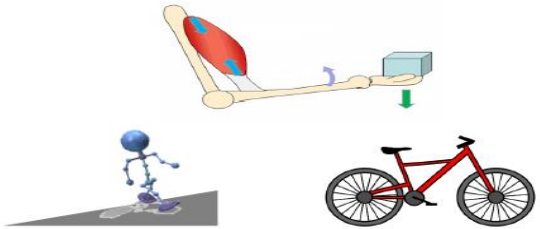
Progression

Résistance « basique »	Résistance « fonctionnelle »
Générique	Spécifique
Assis/ couché	Debout
Une articulation	Plusieurs articulations
Mouvement dans 1 dimension	Mouvements ds 3 dimensions
Mouvements lents	Mouvements rapides
Base stable	Base instable
Unilatéral	Bilatéral
Simultané	Alternant

Take home messages
Hautes intensités de la résistance dynamique > faibles intensités
Quand protocole de haute intensité en résistance est bien adapté celui-ci est tout aussi sûr qu'à faibles intensités
La sélection de l'intensité doit être décidée avec le patient après discussion et explications
La prescription doit être basée sur la détermination due la RM, et prescrite à <10 RM pour les charges initiales , OMNI-RES peut être utilisé pour suivre l'entraînement
Progression : n répétitions, intensité and temps de repos doivent être ajustés

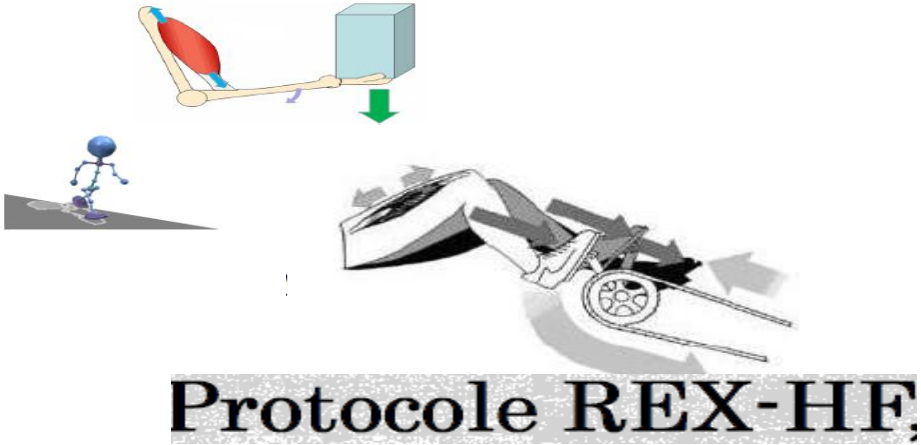
Excentrique ?

Concentrique



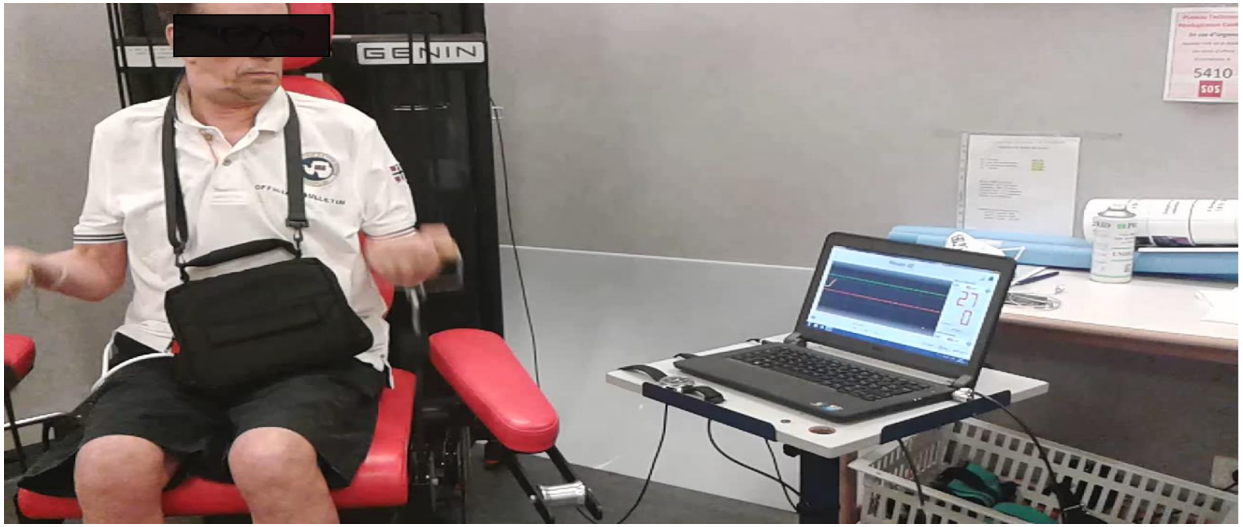
Excentrique

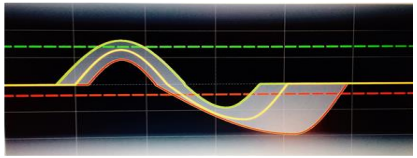
+ contraintes mécaniques et musculaires
- contraintes métaboliques et cardiorespiratoires

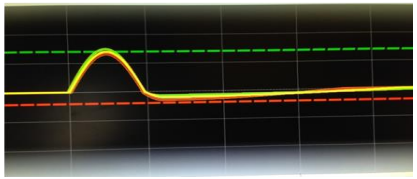


Protocole REX-HF

Résistance concentrique/ excentrique







Inspiratory muscle training

- **Comment?**

20-30 min/sess, 2-3/ week

Start at 30% PI max

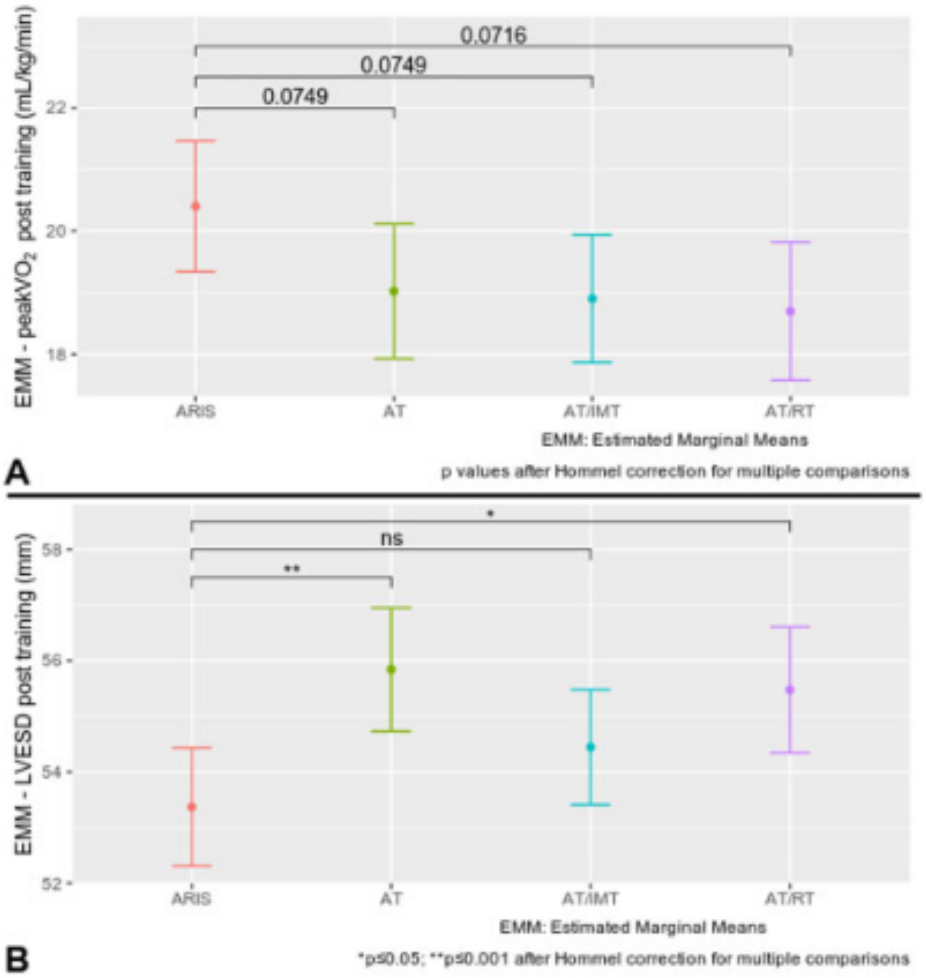
Readjust intensity every 7-10 days up to 60%

Threshold Inspiratory Muscle Trainer®, Power Breathe®, Trainair®

Combined aerobic/resistance/inspiratory muscle training as the 'optimum' exercise programme for patients with chronic heart failure: ARISTOS-HF randomized clinical trial

Ioannis D. Laoutaris[1]*, Ewa Piotrowicz[2], Manolis S. Kallistratos[3], Athanasios Dritsas[1], Niki Dimaki[3], Dimitris Miliopoulos[1], Maria Andriopoulou[3], Athanasios J. Manolis[3], Maurizio Volterrani[4], Massimo F. Piepoli[5], Andrew J.S. Coats[4], and Stamatis Adamopoulos[1]; ARISTOS-HF trial (Aerobic, Resistance, InSpiratory Training OutcomeS in Heart Failure) Investigators

- ARIS : 30 min AT + 10 min RT + 20 min IMT
- AT : 30 min AT + 30 min gym
- AT/IMT : 30 min AT +30 min IMT
- AT/RT : 30 min AT+ RT 30 min



ESC European Society of Cardiology
European Journal of Preventive Cardiology
doi:10.1093/eurjpc/zwaa091

Conclusions

La prescription de l'entraînement doit être adaptée et personnalisée à chaque patient

Progression de celui-ci est essentielle

Réévaluations régulières

Multimodale +++

Sert d'éducation au patient -> observance à long terme