KONJESTİF KALP YETMEZLİĞİNDE EGZERSİZ REÇETELENDİRMESİ

Arş.Gör Cihad ÖDEMİŞ

Danışman:Dr.Öğr.Üyesi İsmail OKUR

1)KONJESTİF KALP YETMEZLİĞİ PATOFİZYOLOJİSİ

2)EGZERSİZ REÇETELENDİRMEDE ÖNEMLİ OLAN PARAMETRELER

3)ÇALIŞMALAR

2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines

Paul A. Heidenreich, Biykem Bozkurt, David Aguilar, Larry A. Allen, Joni J. Byun, Monica M. Colvin, Anita Deswal, Mark H. Drazner, Shannon M. Dunlay, Linda R. Evers, James C. Fang, Savitri E. Fedson, Gregg C. Fonarow, Salim S. Hayek, Adrian F. Hernandez, Prateeti Khazanie, Michelle M. Kittleson, Christopher S. Lee, Mark S. Link, Carmelo A. Milano, ... See all authors

Originally published 1 Apr 2022 | https://doi.org/10.1161/CIR.0000000000001063 | Circulation. 2022;145:e895–e1032

2009	275 bin	2011	%3,6
		2014	%2,7
2014	310 bin		
		2016	sabit

2013-2017 arası hastaneye yatış artmıştır

PATOFİZYOLOJİ-Yapısal Kalp Yetmezliği

SOL KALP YETMEZLİĞİ

En yaygın

Akciğerlede sıvı birikimi

Ejaksiyon Fraksiyon azalmış

SAĞ KALP YETMEZLİĞİ

Alt eksremitelerde sıvı birikimi

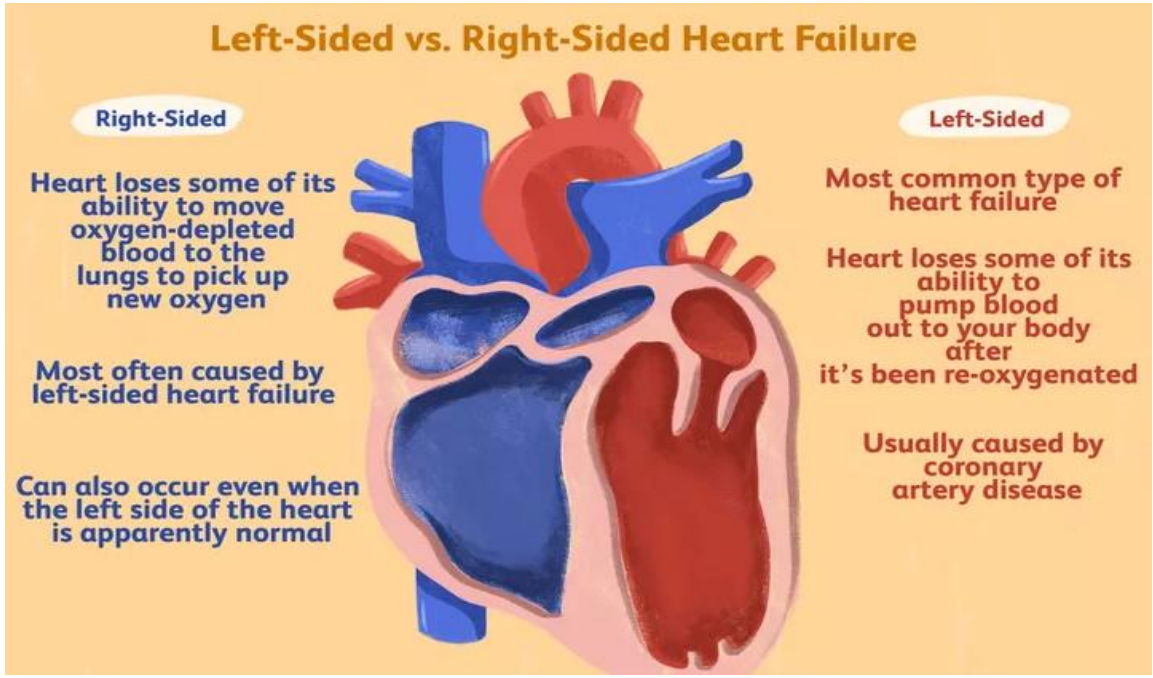
Ejaksiyon fraksiyon oranı korunmuş

NEDENLER

İskemik kalp hastalığı
Hipertansiyon
Kardiyomiyopati
Obezite
Kalp kapak hastalığı

SEMPTOMLAR

Nefes darlığı
Baş dönmesi
Vücutta yaygın ödem
Paroksimal nokturnal dispne
Yorgunluk



Physical Therapist Clinical Practice Guideline for the Management of Individuals With Heart Failure

FREE

Michael J Shoemaker ✉, Konrad J Dias, Kristin M Lefebvre, John D Heick, Sean M Collins

Physical Therapy, Volume 100, Issue 1, January 2020, Pages 14–43,
https://doi.org/10.1093/ptj/pzz127
Published: 23 January 2020 **Article history** ▾

Ejaksiyon-Fraksiyon

Kalp yetmezliğinde korunmuş Ejeksiyon-Fraksiyon (HFpEF)

Kalbin içine dolan kanı pompalama yüzdesi

EF> %50

%50-%80

Kalp yetmezliğinde azalmış Ejeksiyon-Fraksiyon (HFrEF)

EF< %40

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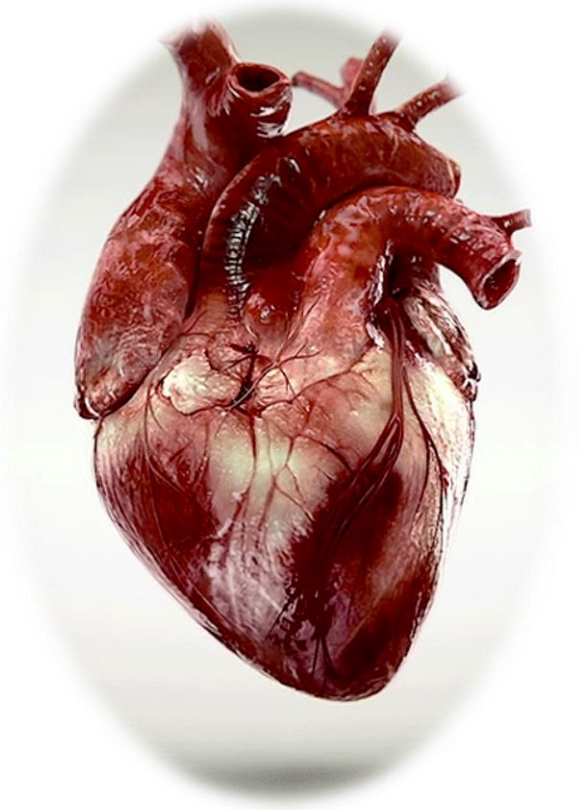
Physical Therapy, Volume 100, Issue 1, January 2020, Pages 14–43,
https://doi.org/10.1093/ptj/pzz127
Published: 23 January 2020 **Article history** ▾



PATOFİZYOLOJİ-Fonksiyonel Kalp Yetmezliği

Sistolik Kalp yetmezliği (HFrEF)

Miyokardiyal kontraktilite

Diastolik Kalp Yetmezliği (HFpEF)

Gevşeme fazı

StatPearls [Internet].
Show details
Treasure Island (FL): StatPearls Publishing; 2024 Jan-.
Search this book

İlerleyici

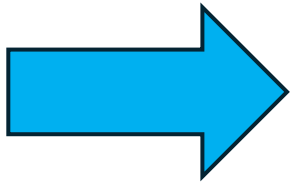
Congestive Heart Failure

Ahmad Malik; Daniel Brito; Sarosh Vaqar; Lovely Chhabra.
Author Information and Affiliations

Last Update: November 5, 2023.

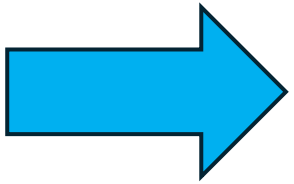
Kompansasyon

Kalp debisi ve sistemik talepler



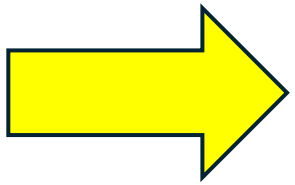
Beta-reseptör
Adrenalin deposu

Kronik sempatik sinir aktivasyonu



Renin-anjiyotensin

Kardiyak debinin düşmesi



Epinefrin,
Nöroepinefrin,
Endotelin-1
Vazopressin

JOURNAL ARTICLE

Physical Therapist Clinical Practice Guideline for the Management of Individuals With Heart Failure

FREE

Michael J Shoemaker ✉, Konrad J Dias, Kristin M Lefebvre, John D Heick, Sean M Collins

Physical Therapy, Volume 100, Issue 1, January 2020, Pages 14–43,
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Published: 23 January 2020 **Article history** ▾

Yapısal Değişiklik Başlangıcı

KONJESTİF KALP YETMEZLİĞİ SINIFLANDIRMASI

AHA/ACC Stage	Description	NYHA Class	Description
Stage A	At high risk for developing HF. No identified structural or functional abnormality, no signs or symptoms of HF.	N/A	
Stage B	Structural heart disease that is strongly associated with the development of HF but no signs and symptoms of HF.	I	No limitation in physical activity; ordinary physical activity does not cause fatigue, palpitations, or dyspnea.
Stage C	Symptomatic HF, associated with underlying structural heart disease.	I	No limitation in physical activity; ordinary physical activity does not cause fatigue, palpitations, or dyspnea.
		II	Slight limitation of physical activity; comfortable at rest but ordinary activity results in fatigue, palpitations, or dyspnea.
		III	Marked limitation of physical activity; comfortable at rest but less than ordinary activity results in fatigue, palpitations, or dyspnea.
		IV	Symptoms at rest; unable to do any physical activity without symptomology.
Stage D	Advanced structural disease with marked symptomology at rest despite maximal medical therapy.	IV	Symptoms at rest; unable to do any physical activity without symptomology.

KULLANILAN İLAÇLAR

Common Medications	Physiological Effect	Effect on Exercise
Antiarrhythmics	Improves contractility	No effects
β-blockers	Inhibit the sympathetic nervous system Reduce heart rate	Decreased submaximal and maximal blood pressure and heart rate Decreased maximal oxygen uptake in hypertension
Diuretics	Reduce blood volume	No effect on exercises unless dehydrated
Angiotension-converting enzyme (ACE) inhibitors	Suppress renin–angiotensin system Promote vasodilation	May decrease exercise submaximal and maximal heart rate, lower submaximal and maximal blood pressure
Calcium channel antagonists	Reduce blood pressure Promote vasodilation	Generally no effects May decrease blood flow to working muscles: lactate threshold and maximal heart rate
Aldosterone receptor blockers	Reduce blood pressure Promote vasodilation	No effect

Many medications may induce an unintended orthostatic hypotensive response. Individuals taking such medications should consult with their physician and take special precaution when changing body positions or exercise intensities.

Kalp hızı ve submaksimal ve maksimal kan basıncı

Maksimal oksijen alımı

Submaksimal ve maksimal kalp hızı ve kan basıncı

Kaslara kan akışı,maksimal kalp hızı

Exercise Training in Patients with Heart Failure: From Pathophysiology to Exercise Prescription

Gianluigi Cuomo[1], Anna Di Lorenzo[1], Anna Tramontano[1], Francesca Paola Iannone[1], Andrea D'Angelo[1], Rita Pezzella[1], Crescenzo Testa[1], Alessandro Parlato[1], Pasquale Merone[1], Mario Pacileo[2], Antonello D'Andrea[2], Giuseppe Cudemo[1], Elio
Gabriella Iannuzzo[4], Carlo Vigorito[1], Francesco Giallauria[1,*]

KALP YETMEZLİĞİNDE EGZERSİZİN ETKİLERİ

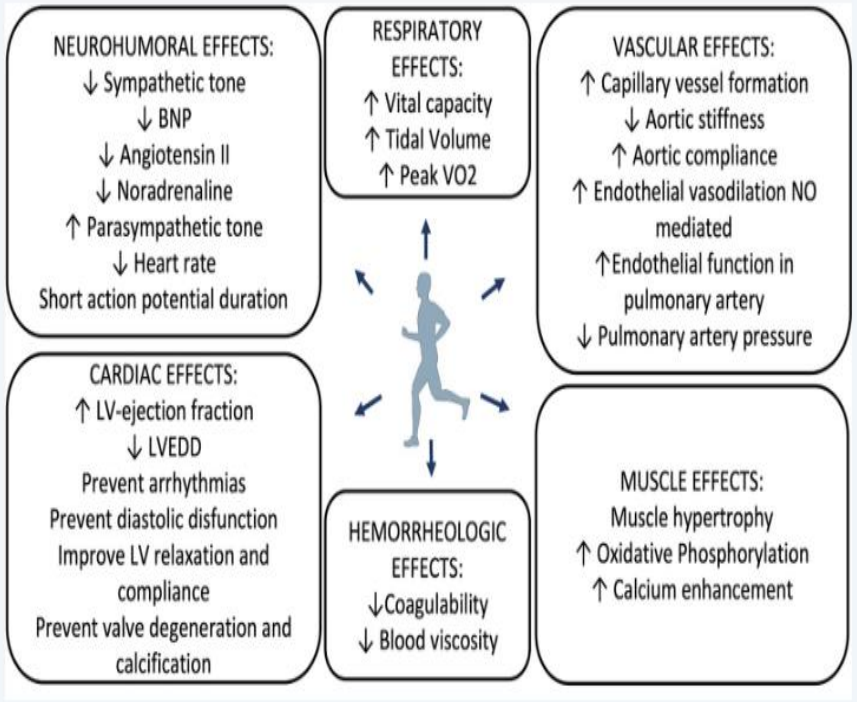


Fig. 1.

Effects of exercise training in Heart failure. BNP, brain natriuretic peptide; LV, left ventricular; LVEDD, left ventricular end diastolic diameter; NO, nitric oxide; peakVO2, peak oxygen consumption.

- ✓ Parasempatik tonus artışı
- ✓ Pik VO2 artışı
- ✓ Kas hipertrofisi
- ✓ Koagülasyon ve kan vizkosite azalışı
- ✓ Kapiller artış
- ✓ Pulmoner arter basıncının azalması

EGZERSİZ REÇETELENDİRMESİ İÇİN KULLANILAN DEĞERLENDİRME YÖNTEMLERİ

Kardiyopulmoner Egzersiz Testi (CPET)

Maksimal Aerobik Yoğunluk

6 dakika yürüme testi (6MWT)

Submaksimal Yoğunluk

Basamak Testi (ST)

Egzersiz Toleransı, Maksimal Egzersiz Kapasitesi

Alternatives to Aerobic Exercise Prescription in Patients with Chronic Heart Failure

Mayron F Oliveira[1], Gabriela Zanussi[1], Bianca Sprovieri[1], Denise M. L. Lobo[1], Luiz E Mastrocolla[2], Iracema I. K. Umeda[1], Priscila A Sperandio[1]

Setor de Reabilitação Cardiovascular - Equipe de Fisioterapia - Instituto Dante Pazzanese de Cardiologia[1]; Setor de Reabilitação Cardiovascular - Equipe Médica - Instituto Dante Pazzanese de Cardiologia[2] São Paulo, SP – Brazil

Table 2 – Cardiopulmonary Exercise Test (CPET), six-minute walk test (6MWT) and step test (ST)

Cardiopulmonary Exercise Test	
$\dot{V}O_2$ peak (mL.kg^{-1}.min^{-1})	15.2 ± 3.1
$\dot{V}O_2$ peak (% predicted)	28.9 ± 5.0
RER	1.12 ± 0.09
$\dot{V}E/\dot{V}CO_2$ Slope	37.7 ± 7.9
O_2 uptake efficiency slope	1204.5 ± 25.9
O_2 Pulse (mL/bpm)	10.2 ± 2.6
Rest HR (bpm)	68 ± 11
HR_{AT} (bpm)	92 ± 14
HR_{AT} (% predicted)	55 ± 13
HR_P (bpm)	113 ± 19
HR_P (% predicted)	70 ± 16
Borg dyspnea	7 ± 2
Six-minute walk test	
6MWT (m)	456 ± 83
HR_{6MWT} (bpm)	94 ± 13
HR_{6MWT} (% predicted)	58 ± 10
SBP_{6MWT} (mmHg)	121 ± 18
$SpO_{2\ 6MWT}$ (%)	96 ± 2
Borg dyspnea	3 ± 1
Step test	
Steps (number of steps)	92 ± 20
HR_{ST} (bpm)	110 ± 17
HR_{ST} (% predicted)	67 ± 19
SBP_{ST} (mmHg)	120 ± 23
$SpO_{2\ ST}$ (%)	96 ± 1
Borg dyspnea	6 ± 2

$\dot{V}O_2$: oxygen uptake; mL: milliliter; kg: Kilogram; min: minute; RER: respiratory exchange ratio; $\dot{V}E$: minute ventilation; $\dot{V}CO_2$: carbon dioxide output; O_2: oxygen; bpm: beats per minute; HR: heart rate; AT: anaerobic threshold; P: peak; m: meters; mmHg: millimeters of Hg; SBP: systolic blood pressure; SpO_2: oxyhemoglobin saturation. Values are expressed as mean ± standard deviation.

EGZERSİZ TESTİNİN YAPILAMADIĞI DURUMLARDA REÇETELENDİRME

BAŞLANGIÇ	11-13 RPE	12-14 RPE
SÜRE	30 dk	
YOĞUNLUK	3-7 MET saat/hafta	

J Cardiovasc Dev Dis. 2020 Jun; 7(2): 15.
Published online 2020 Apr 27. doi: 10.3390/jcdd7020015
PMCID: PMC7344739
PMID: 32349219

Exercise Prescription Guidelines for Cardiovascular Disease Patients in the Absence of a Baseline Stress Test

Megan Mytinger, Rachael K. Nelson, and Micah Zuhl*

▸ Author information ▸ Article notes ▸ Copyright and License information PMC Disclaimer

Exercise training in heart failure: from theory to practice. A consensus document of the Heart Failure Association and the European Association for Cardiovascular Prevention and Rehabilitation

Massimo F. Piepoli, Viviane Conraads, Ugo Corrà, Kenneth Dickstein, Darrel P. Francis, Tiny Jaarsma, John McMurray, Burkert Pieske, Ewa Piotrowicz, Jean-Paul Schmid, Stefan D. Anker ... See all authors

First published: 18 February 2014 | https://doi.org/10.1093/eurjhf/hfr017 | Citations: 507

Devamlı Aerobik Egzersiz

Haftada 3-5 kez
20-60 dk
Tolerans

Bisiklet, koşu bandı

Düşük Yoğunlukda
Haftada 2 kez
5-10 dakika

Exercise Training in Patients with Heart Failure: From Pathophysiology to Exercise Prescription

Gianluigi Cuomo[1], Anna Di Lorenzo[1], Anna Tramontano[1], Francesca Paola Iannone[1], Andrea D'Angelo[1], Rita Pezzella[1], Crescenzo Testa[1], Alessandro Parlato[1], Pasquale Merone[1], Mario Pacileo[2], Antonello D'Andrea[2], Giuseppe Cudemo[1], Elio Venturini[3] Gabriella Iannuzzo[4], Carlo Vigorito[1], Francesco Giallauria[1,*]

Aralıklı Egzersiz

HIIT

%90-95 maksimal enerji kapasitesi 3 veya 4 tekrar
4 dakika

3 dakika düşük yüklenmeli dinlenme

Isınma ve soğuma

LIT

30 sn %50
60 sn dinlenme
15 dk

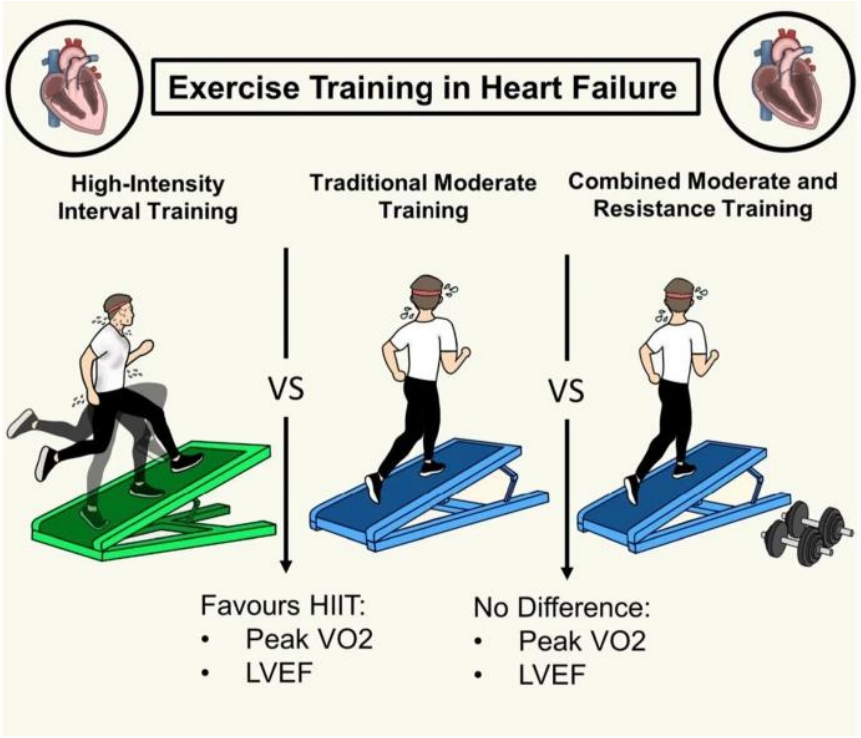
Yoğunluk için hasta toleransı

Exercise Mode in Heart Failure: A Systematic Review and Meta-Analysis

Jamie Edwards, Nesan Shanmugam, Robin Ray, Fadi Jouhra, Jennifer Mancio, Jonathan Wiles, Anna Marciniak, Rajan Sharma & Jamie O'Driscoll

Sports Medicine - Open **9**, Article number: 3 (2023) | Cite this article

13 çalışmada HIIT vs MIT



4 çalışmada MIT vs CT(sürekli aerobik egzersiz

Study	Groups	Design	Country	Exercise training mode	Exercise intensity	Exercise frequency (days p/w)	Intervention duration (weeks)	Adverse events
Iellamo et al. [28]	MIT	RCT	Italy	Aerobic (uphill treadmill walking)	45–60% HRR (30–45 min)	2–5	12	0
	HIIT	RCT	Italy	Aerobic (uphill treadmill walking)	75–80% HRR (4 × 4 min intervals, by 2–4 times)	2–5	12	0
Ellingsen et al. [22]	MIT	RCT	Norway (9 centres)	MIT (treadmill or cycling)	60–70% MHR (47 min)	3	12	NR
	HIIT	RCT	Norway (9 centres)	HIIT (treadmill or cycling)	90–95% MHR (4 × 4 min) 38 min session	3	12	NR
Iellamo et al. [29]	MIT	RCT	Italy	Aerobic (uphill treadmill walking)	45–60% HRR (30–45 min)	3	12	0
	HIIT	RCT	Italy	Aerobic (uphill treadmill walking)	75–80% HRR (4 × 4 min intervals, by 2–4 times)	3	12	0
Besnier et al. [30]	MIT	RCT	France	MIT (cycling)	60% peak power output (30 min)	5	3.5	0
	HIIT	RCT	France	HIIT (cycling)	100% peak power output (Two 8-min blocks of 30 s max output and 30 s active rest)	5	3.5	0
Koufaki et al. [31]	MIT	RCT	UK	MIT (cycling)	40–60% peak VO_2 (21–40 min)	3	24	1 (anxiety attack)
	HIIT	RCT	UK	HIIT (cycling)	100% peak power output (2 × 15 min bouts of 30 s max output with 1 min active rest between)	3	24	1 (syncope)
Wisløff et al. [32]	MIT	RCT	Norway	moderate continuous—uphill walking	70–75% peak HR	3	12	0
	HIIT	RCT	Norway	Aerobic interval training—uphill walking (4 × 4-min intervals)	90–95% peak HR	3	12	0
Dimopoulos et al. [33]	MIT	RCT	Greece	MIT (cycling)	50% WR peak (40 min)	3	12	NR
	HIIT	RCT	Greece	HIIT (cycling)	100% WR peak (30 s intervals and 30s rest for 40 min)	3	12	NR
Freyssin et al. [34]	MIT	RCT	France	MIT (cycling and treadmill)	HR corresponding VT1 (45 min)	5	8	0
	HIIT	RCT	France	AIT (cycling)	50% steep ramp test (30 s intervals for 40 min)	5	8	0
Fu et al. [35]	MIT	RCT	Taiwan	MIT (cycling)	60% HRR/VO_2 peak	3	12	NR
	HIIT	RCT	Taiwan	HIIT (cycling)	80% HRR/VO_2 peak	3	12	NR
Ulbrich et al. [36]	MIT	RCT	Brazil	MIT (uphill walking)	75% peak HR	3	12	0
	HIIT	RCT	Brazil	HIIT (uphill walking)	95% peak HR (3 min intervals with 3 min active recovery, 4–6 times)	3	12	0
Donelli da Silveira et al. [37]	MIT	RCT	Brazil	MIT (treadmill)	50–60% peak VO_2	3	12	0
	HIIT	RCT	Brazil	HIIT (treadmill)	80–90% peak VO_2	3	12	0
Angadi et al. [38]	MIT	RCT	USA	MIT (treadmill)	60–70% peak HR	3	4	0
	HIIT	RCT	USA	HIIT (treadmill)	80–85% peak HR	3	4	0
Mueller et al. [23]	MIT	RCT	Germany	HIIT (cycling)	80–90% HRR	5	12	NR
	HIIT	RCT	Germany	Aerobic (cycling)	35–50% HRR	3	12	NR

HIIT, High-intensity interval training; MIT, moderate intensity training; RCT, randomised controlled trial; MHR, maximal heart rate; HRR, heart rate reserve; WR, work rate; VO_2, volume oxygen

HIIT vs MIT

HIIT

Journal of Arrhythmia
Open Access

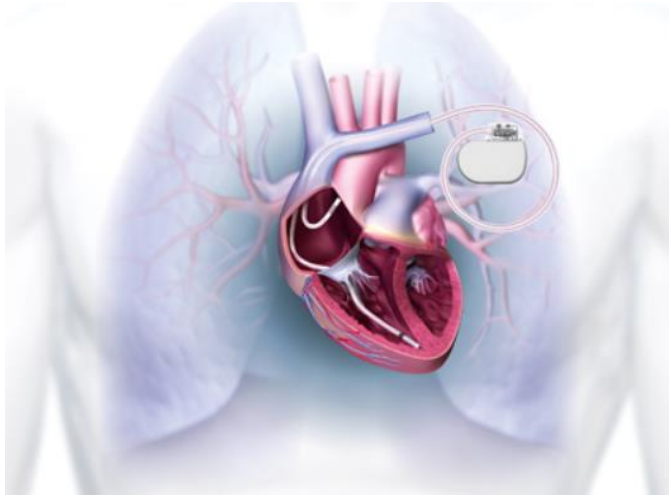
CLINICAL REVIEW | Open Access

Aerobic exercise prescription in heart failure patients with cardiac resynchronization therapy

Deddy Tedjasukmana, Kevin Triangto, Basuni Radi

First published: 09 December 2020 | https://doi.org/10.1002/joa3.12475 | Citations: 2

Ventriküller arası senkronizasyon



Modified Bulke

Naughton

Bruce

Chronotropic Assessment Exercise Protocol (CAEP)

TABLE 3. Suggested exercise protocol in CRT patients

	CRT exercise protocol
Frequency	• 3-5 days/week • 30-50 minutes/session
Intensity	• 80% of Heart Rate Reserve • Maximal intensity in Borg scale of 14 of 20 • 10-20 beats below shock threshold for CRT-D
Type	• 5- to 10-minute warm-up stretches (lower extremities) • 20- to 30-minute aerobic ergocycle • 5- to 10-minute cooling down
Time	After 1 month medically stable preceding the implantation of CRT
CRT mode	Rate adaptive pacing mode

Dirençli Egzersiz

Ventriküler yüklenme ve remodeling üzerinde negatif etkiye sahip

Aerobik dayanaklılık ve aralıklı egzersizlere ilavaten

VO_2 max, vasküler akış

Exercise Prescription in Cardiac Rehabilitation

A Practical Approach to Early Mobilization and Exercise Training

Editors

Adam Staron
Jadwiga Wolszakiewicz
Meteb AlSulaimi

A resistance training circuit should include [12,83]:

- Chest press;
- Shoulder press;
- Triceps extension;
- Biceps curl;
- Pull-down (upper back);
- Lower back extension;
- Abdominal crunch;
- Quadriceps extension or leg press;
- Calf raise.

Figure 11. Pull-down (upper back). Source: Photos by authors.

(A)

3 ay içerisinde kardiyak ameliyat geçiren kalp yetmezliği hastalarında omuz üstü el hareketleri tavsiye edilmemektedir

Exercise Prescription in Cardiac Rehabilitation

A Practical Approach to Early Mobilization and Exercise Training

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Table 35. ACSM resistance training recommendations.

Frequency	2–3 days/week
Intensity	60%–70% of 1-RM (moderate to vigorous intensity) for beginners to improve strength; 40%–50% (very light to light intensity) of 1-RM for older patients beginning exercise to improve strength, as well as for sedentary individuals beginning a resistance program; <50% (light to moderate intensity) of 1-RM to improve muscular endurance; 20%–50% of 1-RM in older adults to improve power
Time	Not specified for effectiveness
Type	Involving each major muscle group Targeting agonists and antagonists
Repetitions	8–12 to improve strength 10–15 to improve strength in older patients 15–20 to improve muscular endurance
Sets	2–4 for most adults 1 set can be effective for older patients
Pattern	Rest of 2–3 min between each set of repetitions Rest > 48 h between sessions
Progression	Gradual (greater resistance or more repetitions or increasing frequency)

Abbreviations: ACSM—American College of Sports Medicine; 1-RM—one repetition maximum. Source: Adapted from [12].

General rules for resistance training performance include [88]:

- Lifting weights in a rhythmic manner through a full range of motion;
- Lifting load at a moderate to low speed;
- Alternating between upper and lower body exercises;
- The use of a proper posture;
- Avoidance of gripping weights and holding breath (exhaling during exertion and inhaling during the relaxation phase is recommended);
- Training opposite muscles.

Valsalva manevrası

Artan venöz dönüş

Kontrolsüz kan basınç artışı

İnspiratuvar Kas Eğitimi

%30 MIP

%60 MIP

20 dk
3-5 gün/hafta
8 hafta

VO2peak
MIP
QoL

THRESOLD IMT

Aerobik Egzersiz+İnspiratuvar Kas Eğitimi

C-Reactive protein, NT-proBNP

PowerBREATHE

Combined aerobic/inspiratory muscle training vs. aerobic training in patients with chronic heart failure

The Vent-HeFT trial: a European prospective multicentre randomized trial

Stamatis Adamopoulos, Jean-Paul Schmid, Paul Dendale, Daniel Poerschke, Dominique Hansen, Athanasios Dritsas, Alexandros Kouloubinis, Toon Alders, Aggeliki Gkouziouta ... See all authors

First published: 14 March 2014 | https://doi.org/10.1002/ejhf.70 | Citations: 80

SYSTEMATIC REVIEW

Impact of inspiratory muscle training on respiratory muscle function and functional capacity in patients with heart failure: a scoping review

Article Summary

DOI: 10.24969/hvt.2024.451 CARDIOVASCULAR DISEASES
Published: 03/01/2024 Received: 28/02/2023 Revised: 24/11/2023 Accepted: 25/11/2023
Views: 477 Downloads: 318
Keywords: heart failure, inspiratory muscle training, respiratory metaborreflex, functional capacity

İnspiratuvar Kas Eğitimi (IMT)

İnspiratuvar Kas Dayanıklılığı (SPımax)

İnspiratuvar Kas Gücü (Pımax)

EGZERSİZ REÇETESİNDE DİKKAT EDİLECEK HUSUSLAR

Aerobik kapasite,kardiyak output	3,5 → 5 MET	8-10 MET	1 MET=3,5 ml/kg/dak

Zayıf dolaşım (azalmış kardiyak debi artmış vazokonsriksiyon)	→	yorgunluk ve nefes darlığı

Anaerobik metobolizma	erken laktat oluşumu ve yorgunluk

SPECIAL POPULATIONS

Home-Based Exercise Prescription for Congestive Heart Failure

Langford, Emily BS; Burnham, Alyssa BS; Thompson, Krystopher BS, CSCS, NSCA-CPT; Cook, Jordan BS, ATC, CSCS; Ryan, Greg A. PhD, CSCS*D

Editor(s): Ronai, Peter MS, RCEP, CSCS, NSCA-CPT, FACSM

Author Information

JOURNAL ARTICLE

Physical Therapist Clinical Practice Guideline for the Management of Individuals With Heart Failure

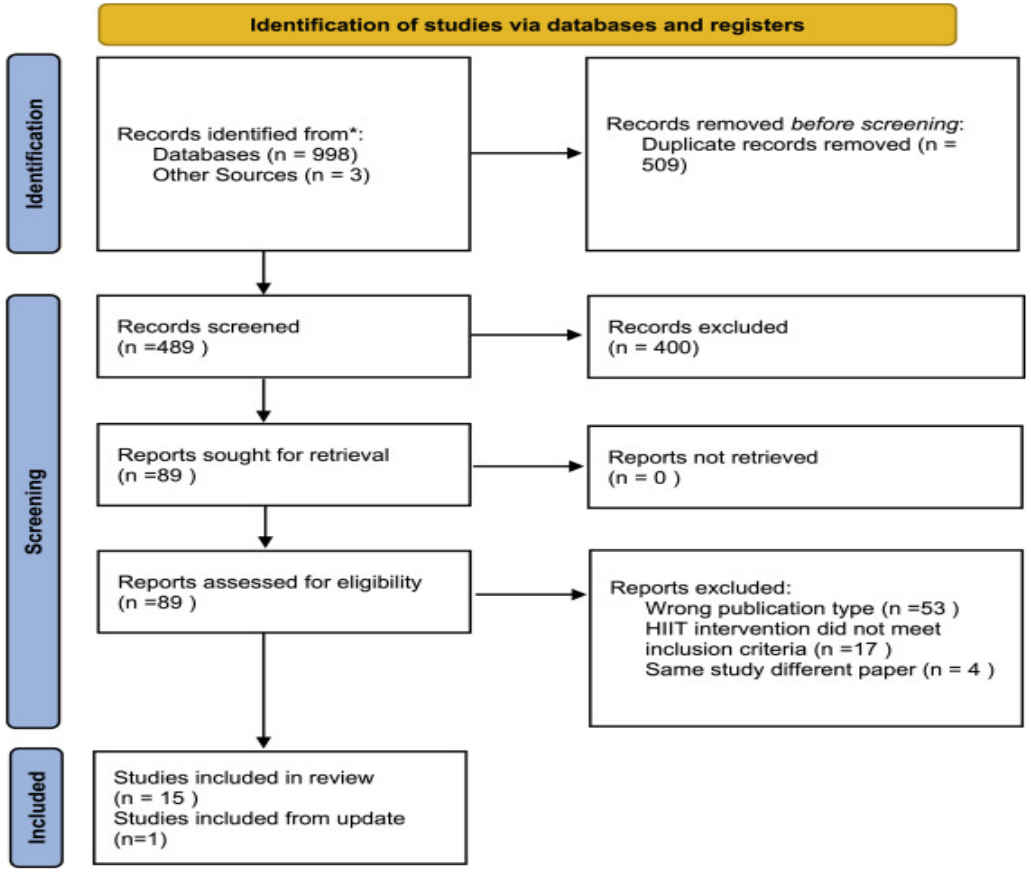
FREE

Michael J Shoemaker ✉, Konrad J Dias, Kristin M Lefebvre, John D Heick, Sean M Collins

Physical Therapy, Volume 100, Issue 1, January 2020, Pages 14–43,
https://doi.org/10.1093/ptj/pzz127
Published: 23 January 2020 **Article history** ▾

Table 2 Definitions of Zone Colors Associated With Clinical Manifestations and Physical Therapist Recommendations[a]

Zone Color	Signs and Symptoms	Physical Therapist Recommendations
Green zone	• No shortness of breath • No swelling • No weight gain • No chest pain • No decrease in your ability to maintain your activity level	Continue activity and therapy as tolerated.
Yellow zone	• Weight gain of 2–3 lbs in 24 hrs • Increased cough • Peripheral edema: increased distal extremity swelling • Increase in shortness of breath with activity • Orthopnea: increase in the number of pillows needed	Symptoms may indicate an adjustment in medications and therefore warrants communication with the physician.
Red zone	• Shortness of breath at rest • Unrelieved chest pain • Wheezing or chest tightness at rest • Paroxysmal nocturnal dyspnea: requiring to sit in chair to sleep • Weight gain or loss of more than 5 lbs in 3 days • Confusion	Symptoms indicate overt decompensation and an immediate visit to the emergency department or physician office.



7 çalışma HIIT vs UC

9 çalışma HIIT vs MCT

Physiological and psychological outcomes of high intensity interval training in patients with heart failure compared to moderate continuous training and usual care: A systematic review with meta analysis

Kara Callum (Cardiac Physiologist) [a c], Paul Swinton [b], Trish Gorely [c], Daniel Crabtree [f], Stephen Leslie [e d]

HIIT >MCT

VO2 peak, LVEF,

European Journal of
Heart Failure

Position paper | Open Access

Self-care of heart failure patients: practical management recommendations from the Heart Failure Association of the European Society of Cardiology

Tiny Jaarsma, Loreena Hill, Antoni Bayes-Genis, Hans-Peter Brunner La Rocca, Teresa Castiello, Jelena Čelutkienė, Elena Marques-Sule, Carla M. Plymen, Susan E. Piper ... See all authors

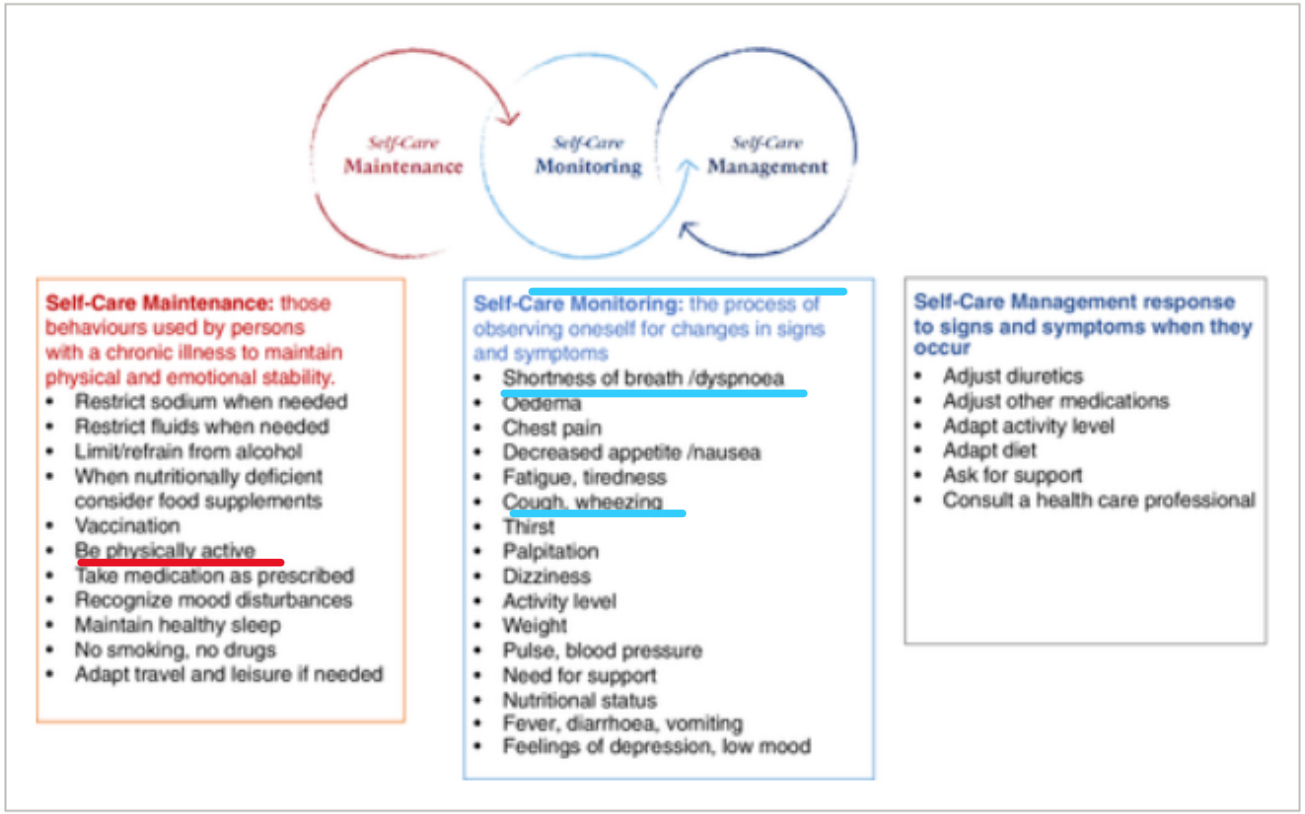
First published: 18 September 2020 | https://doi.org/10.1002/ejhf.2008 | Citations: 181

Özbakım hakkında kalp yetmezliği hastaları için danışmanlık egzersiz reçetelendirmesi dışında gerekli bir durumdur

Optimize exercise tolerance and resume sexual activity

Current guidelines and evidence

- Exercise training may improve functional capacity, quality of life and reduce hospitalization.[36]
- Guidelines recommend regular physical activity and/or exercise training, and specify that these are effective and safe in patients with HF.[14, 25, 37]
- Extreme athleticism is associated with several distinct adverse HF phenotypes, although direct causality is not established.[38]
- Sexual activity can be resumed for patients in NYHA class I or II and for patients who are in NYHA class III or IV if their condition is stable and optimally managed.[39]



Exercise Training in Patients with Heart Failure: From Pathophysiology to Exercise Prescription

Gianluigi Cuomo[1], Anna Di Lorenzo[1], Anna Tramontano[1], Francesca Paola Iannone[1], Andrea D'Angelo[1], Rita Pezzella[1], Crescenzo Testa[1], Alessandro Parlato[1], Pasquale Merone[1], Mario Pacileo[2], Antonello D'Andrea[2], Giuseppe Cudemo[1], Elio Venturini[3], Gabriella Iannuzzo[4], Carlo Vigorito[1], Francesco Giallauria[1,*]

Table 1. Key elements for exercise training modalities.

	Starting protocol	Progression scheme	Main Effects
Moderate continuous training	10–15 minutes. Intensity: 40–50% of VO_{2peak}.	30 minutes. Intensity: >60–70% of VO_{2peak}.	Improve exercise tolerance, 6MWD, VO_{2peak}, VE/VCO_2; Improve cardiac output and diastolic function.
Interval training	High intensity: 4 minutes bouts at 90% of maximal exercise capacity, interspersed with 3 minutes recovery period. 5–10 minutes of warm–up and cool–down phases. Exercise duration: 35–45 minutes. Low intensity: Bout of 10 seconds and recovery period of 80 seconds. Exercise duration: 5–10 minutes.	Increase bouts intensity. Bout of 30 seconds and recovery period of 60 seconds. Exercise duration: 30 minutes.	Improve exercise tolerance, 6MWD, VO_{2peak}; Improve resting LVEF, LVEDD.
Strength training	5–10 repetitions. 1–3 circuit each session. 2–3 sessions/week. Intensity: <30%. 1-RM or Borg scale <12.	15–25 repetitions. 1 circuit each session. 2–3 sessions/week. Intensity: 30–50%. 1-RM or Borg scale 12–15.	Improve muscle mass; improve intramuscular co-ordination; increase resting LVEF.
Inspiratory muscle training	Use of threshold device at 20–30% of MIP for 15–30 minutes/day. 5–6 days/week.	Readjust weekly. It is possible practice 2 session daily, 30 minutes each session, 7 days/week.	Improve respiratory muscle strength and endurance, 6MWD, VO_{2peak}.
Functional electrical stimulation	10 Hz frequency. 20 second stimulation-20 second rest. 60 minutes/day. 7 days/week.		Improve 6MWD, exercise duration, VO_{2peak}.

1-RM, 1 repetition maximum; 6MWD, 6-Minute walking distance; LVEDD, left ventricular end diastolic diameter; LVEF, left ventricular ejection fraction; MIP, maximal inspiratory pressure; VO_{2peak}, peak oxygen consumption; VE/VCO_2, minute ventilation/carbon dioxide production.

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Standardised Exercise Prescription for Patients with Chronic Coronary Syndrome and/or Heart Failure: A Consensus Statement from the EXPERT Working Group

CONSENSUS STATEMENT | Published: 30 August 2023
Volume 53, pages 2013–2037, (2023) Cite this article

Dayanıklılık+Dirençli Egzersiz+İnspiratuvar Kas Eğitimi

Table 2 Summarised exercise prescription recommendations for each disease separately

From: Standardised Exercise Prescription for Patients with Chronic Coronary Syndrome and/or Heart Failure: A Consensus Statement from the EXPERT Working Group

Indication	Exercise prescription
CCS	Initial stage (for up to maximally 2 weeks): endurance exercise can start at a low to moderate intensity, but gradually increase up to 20 min, and exercise 3–5 days per week. Resistance exercise intensity should be set at < 30% of one repetition maximum (1-RM) [RPE Borg ≤ 11], for 5–10 repetitions per muscle group (1–3 sets per unit), at a frequency of 2–3 training units per week Improvement stage (from 2 up to 12 weeks): exercise sessions up to 30–45 min at moderate intensity for endurance exercise are advised, at a frequency of ≥ 5 days per week. In some patients high-intensity interval training (HIIT) can be offered as an alternative. In the first improvement stage, resistance exercise intensity should be set at 30–50% 1-RM, for 10–15 repetitions per muscle group (1–3 sets per unit), at a frequency of 2–3 training units per week. In the second improvement stage, resistance exercise intensity should be set at 40–60% 1-RM, for 10–15 repetitions per muscle group (1–3 sets per unit), at a frequency of 2–3 training units per week. In the third improvement stage resistance exercise intensity should be set at 60–80% 1-RM, for 8–10 repetitions per muscle group (1–3 sets per unit), at a frequency of 2–3 training units per week Maintenance stage (after 8–10 weeks of CR): exercise sessions of 20–45 min or even up to 60 min are advised, and daily exercise should be promoted. A minimal programme duration of 12 weeks should be achieved, although a permanent increment in physical activity is recommended. Resistance training should be continued as completed in the improvement stage
CHF	A combination of endurance exercise, resistance exercise, and inspiratory muscle training is advised For endurance exercise: the session duration should be progressed according to patients' tolerance, trying to reach at least a 30-min session duration, and being deployed 3–5 days per week. Moderate intensities are advised, but in patients with physical deconditioning, a lower exercise intensity can be selected in the first weeks of CR. A lifestyle approach by including common activities into the daily routine also is recommended. HIIT can be proposed in some patients with CHF For resistance exercise: in a first stage, resistance exercise intensity should be set at 30–50% 1-RM, for 10–15 repetitions per muscle group (1–3 sets per unit), at a frequency of 2–3 training units per week. In a second stage, resistance exercise intensity should be set at 40–60% 1-RM, for 10–15 repetitions per muscle group (1–3 sets per unit), at a frequency of 2–3 training units per week. In the final stage resistance exercise intensity should be set at 60–80% 1-RM, for 8–10 repetitions per muscle group (1–3 sets per unit), at a frequency of 2–3 training units per week For inspiratory muscle training: particularly in those with inspiratory muscle weakness (PImax < 70%), inspiratory muscle training (IMT) may be clinically relevant. When using inspiratory endurance trainers, an intensity of 60% of sustained maximal inspiratory pressure (PImax) with a build-up towards a duration of 20–30 min and a frequency of 3 days per week for a minimum of 8–10 weeks has been proposed. If a pressure threshold trainer is used, respiratory training is usually started at 30% of PImax and readjusted every 7–10 days up to 60% of PImax. Training duration again should be 20–30 min/day, 3–5 times a week and for a minimum of 8 weeks

Endurans Egzersizi

30 dk, 3-5 gün/hafta, Orta yoğunluk

Dirençli Egzersiz

I %30-50 RM, 10-15 tekrar, 1-3 set
2-3 gün/hafta

II %40-60 RM

III %60-80, 8-10 tekrar

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İnspiratuvar Kas Eğitimi

PImax<%70

Thresold PEP

%30 Pımax

Her 7-10 günde güncellenerek

%60 Pımax

20-30 dk/gün ,3-5 /hafta

minimum 8 hafta

Physical Therapist Clinical Practice Guideline for the Management of Individuals With Heart Failure

Michael J Shoemaker ✉, Konrad J Dias, Kristin M Lefebvre, John D Heick, Sean M Collins

Physical Therapy, Volume 100, Issue 1, January 2020, Pages 14–43,
https://doi.org/10.1093/ptj/pzz127
Published: 23 January 2020 **Article history ▾**

Number	Statement	Key Phrase
1	Physical therapists and other health care practitioners should advocate for increased total daily physical activity as an essential component of care in patients with stable heart failure. (Evidence Quality I; Recommendation Strength: A—Strong)	Advocate for increased total daily physical activity as an essential component of care
2	Physical therapists must educate on and facilitate components of chronic disease management behaviors to reduce the risk of hospital readmission. These measures include education on daily weight assessment, signs and symptoms of an exacerbation, nutrition, and medication management/medication reconciliation. (Evidence Quality I; Recommendation Strength: A—Strong)	Educate on and facilitate chronic disease management behaviors
3	Physical therapists must prescribe aerobic exercise training for patients with stable, NYHA Class II-III HFrEF using the following parameters: Time: 20–60 min; Intensity: 50%–90% of peak VO_2 or peak work; Frequency: 3–5/wk; Duration: at least 8–12 wks; Mode: treadmill or cycle ergometer or dancing (Evidence Quality I; Recommendation Strength: A—Strong)	Prescribe aerobic exercise training
4	Physical therapists should prescribe high-intensity interval exercise training in selected patients for patients with stable, NYHA Class II-III HFrEF using the following parameters: Time: >35 min; Intensity: >90%–95% of peak VO_2 or peak work; Frequency: 2–3/wk; Duration: at least 8–12 wks; Mode: treadmill or cycle ergometer. HIIT total weekly exercise doses should be at least 460 kcal, 114 mins, or 5.4 MET-hrs. (Evidence Quality I; Recommendation Strength: A—Strong)	Prescribe high intensity interval training
5	Physical therapists should prescribe resistance training exercise for upper and lower body major muscle groups for patients with stable, NYHA Class II-III HFrEF using the following parameters: 2–3 sets per muscle group, 60%–80% 1RM, 45–60 mins per session, 3 times per week for at least 8–12 wks (Evidence Quality I; Recommendation Strength: A- Strong)	Prescribe upper and lower body resistance training

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Physical Therapy, Volume 100, Issue 1, January 2020, Pages 14–43,
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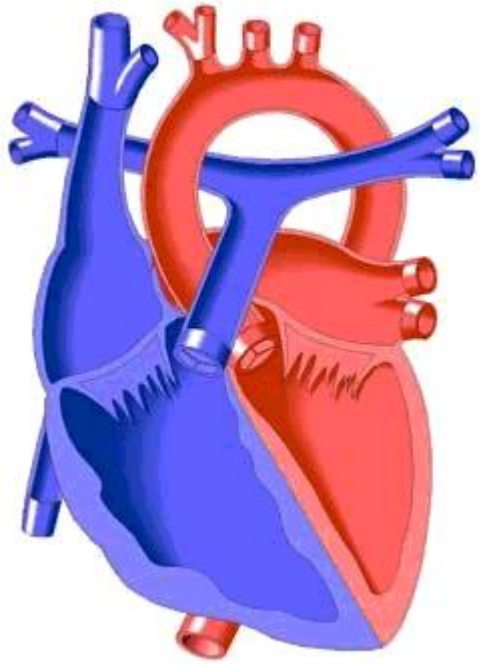
Published: 23 January 2020 **Article history ▾**

6	Physical therapists may prescribe combined resistance and aerobic training for patients with stable, NYHA Class II-III HFrEF using the following parameters: Combine 20–30 minutes of aerobic training with 20–30 mins of resistive training, 2–3 sets per major muscle group, 60%–80% 1RM, 3 times per week for at least 8–12 wks. (Evidence Quality II; Recommendation Strength: B- Moderate)	Prescribe combined aerobic exercise and resistance training
7	Physical therapists should prescribe inspiratory muscle training with a threshold* (or similar) devices (ie, device where resistance is not flow-dependent) for outpatients in the home and clinic setting with stable, Class II and III HFrEF with or without baseline inspiratory muscle weakness using the following parameters: 30 min/day at >30% maximal inspiratory pressure (PI_{Max} or MIP), 5–7 days/wk, for at least 8–12 wks. (Evidence Quality I; Recommendation Strength: A—Strong)	Prescribe inspiratory muscle training
8	Physical therapists may prescribe combined inspiratory muscle training and aerobic exercise training with a threshold (or similar) device (ie, device where resistance is not flow-dependent) for outpatients in the home and clinic setting with stable, Class II and III HFrEF with or without baseline inspiratory muscle weakness using the following parameters: 30 min/day at >30% maximal inspiratory pressure (PI_{Max} or MIP), 5–7 days/wk, for at least 8–12 wks. (Evidence Quality: II, Recommendation Strength: B –Moderate)	Prescribe combined inspiratory muscle training and aerobic exercise training
9	Physical therapists should prescribe NMES in patients with stable, NYHA Class II-III HFrEF using the following parameters: biphasic symmetrical pulses at 15 to 50 hertz, on/off time 2/5 seconds, pulse width for larger muscles of the lower extremity should be 200 to 700 us and for small lower extremity muscles 0.5 to 0.7 ms, 20%–30% of MVIC, intensity to muscle contraction, 5–7 days/week for at least 5–10 wks to the quadriceps, gluteals, hamstrings, and gastrocnemius (Evidence Quality I; Recommendation Strength: A—Strong)	Prescribe neuromuscular electrical stimulation

KONTRAENDİKASYONLAR

EGZERSİZ TESTİ VE PROGRAMI



Akut durumlar

Exercise training in heart failure: role, prescription and program

Raymond Pranata,[1] Emir Yonas,[2] Bambang B. Siswanto,[3] Budhi S. Purwowiyoto[3]

Indonesian Journal of Cardiology
Indonesian J Cardiol 2017:38:226-33
pISSN: 0126-3773 / eISSN: 2620-4762

(A) Contraindications to exercise testing and training

1. Early phase after acute coronary syndrome (up to 2 days)
2. Untreated life-threatening cardiac arrhythmias
3. Acute heart failure (during the initial period of haemodynamic instability)
4. Uncontrolled hypertension
5. Advanced atrioventricular block
6. Acute myocarditis and pericarditis
7. Symptomatic aortic stenosis
8. Severe hypertrophic obstructive cardiomyopathy
9. Acute systemic illness
10. Intracardiac thrombus

Göreceli Kontraendikasyonlar

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(B) Contraindications to exercise training

1. Progressive worsening of exercise tolerance or dyspnoea at rest over previous 3–5 days

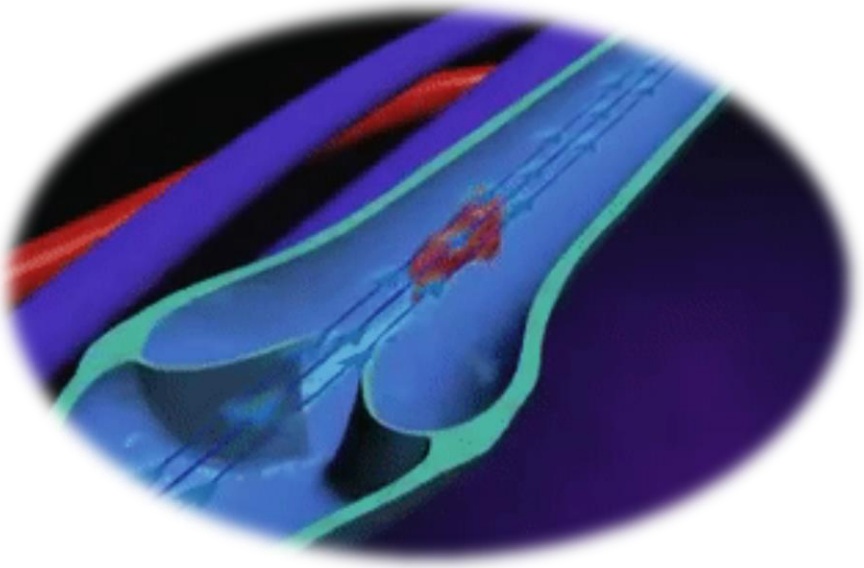
2. Significant ischaemia during low-intensity exercise (<2 METs, <50 W)

3. Uncontrolled diabetes

4. Recent embolism

5. Thrombophlebitis

New-onset atrial fibrillation/atrial flutter



Emboli

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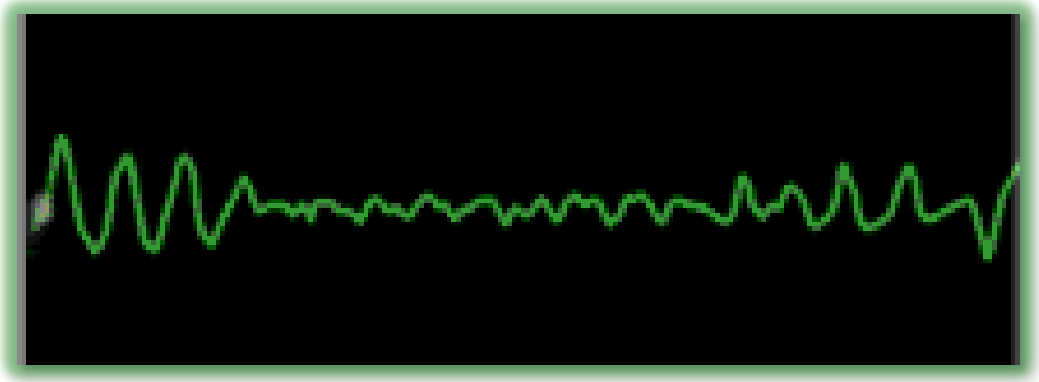
(C) Increased risk for exercise training

1. >1.8 kg increase in body mass over the previous 1–3 days
2. Concurrent, continuous, or intermittent dobutamine therapy
3. Decrease in systolic blood pressure with exercise
4. NYHA functional class IV
5. Complex ventricular arrhythmia at rest or appearing with exertion
6. Supine resting heart rate >100 b.p.m.
7. Pre-existing co-morbidities limiting exercise tolerance

Kesin Kontraendikasyonlar



Ventrilüker aritmi

Exercise training in heart failure: from theory to practice. A consensus document of the Heart Failure Association and the European Association for Cardiovascular Prevention and Rehabilitation

Massimo F. Piepoli ✉, Viviane Conraads, Ugo Corrà, Kenneth Dickstein, Darrel P. Francis, Tiny Jaarsma, John McMurray, Burkert Pieske, Ewa Piotrowicz, Jean-Paul Schmid, Stefan D. Anker ... See all authors

First published: 18 February 2014 | https://doi.org/10.1093/eurjhf/hfr017 | Citations: 507

EGZERSİZ REÇETELENDİRMESİ ÖNCESİ HAZIRLIK

İleri seviye HF

Kaşeksi

Klinik instabilite

Kalistenik Egzersiz

Germe Egzersizleri

Hareket koordinasyonu ve solunum kapasitesi