

Liderando el conocimiento del mañana

Cardio**Advanced**Forum'20



Guías Europeas: Cardiología del Deporte y Ejercicio en Pacientes con Enfermedad Cardiovascular

Dra. Amelia Carro Hevia

Especialista en Cardiología

Coordinadora Grupo de Trabajo Cardiología del
Deporte (Sociedad Española de Cardiología)

Instituto Corvilud (Asturias)



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Guías Europeas: Cardiología del Deporte y Ejercicio en Pacientes con Enfermedad Cardiovascular (2020)

Actividad física, ejercicio y deporte

- ❖ Individuos sanos / deportistas
- ❖ Riesgo o enfermedad cardiovascular
- ❖ Riesgo o enfermedad no cardiovascular

Contenido	Guías	Material Suplementario	Total
Páginas	80	19	99
Referencias	623	139	762
Recomendaciones	34 + 1	7	42
Tablas	16	6	22
Figuras	9	2	11



¿Cómo utilizar esta guía?

Sección de lectura y estudio

- ❖ Conceptos, fisiopatología
- ❖Cuál es el riesgo; ¿puede medirse?
- ❖Prevención cardiovascular segura

Sección Recomendaciones Enfermedad Cardiovascular

Sección Recomendaciones Enfermedad No Cardiovascular

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Conceptos básicos

Actividad física-Ejercicio-Deporte

- Movimiento corporal producido por contracción muscular y que genera un gasto energético
- Estructuración y organización de una actividad física repetitiva con el objetivo de mejorar forma física o rendimiento
- Sujeto a normas, se pone a prueba, con/sin competición, de habilidad, destreza o fuerza física.

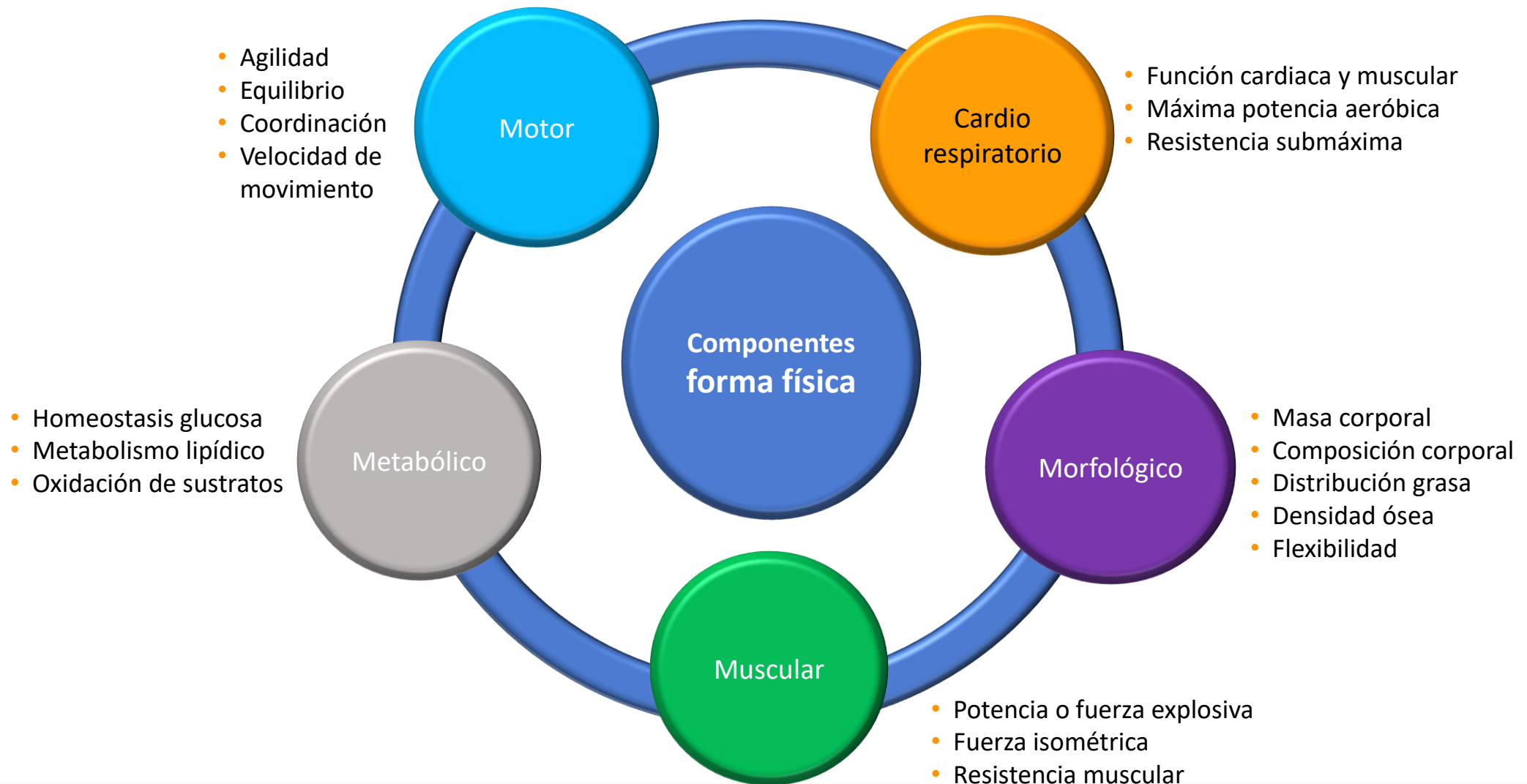
Paciente Atleta

- Individuo joven/adulto
- Entrenamiento físico regular (puede ser intenso)
- Recreativo/profesional
- Orientado a competición/rendimiento

Forma Física

Resultado de la interacción de 5 componentes

Conceptos básicos



Clasificación disciplinas deportivas

HABILIDAD		POTENCIA		MIXTO		RESISTENCIA	
Frecuencia cardiaca	+ / ++	Frecuencia cardiaca	++	Frecuencia cardiaca	++ / +++	Frecuencia cardiaca	+++
Presión arterial	+	Presión arterial	+++	Presión arterial	++	Presión arterial	++
Gasto cardiaco	+	Gasto cardiaco	++	Gasto cardiaco	++ / +++	Gasto cardiaco	+++
Volumen entrenamiento	-	Volumen entrenamiento	+	Volumen entrenamiento	++	Volumen entrenamiento	+++
Remodelado cardiaco	-	Remodelado cardiaco	+	Remodelado cardiaco	++	Remodelado cardiaco	+++
Golf, Tiro, Tiro con arco Tenis de mesa, bolos Curling, Equitación Navegación vela, yate ¿Automovilismo?		Esquí alpino (recreacional) Disparo Disco Judo, Karate Carrera corta distancia Halterofilia, Boxeo, Lucha ¿Bobsleigh Jabalina Snowboard, Esquí acuático?		Baloncesto (adaptado) Fútbol (adaptado) Balonmano (adaptado) Voley-Ball Tenis (dobles) Fencing Rugby, Fútbol, Balonmano Hockey hielo/hierba Rugby, Tenis (individual) Waterpolo Balonmano (competitivo) ¿Cricket?		Caminata larga distancia, carrera-jogging Natación (recreacional) Caminata rápida (speed walking) Baile/Danza Carrera media/larga distancia Piragüismo, Remo Esquí de fondo Ciclismo carretera Esquí media-larga distancia, esquí fondo Pentatlon, Triatlon	

Prescripción Ejercicio Físico

❖ Frecuencia

- Sesiones/semana
- Series de ejercicios

❖ Intensidad

- Resistencia: %VO₂ máx, %FC máx, %FC reserva
- Fuerza / Potencia: %1RM o % 5RM
(% FC máx, % FC reserva si mixto)

❖ Tiempo

- Programa de ejercicio (semanas/meses)
- Entrenamiento (días/semana; sesiones/día)
- Sesión de entrenamiento (minutos/horas)

Clasificación índices intensidad y zonas de entrenamiento

INTENSIDAD	VO ₂ max (%)	Frecuencia cardiaca máxima (%)	Frecuencia cardiaca de reserva (%)	Esfuerzo percibido (escala Borg)	Zona de Entrenamiento
Baja	<40	<55	<40	10-11	Aeróbico
Moderada	40-69	55-74	40-69	12-13	Aeróbico
Alta	70-85	75-90	70-85	14-16	Aeróbico + lactato
Muy alta	>85	>90	>85	17-19	Aeróbico + lactato + anaeróbico

INTENSIDAD	% 1RM	N Máx repeticiones
Baja	<20	
Moderada	30-50	15-30
Alta	50-70	8-15

Prescripción Ejercicio Físico

❖ Frecuencia

- Sesiones/semana
- Series de ejercicios

❖ Intensidad

- Resistencia: %VO₂ máx, %FC máx, %FC reserva
- Fuerza / Potencia: %1RM o % 5RM
(% FC máx, % FC reserva si mixto)

❖ Tiempo

- Programa de ejercicio (semanas/meses)
- Entrenamiento (días/semana; sesiones/día)
- Sesión de entrenamiento (minutos/horas)

❖ Tipo

- Resistencia (carrera, ciclismo, andar, natación)
- Fuerza
- Velocidad
- Flexibilidad (dedos-planta, test movilidad lateral)
- Coordinación y equilibrio

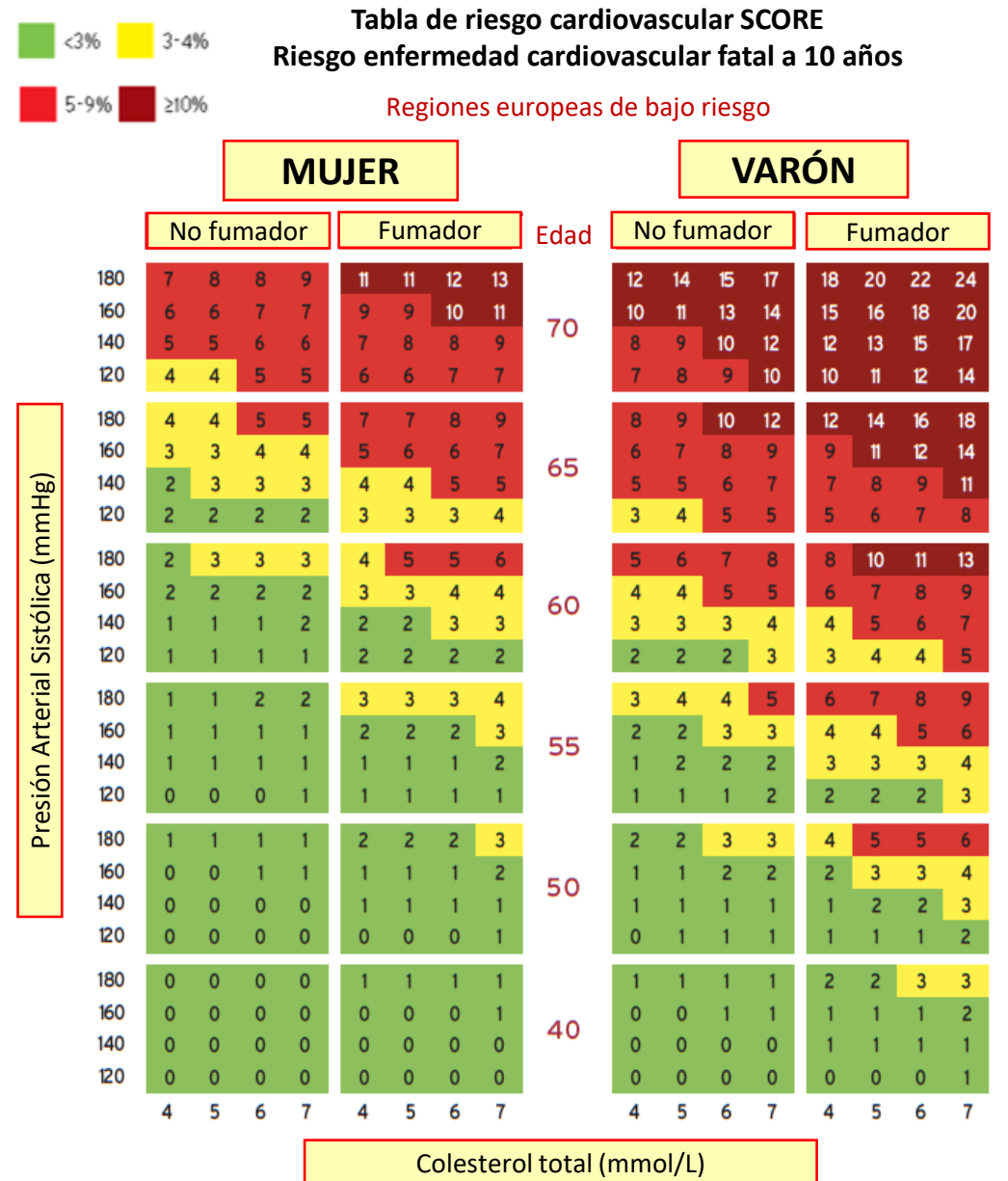
❖ Modo de entrenamiento

- Metabólico: aeróbico vs anaeróbico
- Trabajo muscular
 - isométrico-isotónico
 - dinámico (concéntrico-excéntrico) vs estático
 - continuo-interválico

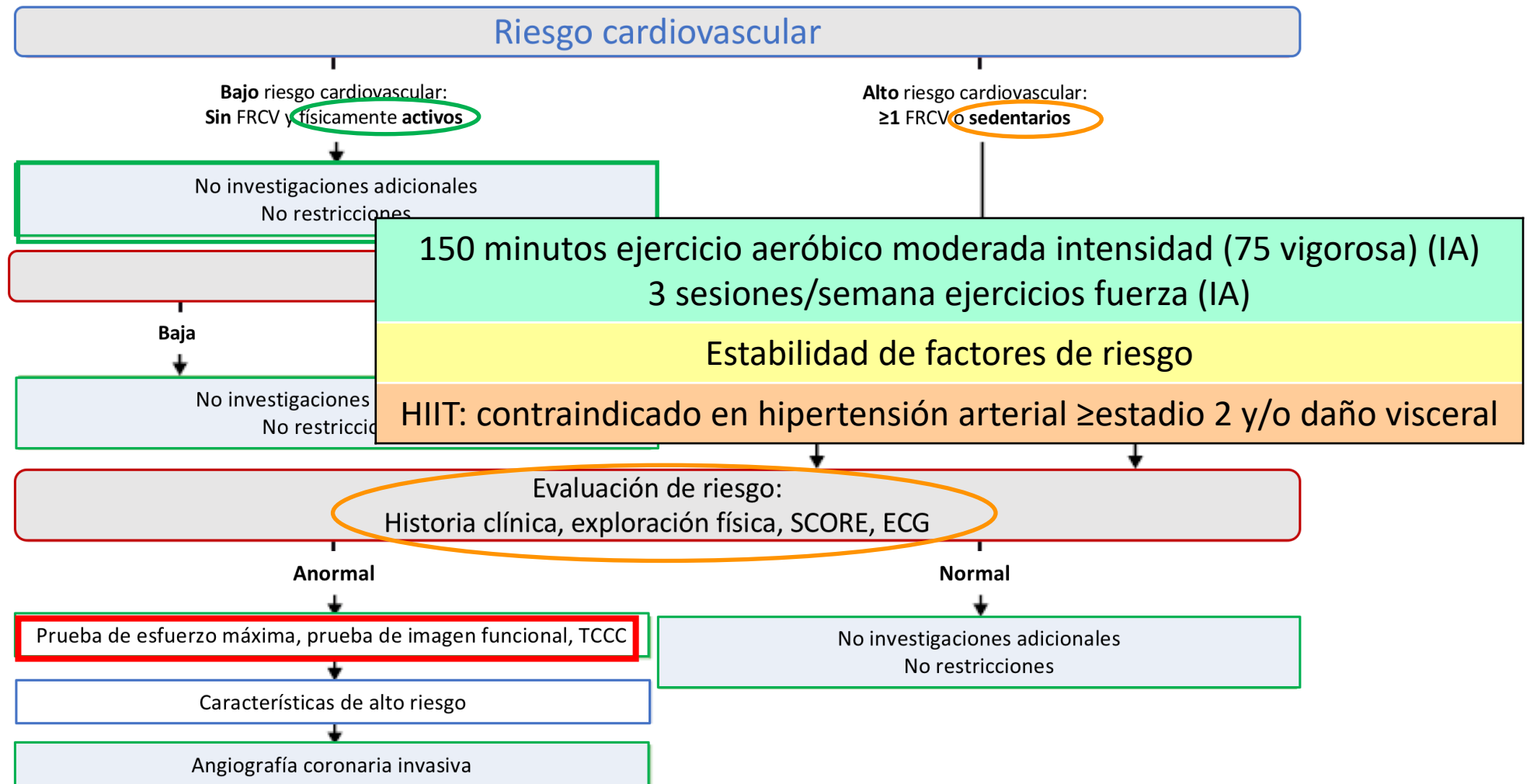
- ❖ **Progresión:** % intensidad; minutos duración

Estratificación Riesgo Cardiovascular

- ❖ **Factores de riesgo:** edad, sexo, tabaquismo, presión arterial sistólica, colesterol total
- ❖ Cálculo del riesgo de **eventos totales (fatales y no fatales):** multiplicar x3 (♂) x4 (♀)
- ❖ **No aplicables en:**
 - Diabetes mellitus (tipo 1, tipo 2)
 - Enfermedad renal crónica
 - Hipercolesterolemia familiar
 - Valores muy elevados de factores de riesgo individual
- ❖ **Modificación tabla SCORE original:**
 - Edad: hasta 70 años
 - Interacción edad y otros factores de riesgo
 - Elimina rango colesterol ≥ 8 mmol/l (300mg/dl)



Prescripción Ejercicio Físico en Individuos Asintomáticos



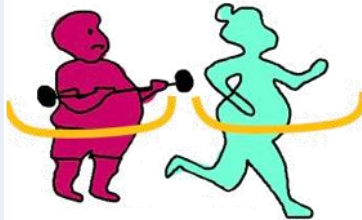
Recomendaciones en diversos escenarios clínicos



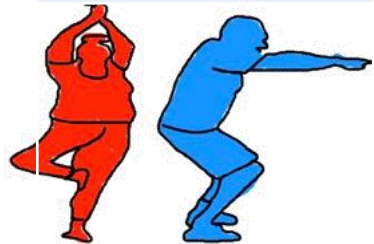
Adultos sanos

- Al menos 150 minutos semanales de ejercicio aeróbico de intensidad moderada o 75 minutos semanales de ejercicio aeróbico de intensidad vigorosa (mayores beneficios hasta 300 minutos semanales)
- Se recomienda distribuir en 4-5 días/semana, preferiblemente, ejercitarse diariamente

Obesidad
Hipertensión
Diabetes



- En individuos obesos (circunferencia abdominal $>94\text{cm}$ ♂; $>80\text{cm}$ ♀), hipertensos bien controlados (PAS $<160\text{mmHg}$) y diabéticos se recomienda:
- 150 minutos semanales (distribuidos en 5-7 días) de ejercicio aeróbico de intensidad moderada (o 75 vigorosa)
 - Entrenamiento de resistencia ≥ 3 veces/semana



Adultos
>65 años

- En adultos mayores con riesgo de caídas se recomiendan ejercicios de fuerza para mejorar equilibrio y coordinación al menos 2 veces/semana
- Adultos >65 años en buena forma física y sin condiciones limitantes de movilidad, se recomiendan al menos 150 minutos de ejercicio aeróbico de moderada intensidad

PAS: presión arterial sistólica

¿Cómo utilizar esta guía?

Sección de lectura y estudio








- ❖ Conceptos, fisiopatología
- ❖Cuál es el riesgo; ¿puede medirse?
- ❖Prevención cardiovascular segura

Sección Recomendaciones Enfermedad Cardiovascular

Sección Recomendaciones Enfermedad No Cardiovascular


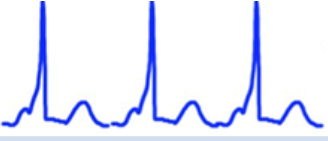




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Recomendaciones en diversos escenarios clínicos

 <p>Insuficiencia cardíaca crónica</p>	<p>Síndromes coronarios crónicos</p>	<ul style="list-style-type: none"> •Estratificación de riesgo de eventos adversos inducidos por ejercicio en individuos con SCC previo •Programa de ejercicio basado en RC en todo individuo con EAC
	<p>Enfermedad valvular</p>	<p>Programa de ejercicio basado en RC en todos los individuos estables para mejorar capacidad funcional, calidad de vida, reducir hospitalizaciones</p> <p>Antes de iniciar actividad deportiva, considerar optimización de factores de riesgo y tratamiento, incluido implante de dispositivos (si indicado)</p> <ul style="list-style-type: none"> •Permitidas todas las actividades deportivas si afectación valvular ligera •Consideraciones especiales en estratificación/seguimiento prolapso valvular mitral y válvula aórtica bicúspide
 <p>Enfermedades de la aorta</p>	 <p>Miocardiopatías</p>	<p>Estratificación de riesgo antes de inicio de actividad deportiva, con evaluación cuidadosa que incluya técnicas de imagen avanzada (TC/CRM) y prueba de esfuerzo que valore respuesta tensional</p> <ul style="list-style-type: none"> •Asesoramiento anual del riesgo en individuos que se ejercitan de forma regular •Particularidades estratificación de riesgo en miocardiopatía hipertrófica
 <p>Miocarditis y Pericarditis</p>		<ul style="list-style-type: none"> •Evaluación exhaustiva mediante estudios de imagen, monitorización ECG prueba de esfuerzo tras recuperación de la fase aguda de miocarditis para valorar riesgo de muerte súbita relacionada con el ejercicio •Se puede reanudar todo tipo de modalidad deportiva (incluida competición) en individuos recuperados completamente de pericarditis tras 30d-3m de reposo (dependiendo de la gravedad)
	<p>Dispositivos intracardiacos</p>	<p>Los individuos portadores de dispositivos (con/sin terapia de resincronización) y enfermedad subyacente deben seguir las recomendaciones propias de su patología</p>

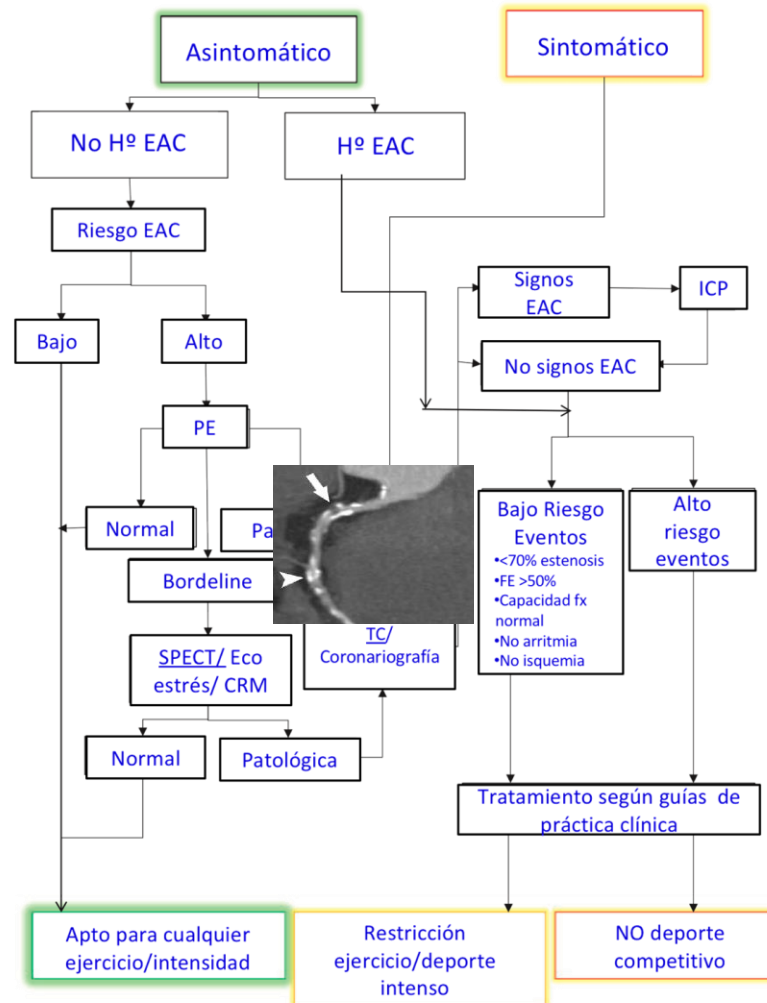
SCC: síndrome coronario crónico; RC: rehabilitación cardíaca; EAC: enfermedad arterial coronaria; TC: tomografía computerizada; CRM: cardi resonancia magnética

Recomendaciones en diversos escenarios clínicos

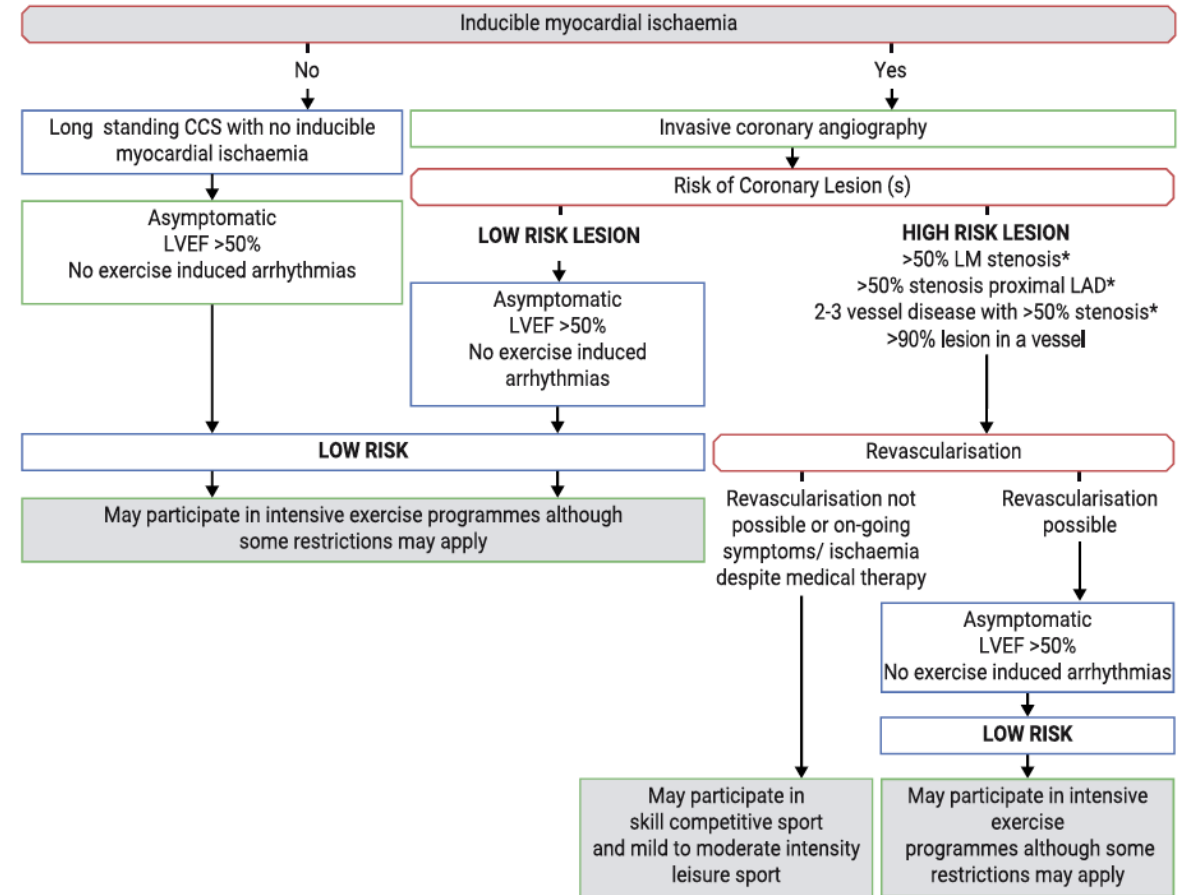
<p>Fibrilación auricular</p>		<p>Ejercicio físico regular recomendado para prevención de fibrilación auricular</p>
	<p>Preexcitación</p>	<p>En individuos con palpitaciones, se recomienda evaluación exhaustiva que excluya preexcitación (latente), enfermedad estructural, arritmias ventriculares</p>
<p>EV o TVNS</p>		<p>En individuos que se ejercitan regularmente y presentan ≥ 2 EVs en ECG basal (≥ 1 EV en deportistas de resistencia elevada) se recomienda evaluación completa (incluida detallada historia familiar) para descartar condiciones estructurales o arritmogénicas</p>
	<p>Síndrome QT largo</p>	<p>Se recomienda terapia betabloqueante (en dosis objetivo) en individuos con síndrome de QT largo que se ejercitan regularmente con prolongación de intervalo QT/síntomas previos</p>
<p>Síndrome de Brugada</p>		<p>Se recomienda implante de DAI en individuos con Síndrome de Brugada y antecedentes de síncope arritmogénico y/o muerte súbita abortada</p>
	<p>Cardiopatías congénitas</p>	<p>Se recomienda realizar ejercicio físico regular de intensidad moderada en todos los individuos con cardiopatías congénitas</p>

EV: ectopia ventricular; TVNS: taquicardia ventricular no sostenida

Recomendaciones Síndrome Coronario Crónico



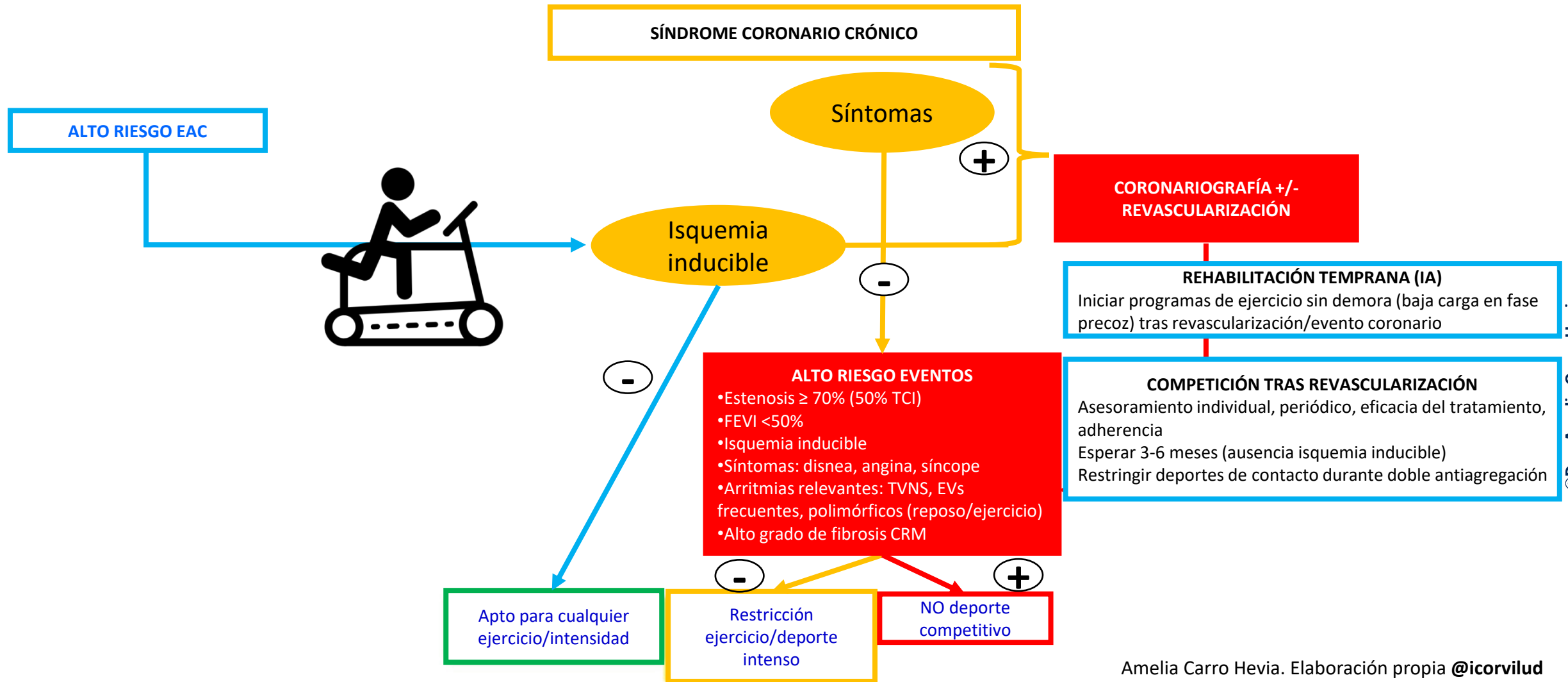
Borjesson et al. Eur H J. 2019; 40:13



Pellicia et al. Eur H J. 2020; 2020 Aug 29;ehaa605

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Recomendaciones Síndrome Coronario Crónico



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Amelia Carro Hevia. Elaboración propia @icorvilud

Recomendaciones en valvulopatías: prolapso mitral

Marcadores riesgo muerte súbita

❖ Eléctricos:

- Inversión onda T derivaciones inferiores
- QT largo
- Arritmias documentadas

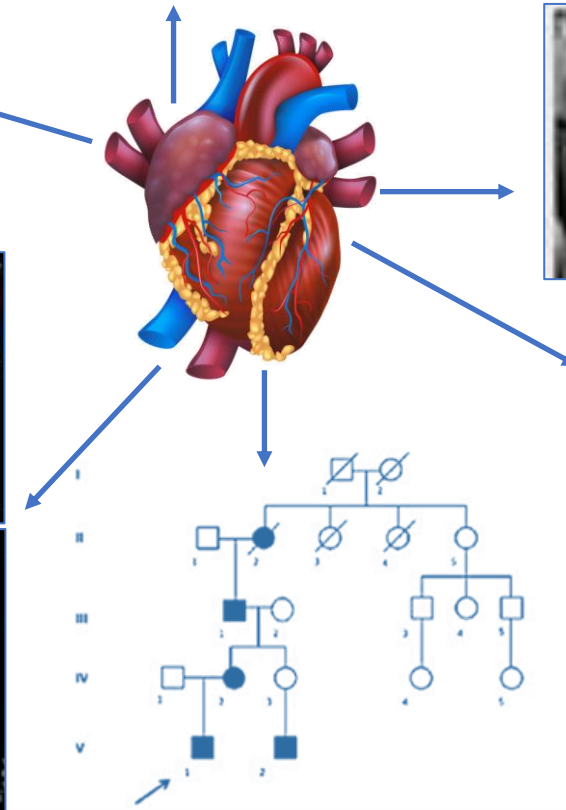
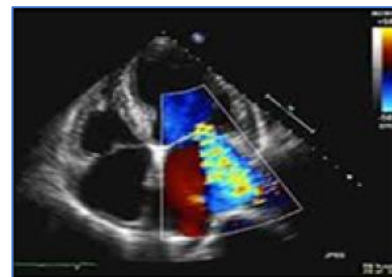
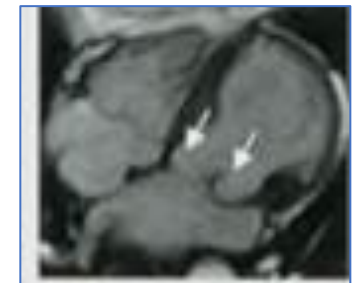
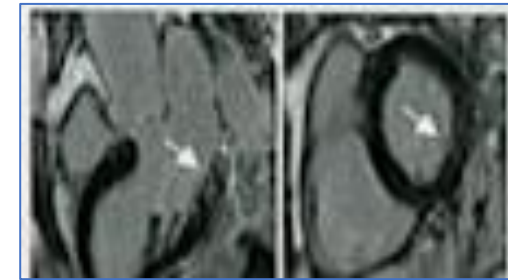
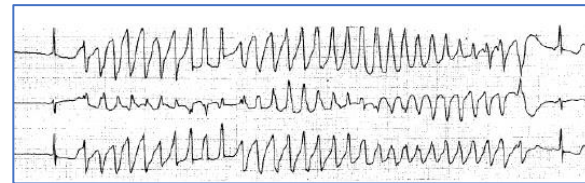
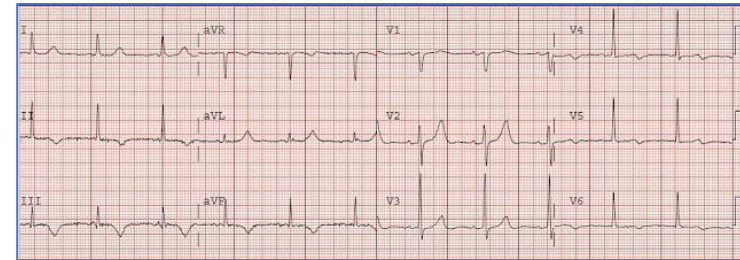
❖ Ecocardiográficos:

- Insuficiencia mitral severa
- Disfunción ventricular severa

❖ Clínicos: historia familiar muerte súbita

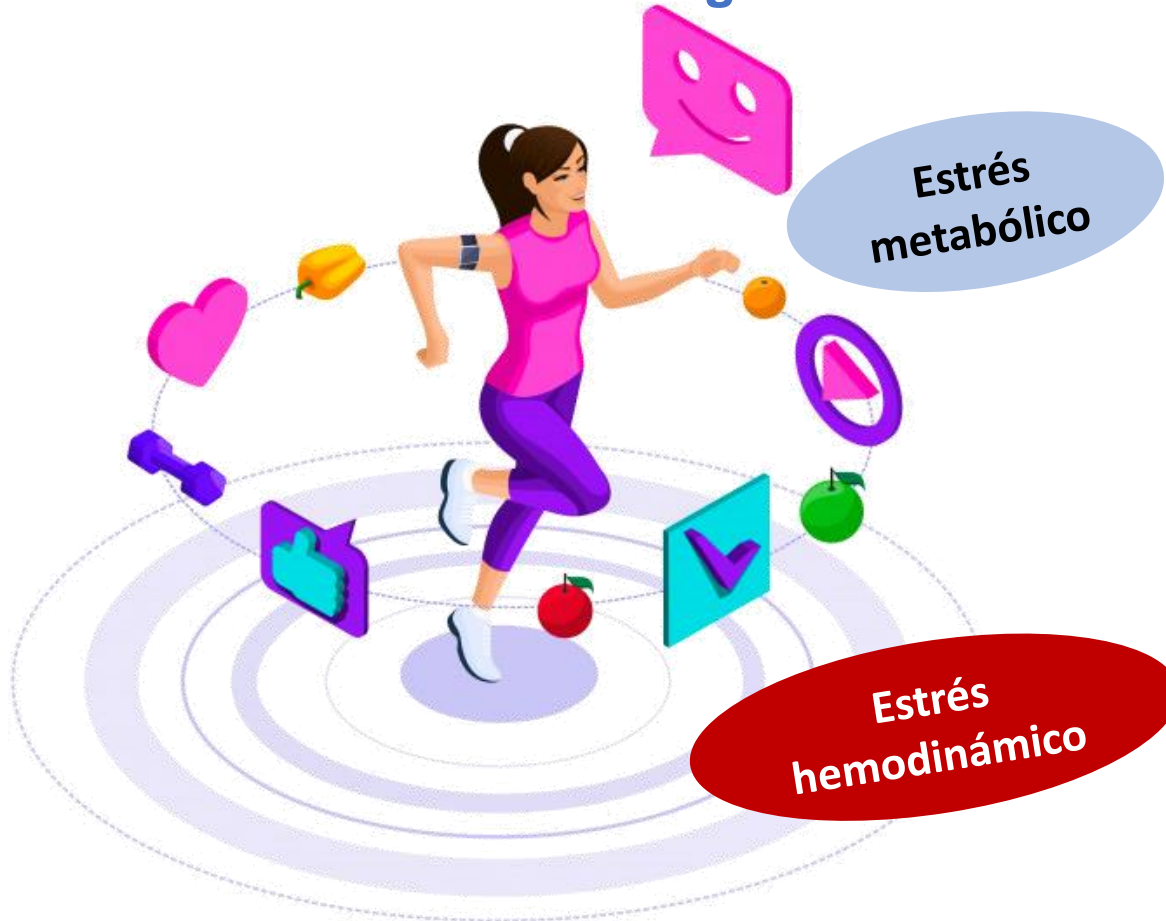
❖ Cardiorresonancia:


- Fibrosis pared basal inferolateral
- Prolapso ambos velos



Recomendaciones miocardiopatía hipertrófica

Estratificación de riesgo MHC





HCM Risk-SCD Calculator

Age Years
 Maximum LV wall thickness mm
 Left atrial size mm
 Max LVOT gradient mmHg

Family History of SCD No Yes
 Non-sustained VT No Yes
 Unexplained syncope No Yes

Version 2014

ESC POCKET GUIDELINES
 Guidelines for the diagnosis and management of hypertrophic cardiomyopathy

Risk of SCD at 5 years (%):

ESC recommendation:

2014 ESC Guidelines on Diagnosis and Management of Hypertrophic Cardiomyopathy (Eur Heart J 2014 – doi:10.1093/eurheartj/ehu284)
 O'Mahony C et al Eur Heart J (2014) 35 (30): 2010-2020

HCM Risk-SCD should not be used in:

- Paediatric patients (<16 years)
- Elite/competitive athletes
- HCM associated with metabolic diseases (e.g. Anderson-Fabry disease), and syndromes (e.g. Noonan syndrome).
- Patients with a previous history of aborted SCD or sustained ventricular arrhythmia who should be treated with an ICD for secondary prevention.

Caution should be exercised when assessing the SCD in patients following invasive reduction in left ventricular outflow tract obstruction with myectomy or alcohol septal ablation.

Pending further studies, HCM-RISK should be used cautiously in patients with a maximum left ventricular wall thickness ≥ 35 mm.

HCM = hypertrophic cardiomyopathy; LV = left ventricular; LVOT = left ventricular outflow tract; NSVT = non-sustained ventricular tachycardia; SCD = sudden cardiac death; VT = ventricular tachycardia

Participación deportiva: puede ser una opción

Recomendaciones miocardiopatías

APROXIMACIÓN GENERAL EN PACIENTES CON LIMITACIÓN SINTOMÁTICA

Valoración formal de la capacidad funcional

EJERCICIO AERÓBICO

Calcular umbral anaeróbico de FC

70-80% de la FC máxima

60-70% de la FC máxima si betabloqueo

20 minutos; 3-5 veces/semana

EJERCICIO ESTÁTICO

(pesos o poleas)

1. No cargar >20% del peso corporal en extremidades superiores
2. No cargar >50% del peso corporal en extremidades inferiores
3. No más de 6 repeticiones x 3

Recomendaciones miocardiopatías

EVITAR

- ❖ Ejercicios explosivos súbitos («sprints»)
- ❖ Ejercicio en rangos de frecuencia cardiaca >80% de la frecuencia máxima predicha por edad
- ❖ Ejercicio en condiciones ambientales adversas (calor, humedad, frío extremo)
- ❖ Programas de ejercicio con un entrenamiento que englobe de forma sistémica entrenamientos con cargas progresivas dirigido a alcanzar elevados niveles de acondicionamiento y excelencia
- ❖ Ejercicio estático isométrico intenso (pesos libres)

¿Cómo utilizar esta guía?

Sección de lectura y estudio

- ❖ Conceptos, fisiopatología
- ❖Cuál es el riesgo; ¿puede medirse?
- ❖Prevención cardiovascular segura

Sección Recomendaciones Enfermedad Cardiovascular

Sección Recomendaciones Enfermedad No Cardiovascular

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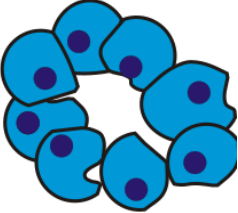
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Recomendaciones en diversos escenarios clínicos

Embarazo		Recomendación de 150 minutos semanales de ejercicio físico aeróbico de intensidad moderada para embarazadas sin contraindicaciones médicas/obstétricas antes/durante/tras la gestación (IA)
	Enfermedad Renal Crónica	En individuos con enfermedad renal crónica se recomiendan: <ul style="list-style-type: none">•150 minutos semanales de ejercicio aeróbico de intensidad moderada•entrenamiento de fuerza de intensidad baja-moderada (2 sesiones/semana; 8-12 ejercicios, 12-15 repeticiones)
Lesión medular		En adultos con lesión de médula espinal se recomiendan <ul style="list-style-type: none">•20 minutos de ejercicio aeróbico de intensidad moderada-vigorosa al menos 3 veces a la semana•entrenamiento de fuerza 2-3 veces a la semana (IA) con el objetivo de obtener beneficios de forma física, salud cardiometabólica y fuerza muscular
	Cáncer	<ul style="list-style-type: none">•Ejercicio durante y tras la terapia ↓ fatiga relacionada con la enfermedad, mejora forma física, calidad de vida y pronóstico (IA)•Pueden participar en ejercicio de alta intensidad con asesoramiento general (incluida prueba de esfuerzo) y ecocardiograma (si fármacos cardiotóxicos) previo (IA)

Recomendaciones en diversos escenarios ~~clínicos~~

Altitud

Fondo marino



Frío/calor extremo

Polución ambiental

Las guías son (solo) «guías»

- ❖ Evidencia científica: consenso de expertos (nivel C)
- ❖ Prácticas y pragmáticas
- ❖ Consideradas para una buena práctica clínica, pero sin vínculo legal
- ❖ Dejan libertad al juicio clínico del médico responsable
- ❖ No necesariamente deben ser consideradas para interferir en la autonomía del paciente-atleta



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