

EXERCISE AND HEART RATE VARIABILITY IN CHRONIC MUSCULOSKELETAL PAIN: A SYSTEMATIC REVIEW

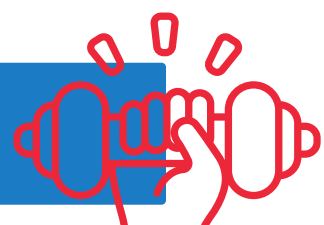
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INTRODUCTION

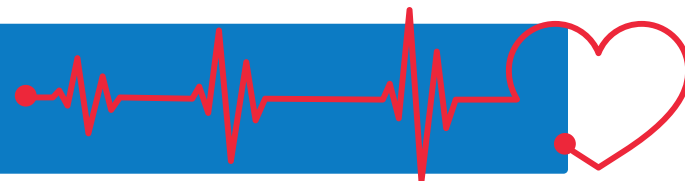


Chronic musculoskeletal pain (CMP) is a complex condition^{1,2,3} that affects **autonomic function**, often leading to altered heart rate variability (HRV)

HRV matters because:

- Low HRV is associated with higher pain sensitivity, increased stress, and poor overall health⁴
- Improving HRV could support better pain management and overall well-being⁵

AIM



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This systematic review explored how different exercise interventions influence HRV in individuals with CMP^{8,9}

Objectives:

- Examine the impact of various **training modalities**
- Identify effective strategies for **improving autonomic function**
- Inform **future therapeutic approaches** for CMP management

METHOD

Databases searched up to June 15, 2024: PubMed, Web of Science, and Cochrane Library

- **Inclusion criteria:** population; Adults (18-65) with CMP, Intervention; Exercise programs ≥ 4 weeks, and Outcome measure; Heart rate variability, assessed pre- and post-intervention
- **Review process:** Two independent reviewers conducted study selection, data extraction, and risk of bias assessment using Cochrane RoB-2 and ROBINS-I
- **Data analysis & reporting:** Exercise interventions were detailed using the Consensus on Exercise Reporting Template (CERT), effect sizes were calculated to quantify HRV changes, and certainty of evidence was assessed using the GRADE framework

RESULTS




Study overview:

10 studies included (5 randomized, 5 non-randomized controlled trials)

Total participants: 277 adults with CMP

Exercise duration: 4 to 24 weeks

Types of exercise interventions:


- Resistance training 
- Aerobic training 
- Multi-component training 



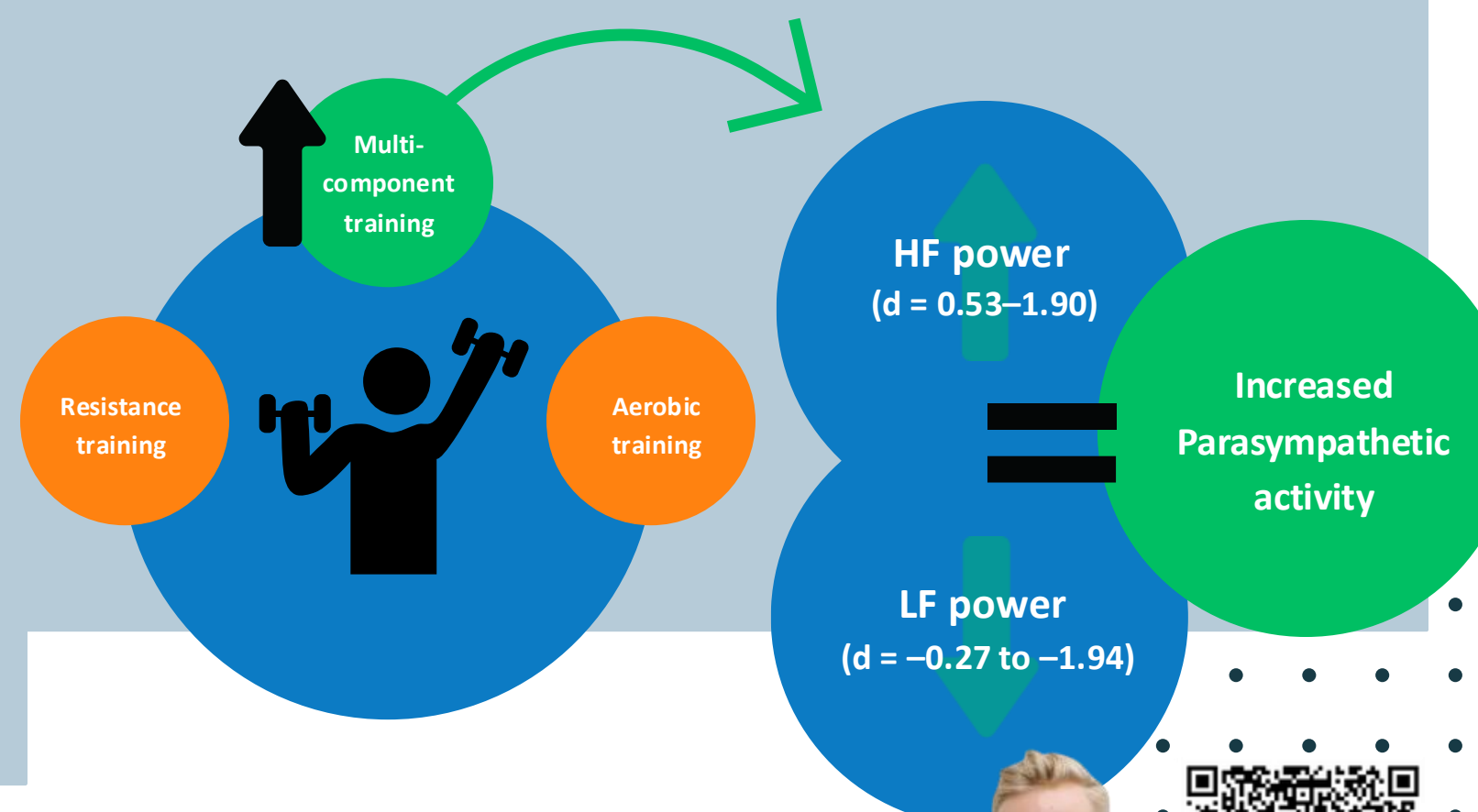
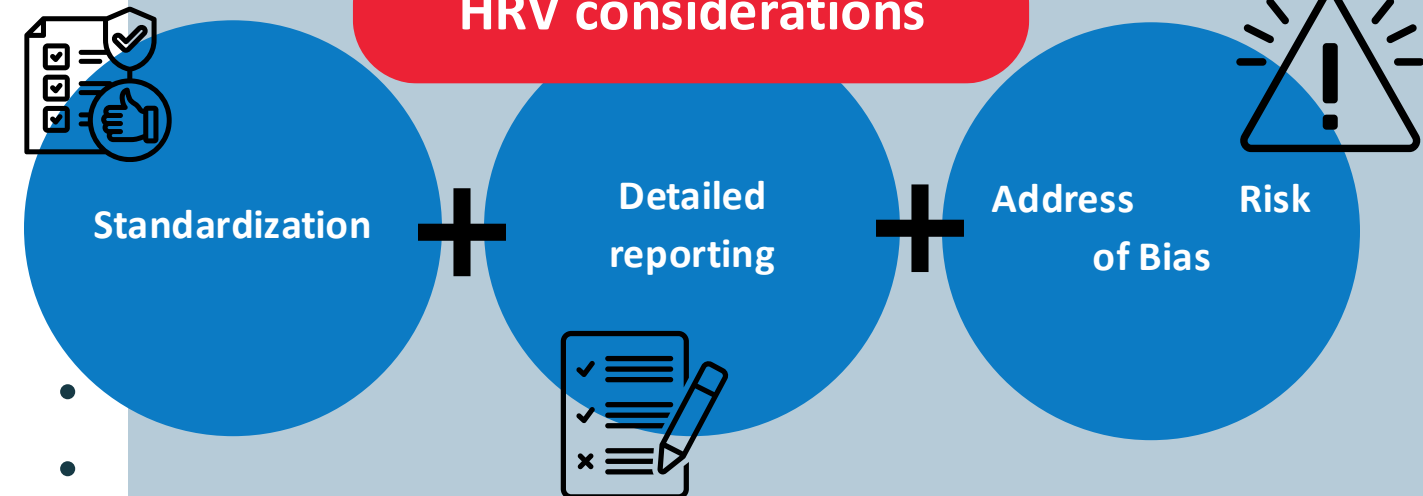
Key findings: significant within-group improvements in HRV, especially in:
• Vagal modulation at rest (indicative of better autonomic function)



Limitations: Variability in HRV assessment protocols and differences in exercise modalities made direct comparisons challenging

Certainty of evidence:  **Low to moderate** → Standardized methodologies needed for future research

HRV considerations



REFERENCES

GBD. Lancet. 2020.¹, Hartvigsen et al. Lancet. 2018.², Arendt-Nielsen et al. Pain. 2018.³, Tracy LM et al. Auton Neurosci. 2016.⁴, Koenig J et al. Pain Med. 2016.⁵, Circulation. 1996.⁶, Geneen LJ et al. Cochrane. 2017.⁷, Routledge FS et al. Can J Cardiol. 2010.⁸, Kingsley JD et al. J Strength Cond Res. 2010.⁹



We thank Hasselt University (Special Research Fund) and the Research Foundation Flanders (FWO) for their support.



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