Qeios

Peer Review

Review of: "Intermittent Pneumatic Compression as a Regulator of Physiological Processes: A Conceptual Framework"

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1. Independent researcher

General assessment

This very long manuscript proposes an ambitious framework positioning intermittent pneumatic compression (IPC) as a systemic regulatory therapy rather than a local mechanical intervention.

The article stands out for its internal coherence, transdisciplinary openness, and ability to generate original research avenues. However, it presents significant methodological weaknesses that limit its level of evidence and require substantial clarification.

Major strengths

1. Conceptual originality

Reframing IPC as a model of biological self-regulation represents a genuine contribution. The hierarchical model (mechanical → neural → endocrine–humoral → immune) is logically constructed and compatible with current physiological knowledge.

2. Integration of marginalized literature

The inclusion of clinical data provides an original perspective. Although these data do not meet current methodological standards, their longitudinal coherence nevertheless gives them prospective value.

3. Structuring concept of intermittent pneumatic compression

The systematic review of the technical and biological parameters of IPC is particularly relevant.

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Major critical points

1. Insufficient level of evidence

The manuscript relies primarily on:

• observational studies;

• case series;

• plausible but unproven physiological hypotheses.

It is imperative to state explicitly that the systemic effects described fall within a hypothetical framework rather than established causal relationships.

Recommendation:

→ Add a boxed text or a dedicated section clearly distinguishing established facts, clinical signals, and speculative hypotheses.

2. Excessive expansion of the scope of indications

Exploration of fields such as oncology, anti-aging, immunomodulation, or psychiatry exposes the manuscript to the classic criticism of a theory with near-universal scope.

Although the authors acknowledge the risks, the clinical prioritization remains insufficient.

Recommendation:

→ Clearly prioritize 2–3 core clinical areas (e.g., neurological rehabilitation, dysautonomia, metabolic disorders) and relegate the others to a “long-term perspectives” section.

3. Benefit–risk ambivalence

The article acknowledges that IPC may stimulate both physiological and pathological processes (autoimmunity, inflammation, neoplasia). However, this ambivalence remains theoretical and is insufficiently translated into practical recommendations.

Recommendation:

→ Propose practical usage recommendations.

4. Style and structure

The manuscript is very dense and at times discursive, with a risk of diluting the main message. Some prospective sections would benefit from being shortened.

Recommendation:

→ Reduce the text by approximately 20–30% by refocusing on the central model and its testable

implications.

Suggestions for future research (priority)

To strengthen the scientific credibility of the model, the authors should focus on:

mechanistic studies (mechanotransduction, HRV, endothelial biomarkers);

randomized pilot trials with clear physiological endpoints;

standardized protocols designed to test specific sub-hypotheses rather than global effects.

Conclusion

This manuscript represents a strong conceptual contribution but not a scientific demonstration. It should be evaluated as a theoretical and programmatic framework article rather than as clinical validation.
Subject to major methodological clarifications, refocusing of indications, and cautious rewording of certain claims, this work could become a structuring reference for the future development of research on intermittent pneumatic compression.

Recommendation:

Major revisions required

Declarations

Potential competing interests: No potential competing interests to declare.