Qeios

Peer Review

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

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The manuscript reveals a passionate description of the IPC treatment derived from long-standing clinical and research experience and is rich with intriguing possibilities about new applications and mechanisms. However, I think that its scientific value would benefit from a clearer distinction between scientifically proven concepts/mechanisms and anecdotal or hypothetical ones. Certain concepts are given as solid statements as if they were part of established knowledge. However, without the supporting experimental evidence, documented by relevant references, they should be presented in a more possibilistic way. For example, P7, "Quality of life": "The muscle-relaxing impact of IPC, …, can noticeably influence mood, motivation, and even self-image."; P7 L6: "…makes IPC a multisensory event capable of activating a wide spectrum of neuropsychological mechanisms associated with safety, recovery, embodied well-being, interpersonal interaction, and a sense of groundedness."; P13 L2 : "Exacerbations of myasthenia gravis and rheumatoid arthritis we have witnessed have made it clear how strong and rapid the immune response to IPC can sometimes be".

I think the idea of outlining an alphabet is good, although appendix 2 appears more oriented to showing the complexity of the topic than to clarifying it. I would recommend a simplified structure that possibly outlines the most relevant parameters first, subsequently addressing smaller details. It would be important to reduce redundancy (most frequency parameters can be calculated from time parameters). Adding a graphical scheme of the pressure profile(s) would also help.

Minor/specific observations

P3 L6. "compression gradient": consider rewording as "pressure gradient generated by the compression"

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P4 L19 “..this 1-Hz frequency”: unclear what it refers to. Previously, only the inflation/holding duration of 1-2 s was mentioned. However, a 1-2 s deflation period also takes place, which makes a total cycle duration of 2-4 s and corresponds to a frequency of 0.25-0.5 Hz.

P4 L22 “...that adjust compression frequency to correct specific physiological imbalances”. This is really vague and difficult to understand. Explain, if possible.

P5 L11 “. In these cases, IPC's rapid pain relief is mainly due to its anti-edematous and anti-inflammatory vascular effects”. Is this consideration from the author or from the cited papers?

P7 L4 “...a rapid "release" response that includes thermoregulation (via hyperemia and localized heat accumulation)”: this is unclear. Where does heat accumulate and why?

P25 L8 “$P = (P_0 + Pmax) \times K_1 \times K_2$, where P is the target compression for a specific patient; K_1 reflects tissue compliance—how soft and deformable the tissue is; and K_2 reflects tissue rigidity” This is unclear as compliance and rigidity are not independent variables: compliance=1/rigidity

In addition, it appears a bit strange to discuss the possible patient specificity of the treatments while the specificity of the treatment protocols for the different clinical objectives is never dealt with.

P31 Area of influence. Given the large number of mechanisms and pathways and uncertainty about those possibly involved in the treatment, the idea of numerically weighing the body surface according to its “significance” appears too far-fetched.

P32 L1 The idea of calculating a “compression dose” as a surface-time pressure integral (like a training load in exercise) is also difficult to understand without reference to a specific clinical treatment. What would be the purpose of this parameter?

Declarations

Potential competing interests: No potential competing interests to declare.