

## Intensity is a subjective construct

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Dear Editor,

We read with interest the preliminary report by Watson et al. of a clinical trial evaluating high-intensity resistance training in individuals with osteoporosis [1]. There is a need for quality research assessing the benefits and risks of exercise regimens in individuals with established osteoporosis. However, we feel obliged to draw attention to a misinterpretation of the cited exercise recommendations to which we contributed [2]. Watson et al. cited the Too Fit to Fracture recommendations as stating that high-intensity exercises should not be attempted by individuals with osteoporosis [1]. Our recommendations encourage individuals with osteoporosis to engage in progressive resistance training at an intensity of 8–10 repetitions maximum, with progressive overload, which by most standards, would be considered relatively high-intensity resistance training [2]. It is only in the presence of vertebral fracture, or in individuals who are sedentary or who have comorbid conditions that limit participation, that we encourage a lower intensity *in the initial stages of training*, but we follow with a statement that progressive overload is

required to increase muscle strength over time [2]. Also, individuals with a vertebral fracture may need to prioritize alignment over intensity, but it does not mean that they cannot progress to an intensity corresponding with 8–10 repetitions maximum, as long as they are practicing spine sparing strategies, and are guided by a physical therapist or exercise physiologist with training in osteoporosis [2, 3]. The Too Fit to Fracture recommendations do not discourage high-intensity resistance training, but they do provide guidance on factors that may influence initial exercise prescription, adaptations, and progression.

When individuals are at high risk of fracture (e.g., according to FRAX, or with history of vertebral or hip fracture, or multiple fragility fractures), the exercise physiologist must use good clinical judgment to ensure that the risks do not outweigh the benefits. For some high-risk individuals, that may mean using body weight as resistance, or selecting exercises that do not involve forward flexion or torsion of the spine, or applying heavy axial loads [2, 3]. It does not mean the client/patient cannot progress to an intensity that they would

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perceive as high. Also, we made it clear in our report that if the opportunity to seek guidance from a physical therapist or exercise physiologist is not possible, then it would be advisable for individuals at high risk of fracture to use body weight exercises or exercise bands for resistance, for safety reasons.

Our recommendations do state that for individuals with a vertebral fracture (or high risk of fracture), high-intensity *aerobic* physical activity should be avoided [2]. Perhaps Watson et al. have misinterpreted that recommendation to mean that all high-intensity exercises should be avoided; we want to make it clear that it is only in people with vertebral fracture (or high-risk individuals) that high-intensity aerobic physical activity is not advisable, because vigorous or high intensity aerobic physical activity tends to be associated with higher impact, or rapid and repetitive movement, where the risks of additional fractures outweigh the benefits over moderate intensity aerobic physical activity. As with recommendations on strength training, the exercise physiologist or physical therapist should use good clinical judgment when making decisions at the individual level about appropriate aerobic physical activity.

The Too Fit to Fracture recommendations were designed to be applicable across the spectrum of individuals at moderate and high risk of fracture, including those with comorbid conditions, multiple fractures, or pain, or who live in assisted living settings, and we have described the need to adapt exercise according to clinical presentation [2, 3]. Indeed, there is limited to no high-quality evidence regarding the safety and efficacy of high-intensity resistance training or high-intensity aerobic physical activity in people with established osteoporosis, so our consensus process considered the *potential* risks and

benefits very carefully, knowing that the recommendations needed to be generalizable to all people with osteoporosis. Given the controversial nature of the inferences made in the paper by Watson et al. about high-intensity resistance training exercise in people with low bone mass [1], we want to ensure that the Too Fit to Fracture recommendations are represented as published in *Osteoporosis International*.

#### Compliance with ethical standards

**Conflict of interest** None.

#### References

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