

VIEWPOINT

Last Word on Viewpoint: Fragile bones of elite cyclists: to treat or not to treat?

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TO THE EDITOR: We thank the authors of the Commentaries (1) on our Viewpoint (2). Most authors seem to agree with our view that impaired bone health in elite (road-race) cyclists is an issue of concern. Nevertheless, Beck and Sipp (1) propose a performance benefit of low bone mineral density (BMD) as a result of a lower body weight. We argue, however, that this effect is negligible. The difference in whole body bone mineral content in cyclists with normal versus low BMD seems to be only ~100 to 300 g. Irrespective of the impact on cycling performance, Beck and Kipp's view touches the sensitive ethical dilemma of whether athletes should be willing to win at the expense of a potentially irreversible medical condition.

Regarding the treatment of low BMD in elite cyclists, we read with interest the suggestions by many authors to include high-impact jump training as part of the training program of elite cyclists (1). Indeed, there is some evidence to suggest that high-impact training is effective in increasing BMD (3), although this has not been established in elite cyclists. The latter is of particular importance because large volumes of endurance training potentially affects the osteogenic stimulus of high-impact training. In this regard, the preferred training characteristics to maximize the osteogenic stimulus of high-impact training (i.e., mode, load, volume, and frequency) are currently unknown, particularly when combined with endurance training. We should also consider the notion that high-impact exercise may increase the risk of stress fractures, especially in populations characterized with osteopenic or osteoporotic BMD values (3, 4). Therefore, we agree with Gibbs and Churchward-Venne (1) that treatment strategies should ideally be initiated during young adulthood to prevent impaired bone health during later stages of the cycling career.

Along with the efficacy of treatment options, we feel that feasibility and compliance are the major factors determining the value of interventions for elite cyclists. Even a high-impact workout of just 5 min per day may not be feasible for an elite cyclist throughout an entire year, as the competitive season is characterized by periodized training and nutrition schedules, congested race schedules, and a lot of traveling. Future research should establish whether strategically timed periods of high-impact training (e.g., high frequency of high-

impact exercise sessions during the preparatory phase, with a lower frequency of sessions during the competitive phase) are effective in improving and/or maintaining bone health over time.

We agree with Greeves and O'Leary (1) that BMD is just one aspect of bone health, whereas bone microarchitecture is at least as important with regard to bone quality, mechanical strength, and subsequent fracture risk (5). Indeed, even when BMD values are within a normal range, bone microarchitecture may be (irreversible) impaired (6). To the best of our knowledge, it is currently unknown whether low BMD in elite cyclist is accompanied by an impaired bone microarchitecture and bone strength. This might be associated with the limited availability of high-resolution peripheral computed tomography (HR-pQCT) as an instrument to monitor bone microarchitecture on a regular basis. Nevertheless, such information would be highly valuable to better understand the bone health of elite cyclists and to evaluate the need and effectiveness of treatment strategies in this population.

DISCLOSURES

No conflicts of interest, financial or otherwise, are declared by the authors.

AUTHOR CONTRIBUTIONS

L.H. and J-W.v.D. drafted manuscript; L.H., P.K., M.H., R.K., A.E.J., L.J.C.v.L., and J-W.v.D. edited and revised manuscript; L.H., P.K., M.H., R.K., A.E.J., L.J.C.v.L., and J-W.v.D. approved final version of manuscript.

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