Reviewer's report

Title: Cycling and bone health: a systematic review.

Version: 4 Date: 31 May 2012

Reviewer: Jeanne Nichols

Reviewer's report:

General Comments to Authors:

The purpose of this paper was to review existing literature on bone health of cyclists in order to better understand previously reported adverse effects of cycling on bone mass. The authors conducted a systematic review of studies published between 1965 to April, 2012. Of 214 citations located, 32 met inclusion criteria, which included both cyclists and triathletes. A concern of this reviewer is the inclusion of triathletes, as its multisport nature, including weight-bearing activity of running, confers very different mechanical effects on bone, and thus appears to only confound conclusions. I recommend that the authors exclude the one study on only triathletes (McClanahan et al.). Also, of four studies that reported bone biomarker data, one of these (Hinton et al.) did not report bone mass.

Furthermore, the conditions under which biomarkers were assessed were very different in the Hinton et al. study, i.e., they measured changes in biomarkers over the course of a 6-day cycling race, whereas the other three studies conducted cross-sectional comparisons of bone biomarkers in cyclists and non-athletes, or in cyclists compared to other athletes. Thus, I recommend that, at minimum, the Hinton study be excluded from the review, and that the authors also consider focusing only on bone mass measures and not biomarkers.

Specific Comments to Authors:

Abstract: The authors state that cycling “seems to have an unsafe effect on BMD.” It has yet to be shown that cycling, per se, is inherently detrimental to bone. Rather, there is evidence that cyclists do not engage in sufficient weight-bearing activity to stimulate osteogenesis, coupled with evidence of calcium loss during long training or racing bouts. Thus, the conclusion should be tempered to indicate that cycling does not appear to confer an osteogenic benefit, which may be related to long hours in a weight-supported position on the bike followed by recovery time of much sitting or supine lying, especially at the elite and professional levels of competition.

Page 7, last sentence, continuing on to page 8: Re-state as follows: “More recently, Nichols et al. showed that not only were more master cyclists classified as osteoporotic compared to age and weight-matched non-athletes, but also the percentage of osteoporotic cyclists increased significantly over a 7-year period.”
Page 8, 2nd paragraph: State the number of studies that reported results that conflicted with the premise that cycling participation has negative (or “at least not positive”) effect on BMD.

Table 1. It would be helpful to include a column that tells the reader the mean number of years the cyclists had been training specifically in cycling. If this information was not provided in most of the studies reviewed, it could be discussed in the text as a possible factor contributing to the authors’ conclusions.

Page 12: Training level and type of cycling practice: This section is important to discuss in greater detail, as the number of years of cycling as well as the weekly training time likely has a large effect on whether cycling confers negative effects on bone. Where possible, provide detail on the number of studies in elite/professional cyclists vs. amateur or recreational. And, as mentioned above for Table 1, discuss the influence of training time on the study outcomes.

Conclusions: There is an important practical/clinical difference between cycling having a “deleterious” or “neutral” effect on bone health. If the purpose of this review article was to determine cycling’s effect on bone health, as stated, the conclusion does not help the reader determine which is correct.

Page 14: 2nd to last paragraph: delete “swimming;” as this study did not address that sport

Declaration of competing interests:

No, I do not have any competing interests regarding this manuscript.