Why Cyclists Should Lift Heavy Things

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Introduction

Most cyclists would agree that weight training is a positive adjunct to training. Many, however, do not participate in cross training on a regular basis due to perceived barriers. And if they do, it is only during the winter months. These barriers are perpetuated by misconceptions regarding the effects of weight training and/or inexperience in the gym. That being said, year round weight training has been shown to improve performance and health measures in cyclists as described below.

Misconceptions of weight training

1. *I am going to gain weight*
2. *I'm going to be too sore to train right on the bike*
3. *I'm going to injury myself*
4. *Elite cyclists aren't weight training*

Performance

Multiple studies on cyclists and runners have shown that weight training is a positive adjunct to performing in endurance events. One study by Ronnestad et al showed that elite cyclists who participated in two ~35 minute sessions of strength training per week demonstrated better performance outcomes compared to their peers who only cycled [Ronnestad 2017]. Table 1 below outlines the distribution of their weekly training hours. The endurance and strength group effectively took the 1.2hrs of strength training out of zone 1 training. In the end, both groups had the same total training time (~12hrs).

Table 1: Summary of weekly training hours [Ronnestad 2017]

HR Intensity zone	**E&S** (hr)	**E** (hr)
60-82% HR(max)	8.8 ± 2.3	10.6 ± 2.8
83-87% HR(max)	1.2 ± 0.6	1.1 ± 0.6
88-100% HR(max)	0.7 ± 0.4	0.6 ± 0.5
Strength training	1.2 ± 0.6	0
Total time	12.3 ± 1.8	12.3 ± 2.9

The strength training itself was composed of only four exercises: half squat, leg press, single legged hip flexion, and single legged calf raise. Each exercise was performed at 3 sets of 4-10 reps with two minutes rest between each set. The program was initiated two weeks after the end of their season and continued for 10 total weeks. The volume progressively decreased as the cyclists approached their new season, moving from 10 rep max to as little as 4 rep max for each exercise. The weight they used was to failure. As they got stronger, the weight got heavier.

Table 2 below outlines their results after the 10 weeks of strength training. As you can see there was a 0.5kg difference in weight gain between the two groups. This, however, wasn't statistically significant. Additionally, there was a statistically significant difference in mean W/kg during a 30s Wingate test (all out from the gun) and an arguably significant difference in peak W/kg. These improvements indicate that even with a slight increase in body mass, maximal power production improved relative to those weight gains. Lastly, there was a 4.3% difference between groups in a 40 minute time trial. Although this did not reach statistical significance, this difference is huge when it comes to cycling at an elite level. Overall this study suggests that maximal strength training during base training can improve both maximal power as well as endurance measures. Unsurprisingly the strength group did report heavier legs and greater soreness compared to their peers. This, however, didn't affect their performance in the end nor their training during.

Table 2: Results post 10 weeks of maximal strength training [Ronnestad 2017]

Outcome	E&S	E	Statistically significant
Body mass	+0.6 kg	+0.1 kg	no
Lean lower-body mass	+0.37 kg	+0.19 kg	no
VO2 max	-2	-2	no
Peak power 30s wingate	+1.1 W/kg	+0.3 W/kg	no
Mean power 30s Wingate	***+0.2 W/kg***	***-0.2 W/kg***	***yes***
40 minute time trial	+3.5%	-0.8%	no

So we know that strength training works during a building phase of the season, but can it work during race season? Another study by Ronnestad et al looked into just that [Ronnestad 2010]. 12 well-trained cyclists were divided into two groups: endurance and strength (E+S) and endurance only (E). The E+S group had 12 weeks of weight lifting 2x/wk prior to the season and then 13 weeks of weight lifting 1x/wk during the season. They measured thigh cross sectional area (CSA), maximal strength test, blood lactate profile, VO2max, 30-s Wingate Test and a 40 min TT at multiple points over the 25 weeks [Ronnestad 2010].

This study used the same exercises as the previously described study. The experiment used several concepts to minimize fatigue and maintain strength during the competitive season. All of these rely on reducing volume and increasing or maintaining intensity (similar to how tapers work).

1. Reduced frequency from 2x/wk to 1x/wk
2. Reduced sets from 3 to 2 to 1
3. Reduced repetitions from 8 to 4
4. But maintained maximal effort

The study didn't find any difference in body weight between the two groups over the 25wk period. E+S had increased thigh CSA and maximal strength after the preparatory period that was maintained during the season. E+S had a greater improvement in max power, 40min TT and power at a standard lactate level [Ronnestad 2010].

Both these studies demonstrate performance gains due to weight training. These improvements were seen both pre-season and during season. It only took ~1.2hrs/wk with only four exercises being performed during each session. A lot of people may think a ton of variability is needed in their training when in reality, progressing only a few exercises may be the best strategy with limited time.

All this considered, the quality of these two studies is rather limited. There were low number of subjects, only elite cyclists (not generalizable), and nutrition was poorly tracked. That being said, there is high quality evidence that strength training improves performance in other endurance athletes such as long distance runners [Balsalobre-Fernandez 2016].

General Health

The benefits of weight training go beyond just performance. In a large prospective study, those that participated in weight training 2+x/wk had a 23% reduction in all cause mortality [Dankel 2016]. Likewise, multiple studies on endurance athletes have shown weight training to positively affect bone mineral density (BMD), a marker consistently shown to be deficient in cyclists. One study followed masters cyclists for seven years and found that those who weight trained or ran 2+x/wk lost significantly less BMD than masters cyclists who just cycled. A similar effect was found with long distance runners [Duplanty 2018]. That being said, there has been no consensus on how much weight training is needed to see these effects.

Conclusion

Weight training will not only improve your performance as a cyclist, but also your general health. With proper dosing, weight training shouldn't lead to weight gain, excessive soreness or injury. Likewise it will decrease long term mortality as well as improve bone mineral density. Hesitancy is understandable as weight training can often be a new challenge for a cyclist, but practically speaking there isn't much reason not to. If you already do weight training during the winter months, it only makes sense to maintain the strength gains you made by continuing your training through the season. All cyclists should be participating in heavy weight training.

Sources

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