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Conference Abstract

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Is "Big Gear" Effective for Road Cyclists? A Coach's Standpoint to Guide Decision-Making.

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Abstract

"Big Gear" training, a common low-cadence strategy among road cyclists, involves pedalling at 40–60 rpm under high torque, typically at or just below Functional Threshold Power. Despite its widespread use and perceived similarity to resistance training, Big Gear training effectiveness remains debated. This viewpoint critically examines the evidence surrounding Big Gear training role in enhancing muscular strength, endurance, and overall performance in road cyclists. Contrary to popular belief, Big Gear training does not meet the intensity threshold required to induce strength adaptations comparable to traditional resistance training. Evidence shows that Big Gear training produces lower neuromuscular strain and operates at <50% of Maximal Dynamic Force—well below the >60% threshold needed for strength gains. Furthermore, studies indicate that resistance training leads to greater improvements in maximal force production than Big Gear training. Similarly, Big Gear training shows no consistent advantage in promoting endurance adaptations or performance outcomes. Notably, studies that suggest benefits of low-cadence training often employ cadences and intensities higher than those typical of Big Gear training protocols. Some evidence even raises concerns about potential negative effects of Big Gear training on key performance determinants. In conclusion, the available evidence suggests that Big Gear training is either ineffective or, at best, questionable, being insufficient to trigger the positive adaptations associated with low-cadence training. It is recommended that coaches consider the efficacy of traditional Big Gear training in comparison to protocols that have been demonstrated to have more robust evidence-based outcomes.

Keywords

torque; pedal rate; low-cadence; strength; endurance

1 Introduction

"Big Gear" training (BGt) –and its Italian counterpart, known as Resistant Strength Climb (SFR)– is a low-cadence (LC) training method that increases the torque component by pedaling with a heavy gear ratio (Morelli, 2019; Reynolds, 2015; Wilson, 2016). It consists of four to five sets per session, each lasting from one to five minutes, performed at 40-60rpm at an intensity at or slightly below the Functional Threshold Power (FTP) (Hansen & Rønnestad, 2017; Morelli, 2019). Despite its widespread use, its effectiveness remains controversial (Hansen & Rønnestad, 2017).

2 Purpose

This standpoint presents an evidence-based analysis of the efficacy and limitations of BGt in enhancing strength and endurance in road cyclists. To support this aim, I reviewed both direct and indirect evidence regarding the effects of LC training on adaptation and performance. An analysis of study methods distinguished traditional BGt from other LC protocols. This integrative approach offers a concise, critically evaluated summary of current evidence.

3 Key Findings

3.1 Is BGt a form of strength training?

A deep-seated belief among coaches and cyclists is that BGt enhances muscular strength by increasing torque during LC workouts (Chatlaong, 2020; Morelli, 2019; Pav, 2024; Reynolds, 2015), potentially causing neuromuscular disturbances similar to resistance training (RT). However, BGt has not demonstrated reduction in maximal force production to the same extent as RT (Chatlaong, 2020) and freely chosen cadence (FCC) training has been shown to cause even greater reductions (de Araújo Ruas et al., 2011; Mater et al., 2021). Additionally, BGt involves low relative intensity (<50% of Maximal Dynamic Force [MDF]) (Barranco-Gil et al., 2024), which falls below the threshold required to induce strength gains (>60% MDF) (Androulakis-Korakakis et al., 2020; Schoenfeld et al., 2017). Current evidence suggests BGt does not provide sufficient stimulus for strength development and is not an effective form of on-bike strength training (Hansen & Rønnestad, 2017).

3.2 Could BGt replace traditional RT?

Current evidence does not support replacing RT with BGt. Studies comparing RT with cycling-specific protocols have demonstrated greater improvement in MDF in RT groups (Beattie et al., 2017; Koninckx et al., 2010; Kristoffersen et al., 2019; Pallares et al., 2025; Valenzuela et al., 2021). Specifically, the only study on BGt found it ineffective in improving MDF (Kristoffersen et al., 2014). Thus, BGt and RT should not be considered interchangeable.

3.3 Does BGt offer superior advantages in endurance adaptations?

As with strength adaptations, the impact of LC training on aerobic capacity remains inconclusive (Hansen & Rønnestad, 2017). Some studies have reported greater improvements in aerobic indices following LC compared to high cadence (HC) (Paton et al., 2009) or FCC training (Hebisz & Hebisz, 2024). Others found no superiority of LC over other training modalities (Kristoffersen et al., 2014; Ludyga et al., 2017; Nimmerichter et al., 2012; Whitty et al., 2016), including RT (Koninckx et al., 2010; Pallares et al., 2025). Notably, studies favouring LC training used higher cadences and intensities (Hebisz & Hebisz, 2024; Paton et al., 2009) than those employed in traditional BGt (<60rpm at ≤FTP) (Morelli, 2019; Reynolds, 2015; Wilson, 2016). In trained cyclists, FCC training produced superior aerobic gains compared to BGt (Kristoffersen et al., 2014), suggesting that BGt offers no clear endurance advantages over conventional training methods.

3.4 Is BGt advantageous for performance in road cycling?

Although the most comprehensive review found no strong support for benefits of LC training (Hansen & Rønnestad, 2017), some studies suggest that it may enhance short-duration performance (≤30 minutes) (Nimmerichter et al., 2012; Whitty et al., 2016). Conversely, others report no advantage over HC (Paton et al., 2009), FCC (Kristoffersen et al., 2014), or RT (Koninckx et al., 2010). Methodological limitations previously discussed apply here. The commonly cited studies supporting BGt in well-trained cyclists (Nimmerichter et al., 2012; Paton et al., 2009) may be misinterpreted since their protocols differ substantially from traditional BGt. Moreover, performance superiority in the LC group in the Nimmerichter and colleagues (2012) study may reflect training terrain-specific psychophysiological adaptations, rather than differences in cadence, resulting from training in a specific terrain (hill vs flat) (Gandia Soriano et al., 2021). Thus, current evidence remains inconclusive regarding whether BGt can benefit performance in well-trained cyclists.

3.5 Could BGt harm road cycling performance?

While not fully addressed here, some evidence suggests that LC training, such as in BGt, may reduce the cadence at the nadir of rating perceived exertion (RPE) (Whitty et al., 2016), fail to reduce brain activity at optimal cadence (Ludyga et al., 2017), and alter the neuromuscular pattern required to apply high force at HC (Kawamori & Newton, 2006; Koninckx et al., 2010), compared to other training modalities such as HC (Ludyga et al., 2017; Whitty et al., 2016) and RT (Koninckx et al., 2010). Therefore, indirect evidence raises concern about potential negative impacts on performance, especially in prolonged or high-cadence efforts.

4 Practical Applications

The demanding routines of professional and amateur cyclists require optimisation of their training process. Due to limited evidence on some subjects, integrating the best available evidence –direct and indirect– with professional expertise offers a more effective path to informed decision-making. These were the premises for this standpoint.

Current evidence provides no strong rationale for favouring BGt over other training methods. Even within LC training, traditional BGt appears suboptimal, since studies demonstrating LC training benefits used cadences >60rpm and near-maximal intensities. Moreover, BGt may negatively influence key performance determinants. BGt appears even less appealing given recent evidence suggesting that cadence – rather than torque – is the primary limiting factor for power output under accumulated fatigue (Leo et al., 2025).

5 Conclusions

In conclusion, available evidence suggests that BGt is either ineffective or, at best, questionable. The LC and intensity typically employed in BGt are insufficient to trigger the positive adaptations associated with LC training. Effective LC protocols should employ near-maximal intensity and cadence >60rpm for endurance benefits. For strength improvements, LC training must replicate the volume and intensity of traditional off-bike strength protocols. Coaches should reconsider the use of traditional BGt in favour of protocols with better evidence-based outcomes.

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