

## BIOMECHANICAL IMPLICATIONS OF THE BATTING BACKLIFT TECHNIQUE IN CRICKET: A COLLATION OF CURRENT EVIDENCE

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The purpose of this study is to discuss the biomechanical implications of the batting backlift technique (BBT) in cricket. Studies were cross-sectional in which both observational and analytical research methods were employed among past and present successful cricketers (n = 299). Biomechanical and video analyses were performed on all participant groups to determine the type of BBT that they performed. The analyses was conducted utilising the Kinovea TM (Version 0.8.15) software package. This paper showed that the lateral batting backlift technique (LBBT) is a likely contributing factor to successful batsmanship at all levels of cricket ability (junior, adolescent, semi-professional, professional, international and former elite/successful cricketers). It was also found that if batsmen want to be successful at the highest level of cricket, a LBBT is a successful contributing factor (among many of the other contributing factors for success in cricket batting) if adopted at the elite level. Furthermore, the LBBT can assist batsmen in improved performances over the varied formats of cricket between Tests, ODIs and T20s. Despite promising results, there is still a need to answer a number of questions through further in-depth biomechanical investigations and through interventions that are more counter-intuitive.

**KEYWORDS:** Biomechanics, backlift, cricket

**INTRODUCTION:** Studying biomechanical movements would enable skilled batsmen to perform at their best. Biomechanical movements such as the batting backlift technique (BBT) can either enhance or hinder the performance of cricket batsmen at all levels (Noorbhai, 2017). The rather redundant nature of motor organisation in batting, in which the same hitting outcome can be achieved by any number of different batting techniques, has made it difficult to find common biomechanical measures of success across different players, and different levels of skill. This paper aimed to provide a consensus of the BBT at varied skilled levels through biomechanical and video analyses, with key variables of interest being the lateral batting backlift technique (LBBT) and the straight batting backlift technique (SBBT). The study also discusses biomechanical implications of the BBT in cricket (Sarpeshkar and Mann, 2011).

**METHODS:** Given the paucity of studies on the BBT in cricket prior to 2016, this section will largely document the work conducted by Noorbhai and Noakes (2016 – 2019) on the BBT in cricket in recent years, by explaining the methodology and findings of each of the studies. The research design, study procedure, biomechanical analysis, identification of the backlift classifiers, search strategy for cricket players and the data analysis were reliable and conducted similar to previous studies (Noorbhai & Noakes, 2016a; Stuelcken et al., 2005).

Studies (1, 2, 3 and 4) were cross-sectional in which both observational and analytical research methods were employed among past and present successful cricketers (n = 65), semi-professional (SP) (n = 69), professional (P) (n = 48), county professional (CP) (n = 25) and South African International (SAI) players (n = 12), as well as uncoached and coached cricketers (n = 80). Biomechanical and video analyses were performed on all participant groups (Noorbhai and Noakes, 2016a; 2016b; 2019a; 2019b). The analyses included the measurement of a photo sequence with drawing tools and a static angle calculation of the batsman's technique utilising the Kinovea TM (Version 0.8.15) software package. These frames were then used to determine the type of BBT for each type of delivery. The analysis was conducted in both practice and game situations, at the same eye-level. Biomechanical and video analysis was conducted in both the frontal and lateral planes as the batsmen picked up the bat prior to the release of the ball and before making impact with the ball.

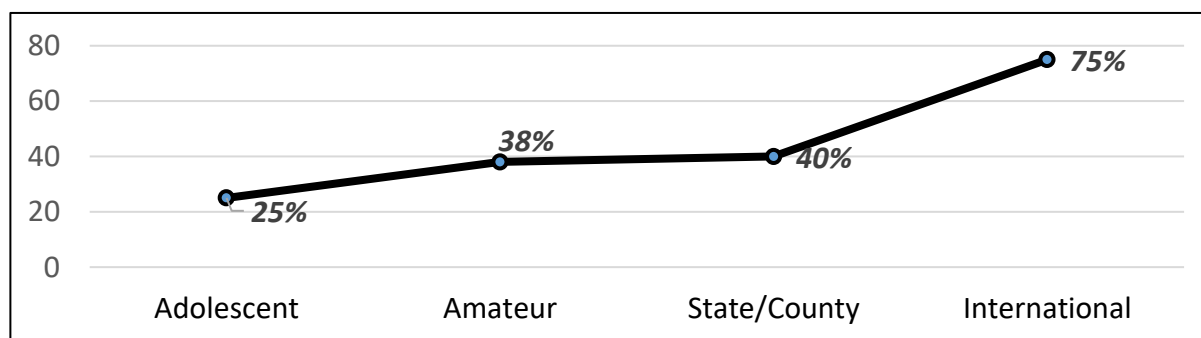
A Pearson's Chi-squared test was performed to determine whether percentages of batsmen using a LBBT differed between the levels of professional cricket. The Student's T-test was used to compare highest scores, career averages and strike rates between batsmen with a LBBT and SBBT, and batsmen in each population group (SP, PP and SAI), respectively. All analyses were performed using R at a significance level of  $\alpha = 0.05$ .

**RESULTS:** Study 1 showed that more than 70% of the greatest batsmen of all time did not adopt the traditionally taught SBBT. Instead, they adopted a more looped action: the movement of the bat (at the moment the bowler released the ball) was in the direction of the slips, or in extreme cases, the face of the bat pointed towards point. Since the vast majority of cricketers are not coached in this technique, these findings indicate that the LBBT is likely a contributing factor to effective batsmanship (Noorbhai and Noakes, 2016a).

Study 2 showed that a LBBT is more common at the highest levels when comparing batsmen at the various levels of cricket (SP = 38%; CP = 40%; P = 40%; SAI = 75%);  $\chi^2 = 39.02$ ,  $df = 3$ ,  $p = 0.001$  (Noorbhai and Noakes, 2019a). This finding is not as conclusive due to the average sample number ( $n = 155$ ) across all the levels. In addition, this study demonstrated that batsmen who have a LBBT were better able to score runs to most parts of the cricket field. Furthermore, study 3 showed that a LBBT was found to positively affect the stance and footwork of batsmen as most batsmen with a LBBT have an open stance at the crease and are able to anticipate the trajectory of the delivery more effectively (Noorbhai and Noakes, 2019b). Again, this is not entirely conclusive due to the limited sample number. Additional analysis on more cricket teams (subject to approval) would need to be investigated.

Study 4 showed that uncoached cricketers naturally adopted the LBBT whereas coached cricketers adopted the SBBT. This suggests that cricket coaches should teach the basic fundamentals of batting techniques to cricketers and allow a young cricketer to play "naturally" without an overemphasis on playing with a SBBT. If such players are not coached, they automatically hit the ball using a LBBT. This indicates that the SBBT is a direct consequence of early coaching. However, this is likely to have detrimental long-term consequences, as it will produce a batting technique that may be too restricted to achieve success at the international level (Noorbhai and Noakes, 2016b).

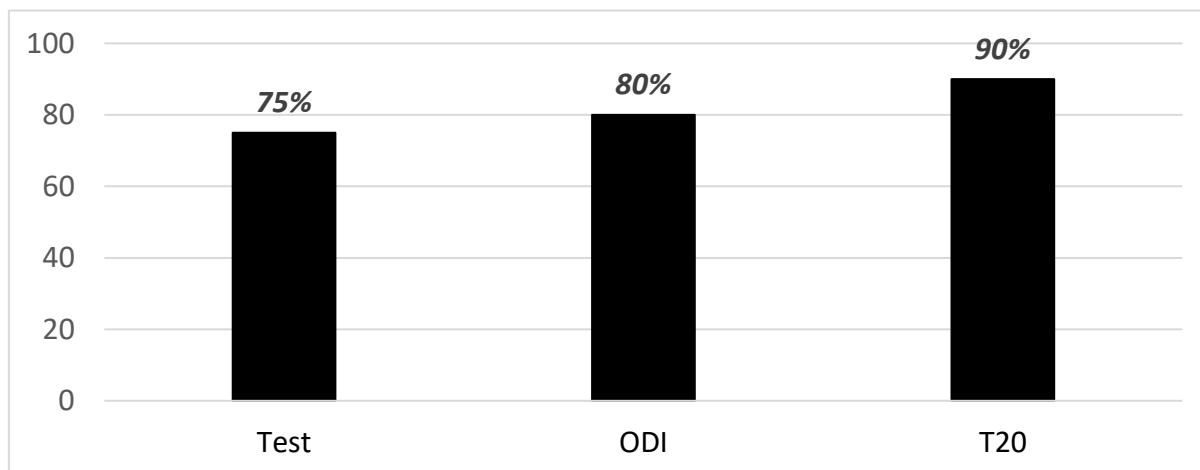
Based on the above four studies, (which funnelled down from the most successful batsmen of all time right down to groups of professional, amateur and coached/uncoached cricketers), we began to understand what BBT was being used at varied levels of cricket. Based on the above, a growing trend of the LBBT has been shown in both the different formats and skill levels (or age groups) of cricket (Figures 1 and 2).



**Figure 1: LBBT trend and percentage change across different levels of cricket**

In Figure 1, we notice the subtle progression between the adolescent and state/county level (25 – 40%). However, one can notice a bigger increase between the state/county level and international level (40 – 75%;  $p = 0.001$ ). This indicates that if batsmen want to be successful at the highest level of cricket, a LBBT is a successful contributing factor (among many of the

other contributing factors for success in cricket batting) if adopted at the elite level. In Figure 2, we see a slight increase of prevalence of the LBBT being used between the different formats of cricket (5% between Tests and one-day international (ODI) cricket, and 10% between ODI and twenty-twenty (T20) cricket). This is, however, not statistically significant. As such, one could postulate, that the LBBT can assist batsmen in improved performances over the varied formats of cricket between Tests, ODIs and T20s. In addition, international batsmen are more likely to adopt a LBBT.



**Figure 2: LBBT trend and prevalence across different formats of cricket**

**DISCUSSION:** Qualitative biomechanical analyses of movement in sports are key to investigate, and particularly in cricket, the mechanical understanding of the backlift in batting has gained some significant traction over the years (Noorbhai, 2017). Research conducted in Australia by Stuelcken, Portus & Mason (2005) on international batsmen ( $n = 9$ ) showed that path tracings of the bat indicated a significant loop (rotary movement of the bat) that was unexpected. It was found that the path of the bat deviated laterally from the mean alignment of the shoulders reaching an average maximum angle in the transverse plane of  $47^\circ$  (after the batsmen initiated the backlift). It is, therefore, important to consider that the path of the bat and direction of the BBT is more important than its starting position.

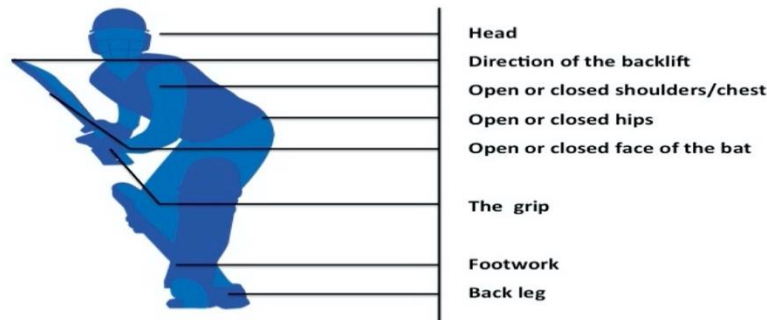
This paper has outlined the practices of the backlift at the various levels of cricket ability (school cricket, adolescent level, club cricket, semi-professional, professional and international cricket levels). It has provided an understanding of why a LBBT is important and why it may be an essential component for success at the highest levels of the game. However, there are some batsmen who are still/will still be successful even though they use the SBBT. As such, coaches need to continue emphasising the importance of individuality (or individual variation) with a batsman as each player will be different.

Stating that the LBBT is an important determinant to success would be a bold statement as there are other key components to also consider, for example: the grip, stance, downswing, impact, follow-through, as well as the morphology, psychology and physical characteristics (fitness, physique and stature) of the batsman (Stretch et al., 1998). It is key to understand that the BBT is a key contributing factor to successful batsmanship. This paper has additional insights and experiences of how current coaches teach the BBT.

Much has changed in the last 50 years of the game due to the rapid adaptations of the one-day format. Although cricket has been in existence for more than 230 years (since 1788), there have been considerable fluctuations in coaching and batting methods in the past century. This paper has contributed to the field of cricket sciences, biomechanics and coaching by demonstrating that the backlift appears to be a key-contributing factor for success.

### Biomechanical implications of the batting backlift technique in cricket

A conceptualised body segment model for the BBT should be used when coaching batsmen (Figure 3). This will assist in understanding the biomechanical implications that the BBT would have on other joint angles and/or components of the batting technique as well as preventing coaches from focusing on just one or two components of the batting technique. Example: players may have a LBBT, however, one should observe what is happening with their feet. The below figure illustrates the main body segments that work collaboratively with the backlift.



**Figure 3: A conceptualised body segment model for the batting backlift technique**

**CONCLUSION:** This study showed that the lateral batting backlift technique (LBBT) is a likely contributing factor to successful batsmanship at all levels of cricket ability (junior, adolescent, semi-professional, professional, international and former elite/successful cricketers). It was also found that coaching a LBBT to young batsmen may be challenging to teach, and therefore, further coaching models should be developed to assist cricket coaches. As much as a LBBT may be a contributing factor for success, there is still a need to answer a number of questions through further in-depth biomechanical investigations and through interventions that are more counter-intuitive. From this study, the BBT in cricket poses a number of questions as to whether it will have biomechanical (as well as coaching) implications for batting success and other components of the batting technique.

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