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AN ANALYSIS OF BATTING BACKLIFT TECHNIQUES AMONG COACHED AND UNCOACHED CRICKET BATSMEN

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ABSTRACT

One of the first principles of cricket batsmanship for batting coaches is to teach junior cricketers to play using a straight bat. This requires the bat to be lifted directly towards the stumps with the bat face facing downwards. No study has yet examined whether there are differences in the batting back lift techniques (BTT) of coached cricketers (CC) and uncoached cricketers (UC). With the study sample, CC comprised of both adolescent (n=30) and amateur (n=10) cricketers, whereas the UC comprised of only young cricketers (n=40). Various types of deliveries were bowled to the participants utilising a bowling machine. Biomechanical and video analyses were performed on both participant groups. Classifiers were utilised to identify the type of BTT employed by all batsmen. More than 70% of uncoached cricketers adopted a lateral BTT, whereas more than 70% of CC adopted the straight BTT. Coaching implications from this study suggest that if players are not coached, they automatically hit the ball using a lateral BTT, which indirectly suggests that coaching emphasising traditional techniques could be disadvantageous to the young cricketer.

***Key words*:** Video analysis; Batting back lift techniques; Cricket; Coached and uncoached batsmen.

INTRODUCTION

One of the first principles of cricket batsmanship as seem by batting coaches is to teach junior cricketers to play using a straight bat; although the most natural way is to play with a bat at a slight angle (Ranjitsinjhi, 1897; Fry *et al*., 1903). In order for this to happen, batsmen are taught to lift the bat directly backwards in the direction of the stumps on the initiation of the batting stroke (Beldam *et al*., 1905).

This straight back lift coaching philosophy was finally entrenched for all cricket playing nations in the first edition of the Marlybone Cricket Club (MCC) coaching manual published in 1954. This included the following statement: "A correct back lift is not natural but can easily be obtained and too much attention cannot be given to getting it right, the bat should be taken back directly over the middle stump" (The MCC, 1954:77).

Forty years later, the 1994 edition of the MCC coaching manual (Lewis, 1992) continued the same interpretation by teaching that the back lift should be directed towards the stumps to ensure that the bat will come down straight, in line with the stumps. However, the same

coaching manual also includes the contrasting statement of former English opening batsman, Sir Geoffrey Boycott: "If your stance is correct, it is a natural movement to pick up your bat in the direction of the slips, as the great batsmen do, such as Sir Donald Bradman" (The MCC, 1962:108). Then, at the top of the back lift, loop the bat and bring it down the line of the stumps. Many tutors teach more traditionally that, if you pick the bat up straight it will come down straight, so they suggest you take the bat back directly over middle-stump. The author feels that the best players have never done that. It simply is not a natural movement and it will let a batsman down under pressure.

If a person searched any search engine with 'how to coach cricket batting', he/she would find over one million results on how to coach batting techniques. If the search is then simplified to 'how to coach batting back lift techniques', the results would reveal approximately six thousand results. Therefore, there is no real consensus of what coaching needs to be advocated with the batting back lift techniques in cricket across all age groups. Most of the coaching literature between 1954 and 2015 have advocated for the bat to be directed towards the wicket-keeper or first slip (The MCC, 1954; Bradman, 1958; The MCC, 1962; Dellor, 1990; Palmer, 1999; Australian Cricket Board, 2000; Woolmer *et al*., 2009). Only since 2007 it became common practice for coaches to coach the back lift in the direction of first or second slip. However, there still remains a paucity of coaches who teach the lateral batting back lift technique.

It is of special interest that Sir Donald Bradman (the most successful batsman of all time with a test batting average of 99.94, at least 30% better than the second best such average), agrees with Boycott's opinion: "If videos were taken of all the greats of cricket then we would see that not one of them take their bats back directly towards the stumps" (Bradman, 1958:36). Bradman's opinion also suggested that "playing with a straight bat was great for defence but not for offence, and that a straight back lift will let you down under pressure" (Bradman, 1958:37). In his coaching video first produced in 1934, Bradman voiced the opinion that "In batting there are many competent players but for some reason, maybe coaching, the emphasis seems now to be on forward play. There are fewer batsmen who are predominantly back foot players. Hence we don't see as many cut shots and pull shots. One cause seems to be the tendency to use heavier bats. These are fine for the pendulum-type shot but militate against strokes across the line of flight".

Bradman's interpretation is that the straight back lift encourages players to play forward and to use heavier bats to generate power (Noorbhai & Noakes, 2015) (Figure 1). According to Bradman, this would reduce their ability to play shots with a cross-bat or off the back foot. As a result, they would have a more restricted range of scoring strokes, they would be more passive in their defensive strokes and they would be unable to score as rapidly as did Bradman (Shillinglaw, 2009).

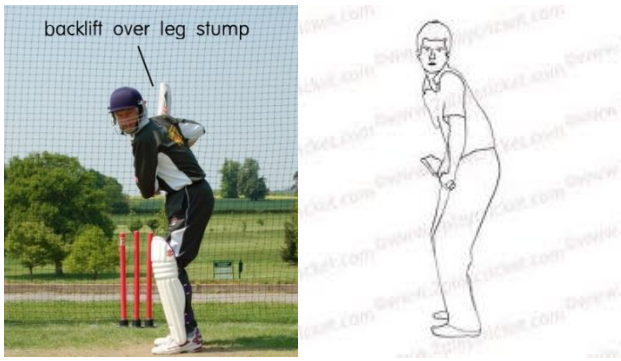


Figure 1. **BACKLIFT TOWARDS THE STUMPS**
(Adapted from Pitchvision and www.2playcricket.com)

The mechanics of the back lift in cricket batting are poorly understood (Davis, 1983; Gibson & Adams, 1989). Qualitative biomechanical analyses of movement in sport are key to its investigation (Kreighbaum & Barthels, 1996). Such a mode of investigation can provide important insights in the biomechanics of technique in sport, especially with those skills that have to satisfy parallel performance outcomes by choosing from a kinematically redundant set of joint angle time-histories (Gelinas & Hoshizaki, 1988; Handford *et al*., 1997; Mullineaux *et al*., 2001).

Cricket batting is complex in this way with different variables, such as the grip, stance, initial movement, back lift, downswing and follow through (Stretch *et al*., 2000). An important component of the overall batting technique is the back lift, a technical component of batting that has defied the traditional attempt to constrain its motion to the linear plane (McLean & Reeder, 2000; Stretch *et al*., 2000). The most proficient run-scorers of the game lift the bat from the region of the slips, often causing the downswing path of the bat to deviate from its upswing. Devising a qualitative biomechanics model of the back lift could, therefore, do much to probe its underlying mechanics.

Research conducted in Australia by Stuelcken *et al*. (2005) on international batsmen (n=9) was one of very few studies that demonstrated findings of the back lift in cricket batting. The study showed that path tracings of the bat indicated a distinctive loop, which was unexpected. No clear evidence was provided by the authors to explain why this occurred, aside from the fact that increasing the number of strokes would be a likely outcome. In addition, it was found that the path of the bat deviated well outside the mean alignment of the shoulders to reach an average maximum angle in the transverse plane of 47°. Furthermore, this angle was reduced by a mean of 23° at the top of the back lift, the position of the bat was still well away from an alignment that would enable the required bat plane for a drive to the off-side (Stuelcken *et al*., 2005).

Later, Penn and Spratford (2012) investigated whether current coaching recommendations for cricket batting techniques are supported by findings from biomechanical research. The research indicated that coaching manuals are valuable tools for coaches and that it is common practice for such coaching manuals to be written by former players and coaches of the game (Penn &

Spratford, 2012). These manuals are based on their views and/or experiences and, thus, lack the scientific rigour of a peer-reviewed journal. Therefore, this area of batting back lift techniques of cricketers requires further research. A previous research study (Noorbhai & Noakes, 2016) has shown that a vast majority of successful batsmen (77%) in the last century had used a lateral batting back lift technique. It was also found that the lateral batting back lift technique is a key contributing factor of the overall cricket batting technique.

For the purpose of this study, the 'lateral' batting back lift technique described by Bradman and Boycott is one in which the bat is lifted laterally in the direction of second slip or gully. Using this technique, the face of the bat is directed towards point. In the straight MCC batting back lift technique, the bat is lifted towards the stumps or first slip and the face of the bat points towards the wicket-keeper or the ground.

RESEARCH AIMS AND OBJECTIVES

To the researcher's knowledge, no study has yet examined whether there are differences in the back lift and batting techniques of coached and uncoached cricket players. Therefore, the aim of this research study was to investigate the batting back lift techniques of coached and uncoached cricket players. It was hypothesised that uncoached cricketers would adopt the lateral batting back lift technique (a looped back lift with an open face of the bat), whereas coached cricketers would adopt the straight batting back lift technique (straight back lift and closed face of the bat).

METHODOLOGY

This is a cross-sectional research study in which both observational and analytical research methods were employed.

Participants

All participants were young, adolescent or amateur cricketers residing in the Western Cape Province, South Africa. The young cricketers (both male and female) were between the ages of 7 and 11 years who participated in the Calypso cricket programme in the Atlantis and Khayelitsha areas in the Western Cape, whereas the adolescent cricketers were between 12 and 18 years of age and belonged to the Western Province Cricket Club. The number of cricketers among both the young and adolescent groups were equally represented in their respective age groups. Amateur cricketers between 19 and 29 years of age were players of the Western Cape amateur provincial team. The average age of the amateur cricketers was 23±2.73 years (Table 3). For the purpose of this research study, adolescent and amateur cricketers were grouped as coached cricketers (CC), whereas young cricketers were grouped as uncoached cricketers (UC).

Calypso cricket is a unique and enjoyable adaptation of the conventional game of cricket (Burton, 1985). Utilising most of the rules of cricket, the game is usually played on the beaches with 2 teams of 10 players each. This competitive sport that originated in the West Indian islands, is played between different villages that gather in their hundreds for the event (Midgett, 2003). It has proven to be an exciting way of introducing young children to the game of cricket

and usually encompasses children being taught how to play cricket instead of being coached for certain ways of playing (Burton, 1985; Midgett, 2003).

Study procedure

Various types of deliveries (n=12; 3 short deliveries, 3 good-length deliveries, 3 full deliveries and 3 full-toss deliveries, either pitched on middle, leg or outside off-stump), were bowled to the participants utilising a bowling machine in indoor or outdoor nets. Participants were required to bat using their usual batting technique.

Biomechanical analysis

Biomechanical and video analyses were performed on both participant groups. This analysis included the measurement of a photo sequence with drawing tools and a static angle calculation of the batsman's technique utilising the Kinovea™ (Version 0.8.15) software package. The analysis was done similar to other studies (Stuelcken *et al*., 2005) whereby the initial movement of the batsman was determined from the first frame before the initiation of the back lift, while initial movement patterns were assessed qualitatively by viewing the footage. The back lift represented the period from the initiation of the back lift to the maximum vertical displacement of the toe of the bat and selected the video frame immediately before the bowler released the ball. These frames were then used to determine the type of batting back lift technique for each type of delivery bowled. Variables of interest included the direction of the back lift and where the face of the bat is directed during the back lift from a Canon LEGRIA HF R506 HD Camcorder™ video camera attached to a laptop computer. An external hard drive from the video camera was inserted into a laptop for further usage of the software. All of the above was performed on both participant groups.

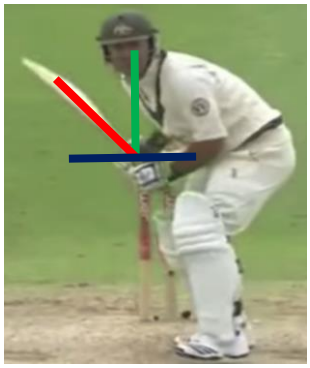
Classifiers

Classifiers were utilised to identify the type of batting back lift technique employed by all batsmen. These classifiers were coded as "1" (bat face facing straight back and towards the wicket-keeper or the ground), "2" (bat face facing first or second slip) and "3" (bat face towards gully or point). If the bat is directed fairly straight back or towards the slips/gully regions but has an open face of the bat, it is classified as classifier "4". Angle ranges were conceptualised to determine these classifiers (1=between 0 and 25º; 2=between 25 and 45º; 3=between 45 and 80º; 4=same as 3, but with an open face of the bat).

For the purpose of this study, the toe of the bat is defined as the vector orthogonal to the toe being the pointer (Glazier *et al*., 2003). This strengthens the validity and reliability of the analysis as the back lift can be readily detected and analysed at different positions and time points in the lift (Hopkins, 2000).

Drawing a vector is a common approach in defining the toe of the bat and how it will point in a particular direction (Kreighbaum & Barthels, 1996). Lines and vectors were drawn (1) vertically from the head to the hands (green line); (2) a line drawn horizontally to show where the hands rest (blue line); and (3) a line drawn obliquely to show the direction of the bat during the back lift (red line). The still photo (which was captured from the video footage, namely the last frame just before the bowler had released the ball) was analysed while the ball had just

been released from the bowler. These lines create an angle to show how far away the bat is from the body in the frontal plane and how much rotation is made before making impact with the ball. The researchers accounted for perspective error by limiting the type of videos observed, as well as including horizontal lines in the background.



Right-handed batsman

Left-handed batsman

Figure 2. **LINES AND VECTORS DEPICT ANGLE OF BATTING BACKLIFT TECHNIQUE**

Analysis of data

STATISTICA 11 analysis software was used for all statistical analyses. Descriptive statistics were performed and results were represented as means and standard deviations for continuous variables.

Ethical considerations

Child assent, as well as informed consent forms were obtained from parents and players prior to each child's and adult's participation. Ethical approval for the study was granted by the Human Research Ethics Committee of the University of Cape Town (HREC: 586/2014). This research study conforms to the World Medical Association Declaration of Helsinki on Ethical Principles for Research Involving Human Subjects.

RESULTS AND DISCUSSION

The CC comprised of both the adolescent (n=30) and amateur (n=10) cricketers, whereas the UC comprised of only the young Calypso cricketers (n=40) (Table 1, 2 & 3). Of the UC, 75% adopted the lateral batting back lift technique and 25% were classified in the most lateral group (Classifier 4) (Table 1 & Figure 3). Of the coached adolescent cricketers, 27% adopted the lateral batting back lift technique and only one batsman was classified under the most lateral group (Table 2 & Figure 4). Between the age groups of under-9 and the amateur side, there is a slight decline of players utilising the lateral batting back lift technique. Therefore, as players increase in age, the use of the lateral batting back lift technique decreases due to traditional coaching. With regard to the amateur cricketers, only 2 out of the 10 players adopted the lateral batting back lift technique and was classified under classifier 4 (Table 3 & Figure 5).

Interestingly, both these batsmen achieved the highest averages in both 3-day and 1-day formats of the game respectively (Player 5.2=41.3 and 48.9%; Player 5.4=51.8 and 34.3%). Although player 5.8 had an average of 46% in 1-day cricket, this figure was not relevant as the player had played only one game (Table 3).

Table 1. **DEMOGRAPHIC AND BATTING CHARACTERISTICS OF YOUNG UC**

Young age groups	**N**	**Lateral BBT**	**Straight BBT**	**Class 1**	**Class 2**	**Class 3**	**Class4**
Under-9	20	16	4	4	5	4	7
Under-11	20	14	6	6	1	3	10
Total (%)	40	30 (75)	10 (25)	10 (25)	6 (15)	7 (17)	17 (43)

BBT=Backlift Batting Technique Class=Classifier

Table 2. **DEMOGRAPHICAL AND BATTING CHARACTERISTICS OF ADOLESCENT CC**

Adolescent age groups	**N**	**Lateral BBT**	**Straight BBT**	**Class 1**	**Class 2**	**Class 3**	**Class4**
Under-13	10	3	7	5	2	2	1
Under-15	10	3	7	5	2	3	0
Under-19	10	2	8	6	2	2	0
Total (%)	30	8 (27)	22 (73)	16 (54)	6 (20)	7 (23)	1 (3)

BBT=Backlift Batting Technique Class=Classifier

Table 3. **DEMOGRAPHIC BATTING AND PERFORMANCE CHARACTERISTICS OF AMATEUR CC IN 3-DAY AND 1-DAY CRICKET**

Amateur players	**Age** (yrs)	**BTT**	**Class**	**Three-day** Runs	Average	**One-day** Runs	Average
Player 4.1	28	Straight	1	76	7.60	15	15.00
Player 4.2	25	**Lateral**	4	5873	**41.35**	2152	**48.90**
Player 4.3	21	Straight	2	1927	27.52	487	18.73
Player 4.4	19	**Lateral**	4	570	**51.81**	103	**34.33**
Player 4.5	25	Straight	2	3000	34.09	376	17.09
Player 4.6	26	Straight	1	802	22.91	171	11.40
Player 4.7	20	Straight	2	117	23.40	6	3.00
Player 4.8	20	Straight	1	73	7.30	46	46.00
Player 4.9	24	Straight	2	90	12.85	13	13.00
Player 4.10	22	Straight	2	167	12.84	114	16.28
Total Gr. Mean±SD	23±2.73	—	2.1±1.04	1269.5	24.17	348.3	22.40

BBT=Backlift Batting Technique Class=Classifier Age by 18 February 2015

3.1

3.2

3.3

3.4

3.5

3.6

3.7

3.8

3.9

3.10

3.11

3.12

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3.27

3.28

3.29

3.30

3.31 **3.32** **3.33** **3.34** **3.35**

3.36 **3.37** **3.38** **3.39** **3.40**

Figure 3. **UNCOACHED CRICKETERS PLAYING CALYPSO (STREET) CRICKET** (n=40)

4.1

4.2

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4.4

4.5

4.6

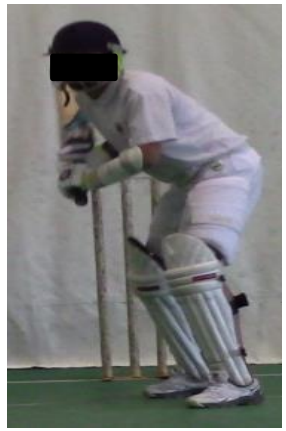
4.7

4.8

4.9

4.10

4.11



4.12

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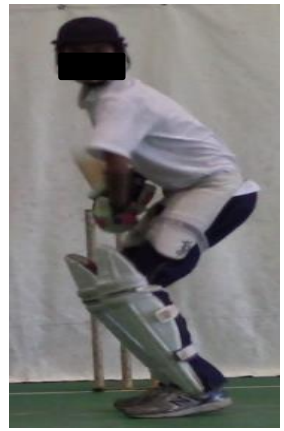
4.14



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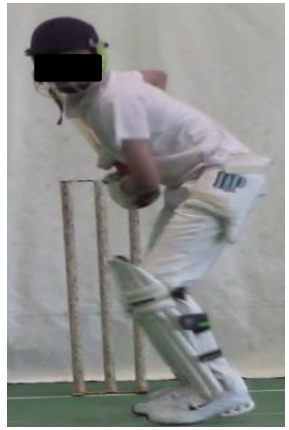

4.19

4.20

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Figure 4. **COACHED CRICKETERS PLAYING CRICKET AT ADOLESCENT LEVEL** (n = 30)

5.1 **5.2** **5.3** **5.4** **5.5**

5.6 **5.7** **5.8** **5.9** **5.10**

Figure 5. **COACHED CRICKETERS PLAYING CRICKET AT AMATEUR LEVEL** (n=10)

6.1 Sir Donald Bradman
Angle of 60º

6.2 Young UC
Angle of 75º

6.3 Adolescent CC
Angle of 35º

6.4 Amateur CC
Angle of 35º

Figure 6. **FOUR-WAY COMPARISON OF BACKLIFT BATTING TECHNIQUES**

The main finding of this research study showed that more than 70% of previously uncoached cricketers adopted the *lateral* batting back lift technique, whereas more than 70% of coached cricketers adopted the *straight* batting back lift technique. This result showed that the natural movement of uncoached cricketers was to pick up the bat in a rotary angle or laterally. Similar sports, such as baseball, golf and tennis, also have their bat pointed away from their bodies before impact and in an angular direction instead of being taken straight back (Welch *et al*., 1995). The technique of baseball hitting shows that higher rotational velocities facilitate successful timing. If the rotational component is emphasised then the centre of pressure aligns itself with the centre of mass between both feet (Welch *et al*., 1995). A wider arc of swing also produces a wide range of shot selection instead of just predominantly forward defensive play (Borooah & Mangan, 2010). Similarly, in cricket this would ensure more effective timing and power when hitting the ball.

To further elaborate on the angular direction of the bat, Figure 6 shows a comparison of batting back lift techniques among CC, UC and Sir Donald Bradman. Both images 6.1 of Sir Donald Bradman and 6.2 of the typical uncoached cricketer shows an enlarged angle of more than 60^{o}, whereas images 6.3 and 6.4 of coached cricketers shows a small angle of less than 40^{o}. It can be deduced that cricketers who have a lateral angle of the back lift of more than 50^{o} might have a better chance of hitting the ball effectively.

STRENGTHS AND LIMITATIONS

The strength of this study was the ability to capture videos for both groups of participants analysing 12 various ball deliveries for each participant. Another strength of this study was that each group of participants played in their same environment and in the same month which limited a seasonal effect. Biomechanical and video analysis of the players were also obtained objectively and were not self-reported. A limitation of this study was the paucity of statistics available for the adolescent group posing a challenge to conduct an additional statistical analysis. Furthermore, the researchers accounted for perspective error by limiting the type of videos observed and including horizontal lines in the background.

CONCLUSION

Uncoached cricketers adopted the lateral batting back lift technique, whereas coached cricketers adopted the straight batting back lift technique. Coaching implications from this study suggests that cricket coaches should teach the basic fundamentals of batting techniques to cricketers, allow a young cricketer to play naturally and coach them based on their individual ability. If such players are not coached, they automatically hit the ball using a lateral back lift which indirectly suggests that early coaching emphasising traditional techniques could be less favourable to the young cricketer. Aside from the stance, grip, downswing and follow through of cricket batting, the back lift is a key contributor to effective batsmanship and, therefore, it should not be excluded in any performance analysis in cricket. Future research is required to evaluate the coaching methods of the batting back lift techniques taught by coaches at various levels in most International Cricket Council countries, as this can inform what the current practice of coaching is across a varied spectrum.

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