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Does shortening the pitch make junior cricketers bowl better?

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ABSTRACT

In order to get bounce and movement seam bowlers need to bowl the ball “into” the pitch. Standard deliveries by elite players are typically projected at around 7° below horizontal. In contrast, young players currently often need to release the ball almost horizontally in an effort to get the ball to bounce close enough to the batter. We anticipated that shortening the pitch could be a simple way to help young bowlers to release the ball at a better angle and with more consistency. Twenty county or best in club age group under 10 and under 11 seam bowlers were analysed bowling indoors on two different pitch lengths. They were found to project the ball on average 3.4° further below horizontal on a 16 yard pitch compared with a 19 yard pitch, while ball speed and position at release changed negligibly. Pitch length did not affect the consistency of the release parameters. The shorter pitch led to a ball release angle closer to that of elite bowlers without changing release speed, and this should enable players to achieve greater success and develop more variety in their bowling.

Keywords: Cricket, seam bowling, release angle, release speed, pitch length

INTRODUCTION

Bowlers try to deceive batters with a combination of speed, movement in the air and movement off the pitch. Pace or seam bowlers must bowl the ball into the surface to get the ball to bounce and/or move sideways off the pitch; as Woolmer, Noakes and Moffett (2008) put it “to get the seam to bite and bounce, you need to hit the deck hard” (p. 253). In other words, a greater downward component of velocity elicits more bounce and increases the chances that the ball will deviate from its line when the raised, stitched seam of the cricket ball hits the pitch.

Adult emerging national pace bowlers, playing on 22 yard (20.12 m) long pitches, bowl the ball at an angle typically around 7° below the horizontal for their standard deliveries (Cork, Justham & West, 2012; Justham, West & Cork, 2008; Worthington, 2010). The current recommendations for junior pitch lengths range from 18 yards (16.46 m) at under 9 to 21 yards (19.20 m) at under 13, with older juniors playing on a full length pitch (Marylebone Cricket Club, 2015). Despite playing on these slightly shorter pitches, many otherwise competent junior bowlers still appear to struggle to project the ball the required distances with good technique. In order to achieve the distance they often release the ball travelling close to or even above the horizontal, not directing the ball into the pitch as the best adults do. The debate about junior pitch lengths has been acknowledged by the Marylebone Cricket Club (MCC, 2017a) and they have removed their recommendations from the 2017 Code of the Laws of Cricket (MCC, 2017b) leaving governing bodies to determine the pitch lengths (Law 8.4) from October 2017 onwards.

Cricket Australia trialled wide ranging changes to their junior formats for their 2016-17 season which included reducing pitch lengths to between 14 m (15.3 yards) for 7 to 10 year olds, and 17.7 m (19.4 yards) for under 14s. These have subsequently been revised to 14, 16 and 18 m for under 9s, 11s and 13s respectively (Cricket Australia, 2017), although research quantifying the specific effects of bowling on shorter pitches is sparse. Elliott, Plunkett and Alderson (2005) found that when asked to bowl as fast as they could on three pitch lengths, junior fast bowlers were

more accurate and under 11s and 13s also bowled with a safer technique on 16 and 18 m pitches compared with 20.12 m. They found that ball speed did not change significantly, although only three deliveries per bowler on each of three pitch lengths were analysed.

Other sports also modify the dimensions of aspects of the playing environment in junior age groups (e.g. tennis, baseball, basketball) and in their review Buszard, Reid, Masters and Farrow (2016) highlighted the potential benefits of scaling equipment and play areas to suit junior participants, while noting the general lack of empirical evidence underpinning such changes.

Shortening the pitch could be a straightforward way to help young cricketers to bowl more like elite players, releasing the ball with a more downward trajectory and consequently achieving greater success and enjoyment. However, bowlers might adjust their range by altering the ball release speed, although the results of Elliott et al. (2005) did not support this. Changes to release position also affect the range of the ball, but release position is constrained by an individual's size and the bowling action itself.

The purpose of this study was to quantify the effect of altering the pitch length on ball release position, speed and angle in bowling by junior seam bowlers and the consistency of these parameters. We anticipated that the bowlers would adapt the angle at which the ball was projected, releasing the ball with a more downward trajectory on a shorter pitch, rather than by adjusting bowling speed or changing the point of release. It was also anticipated that variability in the release parameters would be reduced on the shorter pitch.

METHODS

Twenty male, junior, right-arm seam bowlers (aged 10.8 ± 0.63 years; height 1.46 ± 0.058 m), agreed to participate in the study, having been identified by their county or club coaches as being the best in their age group squads. The study was approved in accordance with university ethics committee guidelines and once the procedures had been explained to them, informed consent was obtained from the players and their parents.

The study was conducted at an indoor cricket facility on a synthetic grass surface (Supergrasse™ Shield), which has a 9 mm pile height and is laid on a concrete base (Figure 1). The layout of the hall enabled the bowlers to use their full run-up. Following their individual bowling warm ups and familiarization with the testing procedure, each player bowled 12 deliveries (two "overs") on each of two different pitch lengths. Half of the group bowled their first 12 balls on 19 yards (17.37 m), followed by 12 balls on 16 yards (14.63 m), and the pitch length order was reversed for the other half of the group. Nineteen yards was the England and Wales Cricket Board (ECB) recommended length for the under 10 age group that 16 of the bowlers had been in during that season (four club bowlers were from the under 11 age group) and 16 yards was chosen by a Level 4 coach following a pilot study with a county under 10 squad.

Figure 1. Data collection environment.

The players were asked to bowl good length balls at their usual pace (aiming to bowl so that the ball bounced and passed or struck the stumps at close to stump height). They rested between deliveries as they desired and had a number of practice deliveries according to their individual needs (typically two or three) when the pitch length was changed. The total number of deliveries per bowler complied with the ECB Fast Bowling Match Directives (ECB, n.d.).

An 18 camera Vicon Motion Analysis System operating at 300 Hz was used to track 14 mm diameter spherical reflective markers attached to the left heel, medial and lateral epicondyles of the right wrist and back of the right hand. Two 24 x 24 mm square patches of reflective tape were placed diametrically opposite each other on the new four-piece leather 135g junior cricket balls (GM “Clubman”) used in the study. The system z-axis was in the upward vertical direction, the y-axis was defined to be parallel to the long axis of the pitch, with the positive direction being measured from the bowling (or “popping”) crease towards the batting end, and the x-axis was mutually orthogonal to y and z, positive from left to right from the bowlers’ perspective. The calibrated volume included at least four steps prior to ball release and over 3.50 m of ball flight. Prior to the bowling trials, a static trial was recorded for each individual with the ball held at the tips of the first and middle fingers, as if just being released (Figure 2). This was used to calculate the distance between the ball and wrist centres (mid-point of the two epicondyle markers) at release.

Figure 2. Ball release static trial.

Ball release was taken to be the first frame where the ball-wrist centre distance exceeded the value from the bowler’s static trial. Raw wrist epicondyle positions were not smoothed as calculating the mid-point of the two to find the wrist centre had a smoothing effect. Throughout the recorded flight, straight line least squares fits were made to ball position with respect to time in the x and y directions, and parabolic least squares fits (with acceleration constrained to be -9.81 m.s^{-2}) were

made in the vertical direction. This smoothed the raw data and enabled ball position and speed at release in each direction to be determined in a similar manner to Dupuy, Mottet and Ripoll (2000).

The magnitude (release speed) and angle with respect to the horizontal (release angle) of the resultant ball release velocity were calculated, along with the release height as a percentage of stature ("Release Height %"), the left heel position in the y direction at front foot contact ("front foot position"), and the y displacement of the ball at release in relation to the front foot position, again as a percentage of stature ("Release Distance %"; Figure 3). As the left heel position at foot contact was required, smoothing of these data was considered inappropriate due to the sudden acceleration.

Figure 3. Bowler at the point of ball release illustrating release height, release distance and front foot position in relation to the bowling crease.

For each bowler on both pitch lengths, median values were determined as representative of each of the five parameters and standard deviations were calculated as estimates of bowler variability (Fleisig, Chu, Weber & Andrews, 2009). All deliveries were included in the analyses but using median values rather than means reduced the influence of outliers. Within-subject differences between medians and standard deviations for each measure were calculated, followed by the means, standard deviations and 95% confidence intervals of these paired differences for the group of 20 bowlers. SPSS (version 22) was used to perform the Shapiro-Wilk test to check that the data were normally distributed. Additionally standardized effect sizes (Cohen's d with the 19 yard standard deviations as the denominator) were interpreted according to the guidelines of Cohen (1988) where: $d < 0.2$ is "trivial"; $0.2 < d < 0.5$ is "small"; $0.5 < d < 0.8$ is "medium"; $d > 0.8$ is "large". Explicit significance testing was not conducted, however a statistically significant two-tailed

difference at the $p < .05$ level can be inferred where the 95% confidence interval does not include zero difference between the paired differences (Cumming, 2014).

RESULTS

The mean of the individual median bowling speeds across all bowlers on both pitch lengths was $21.1 \pm 1.41 \text{ m.s}^{-1}$ (Table 1). The difference between the mean bowling speeds on the two pitch lengths was 0.13 m.s^{-1} , 95% Confidence Interval for the difference was $[-0.06, 0.32]$, and there was a trivial effect size of 0.09 (Table 2).

Table 1. Ball release parameters for each bowler on 16 and 19 yard pitches, median (standard deviation) and overall mean and standard deviation for deliveries on both pitch lengths

	Bowler	RelSp (m.s ⁻¹)		RelAng (°)		RelHt%		RelDist%		FFPos (m)	
16 YARD DELIVERIES	1	21.3	(0.45)	-8.4	(5.2)	109	(0.0)	33	(0.1)	-0.71	(0.23)
	2	20.8	(0.40)	-4.7	(5.0)	105	(0.0)	34	(0.1)	-0.92	(0.16)
	3	19.7	(0.23)	-3.7	(4.1)	114	(0.0)	39	(0.1)	-0.36	(0.07)
	4	19.7	(1.01)	-3.9	(4.0)	110	(0.0)	29	(0.1)	-0.19	(0.15)
	5	23.9	(0.34)	-4.5	(2.1)	107	(0.0)	31	(0.0)	-0.16	(0.06)
	6	21.4	(0.37)	-3.3	(3.2)	105	(0.0)	30	(0.1)	-0.17	(0.06)
	7	17.7	(0.43)	-0.6	(4.3)	119	(0.0)	19	(0.1)	-0.10	(0.08)
	8	20.6	(0.60)	-6.4	(4.0)	114	(0.0)	40	(0.1)	-0.38	(0.21)
	9	21.8	(0.88)	-8.8	(3.6)	109	(0.0)	28	(0.0)	-0.43	(0.08)
	10	20.5	(0.52)	-1.2	(3.5)	117	(0.0)	25	(0.1)	-0.40	(0.31)
	11	22.1	(0.59)	-5.4	(2.5)	115	(0.0)	27	(0.1)	-0.47	(0.07)
	12	20.2	(0.64)	-1.1	(4.3)	107	(0.0)	34	(0.1)	-0.65	(0.14)
	13	21.1	(0.36)	-0.1	(4.0)	114	(0.0)	30	(0.1)	0.09	(0.14)
	14	20.6	(0.44)	-2.9	(4.4)	108	(0.0)	27	(0.1)	-0.25	(0.12)
	15	22.6	(0.41)	-10.5	(6.0)	103	(0.0)	42	(0.1)	-0.27	(0.11)
	16	21.6	(0.35)	0.5	(2.6)	112	(0.0)	14	(0.1)	-0.38	(0.12)
	17	23.4	(0.38)	-6.6	(3.8)	110	(0.0)	35	(0.1)	-0.36	(0.10)
	18	21.4	(0.49)	-0.0	(3.6)	110	(0.0)	34	(0.1)	-0.41	(0.10)
	19	23.2	(0.65)	-6.3	(2.9)	107	(0.0)	34	(0.1)	-0.28	(0.17)
	20	20.7	(0.44)	-5.3	(3.9)	114	(0.0)	41	(0.1)	-0.32	(0.11)
19 YARD DELIVERIES	1	21.4	(0.87)	2.6	(6.1)	112	(0.0)	22	(0.1)	-0.78	(0.16)
	2	20.1	(0.44)	2.8	(3.8)	110	(0.0)	28	(0.1)	-0.87	(0.16)
	3	19.0	(0.46)	2.3	(4.7)	117	(0.0)	36	(0.1)	-0.38	(0.09)
	4	19.3	(0.80)	-0.5	(2.8)	112	(0.0)	29	(0.0)	-0.22	(0.11)
	5	23.3	(0.47)	-2.8	(3.9)	109	(0.0)	25	(0.1)	-0.16	(0.06)
	6	21.0	(0.35)	-0.3	(2.5)	107	(0.0)	28	(0.1)	-0.23	(0.25)
	7	18.4	(0.62)	3.1	(3.8)	121	(0.0)	14	(0.1)	-0.04	(0.08)
	8	20.4	(0.82)	-3.0	(3.5)	114	(0.0)	37	(0.1)	-0.21	(0.12)
	9	21.6	(0.62)	-4.8	(3.8)	110	(0.0)	24	(0.0)	-0.44	(0.05)
	10	19.7	(0.59)	5.5	(5.8)	119	(0.0)	18	(0.1)	-0.35	(0.14)
	11	22.3	(0.67)	-6.0	(3.5)	115	(0.0)	28	(0.1)	-0.47	(0.05)
	12	20.2	(0.50)	0.0	(3.6)	107	(0.0)	31	(0.1)	-0.58	(0.09)
	13	21.2	(0.39)	-0.2	(3.0)	115	(0.0)	33	(0.1)	0.07	(0.11)
	14	20.5	(0.49)	-1.0	(3.0)	111	(0.0)	21	(0.1)	-0.26	(0.12)
	15	22.7	(0.35)	-2.5	(5.7)	107	(0.0)	31	(0.1)	-0.17	(0.18)
	16	21.4	(0.50)	1.0	(1.4)	113	(0.0)	17	(0.0)	-0.40	(0.09)
	17	23.2	(0.23)	-5.1	(2.8)	112	(0.0)	34	(0.1)	-0.42	(0.13)
	18	21.9	(0.54)	1.3	(1.9)	111	(0.0)	33	(0.0)	-0.35	(0.07)
	19	23.2	(0.42)	-3.9	(3.4)	109	(0.0)	32	(0.1)	-0.36	(0.10)
	20	20.7	(0.46)	-3.5	(2.8)	116	(0.0)	38	(0.1)	-0.39	(0.14)
Overall mean		21.14	(0.51)	-2.45	(3.72)	111.4	(0.0)	29.7	(0.1)	-0.355	(0.12)
s		1.41	(0.18)	3.55	(1.09)	4.2	(0.0)	7.0	(0.0)	0.220	(0.06)

Note: RelSp, release speed; RelAng, release angle; RelHt% & RelDist%, release height and distance respectively as a percentage of stature; FFPos, y position of the left heel with respect to the bowling crease.

Table 2. Means, differences between means, confidence intervals and effect sizes for ball release parameters and their variability

	16 yd (mean $\pm$ s)	19 yd (mean $\pm$ s)	Difference	95% CI on Difference	Effect Size
RelSp (m.s ⁻¹)	21.2 $\pm$ 1.43	21.1 $\pm$ 1.42	0.13	-0.06, 0.32	0.09
RelSp variability	0.50 $\pm$ 0.19	0.53 $\pm$ 0.17	-0.03	-0.11, 0.05	0.18
RelAng (°)	-4.2 $\pm$ 3.1	-0.7 $\pm$ 3.2	-3.4	-4.8, -2.0	1.08
RelAng variability	3.85 $\pm$ 0.94	3.59 $\pm$ 1.23	0.26	-0.3, 0.8	0.21
RelHt% (% stature)	110 $\pm$ 4.3	112 $\pm$ 4.9	-1.8	-2.4, -1.3	0.46
RelHt% variability	0.0 $\pm$ 0.0	0.0 $\pm$ 0.0	0.0	-0.0, 0.0	0.21
RelDist% (% stature)	31 $\pm$ 6.9	28 $\pm$ 6.9	3.2	1.4, 5.0	0.47
RelDist% variability	0.1 $\pm$ 0.0	0.1 $\pm$ 0.0	0.0	-0.0, 0.0	0.43
FFPos (m)	-0.36 $\pm$ 0.22	-0.35 $\pm$ 0.22	-0.01	-0.0, 0.0	0.03
FFPos variability	0.13 $\pm$ 0.06	0.12 $\pm$ 0.05	0.01	-0.02, 0.05	0.30

Note: RelSp, release speed; RelAng, release angle; RelHt% & RelDist%, release height and distance respectively as a percentage of stature; FFPos, y position of the left heel with respect to the bowling crease.

Eighteen of the 20 bowlers released the ball at a more downward angle on the 16 yard pitch (Table 1). In fact the median release angles of 19 bowlers were below the horizontal on the 16 yard pitch (range -10.5 to 0.5°), compared with only 12 on 19 yards (range -6.0 to 5.5°). Hence, at -4.2° the group mean release angle was 3.4°, 95% CI [2.0, 4.8] further below the horizontal on 16 yards than on 19 yards (at -0.7°), with a large effect size of 1.08 (Table 2).

The average Release Height % was lower and average Release Distance % greater on the shorter pitch, both small effects (equivalent to 0.03 m lower and 0.05 m further forward).

Placement of the front foot at the point of delivery was essentially unchanged between the two pitch lengths, the heel being approximately 0.35 m behind the bowling crease. Of the 20 bowlers only three bowled one or more No Balls (where no part of the front foot is behind the back edge of the bowling crease, i.e. the front foot position was positive). Between those three, only 12 No Balls were bowled in total: 2.5% of the 480 balls recorded. Just one bowler's median front foot position was in front of the crease, by 0.09 m on the 16 yard pitch and 0.07 m on 19 yards.

Group mean variability was not substantially different between pitch lengths for any of the release parameters.

DISCUSSION

This study quantified the impact of altering the pitch length on the ball release position, speed and angle of deliveries by a group of 20 junior seam bowlers. The only large difference found was in the initial angle of projection of the ball (release angle) which was 3.4° lower on the 16 yard pitch compared with the 19 yard pitch.

The ball release heights as a percentage of stature reported here are comparable to the values in the literature (e.g. Bartlett, Stockill, Elliott and Burnett, 1996; Salter, Sinclair and Portus, 2007; Spratford, Keneally-Dabrowski, Byrne, Hicks and Portus, 2016; Worthington, 2010), while release distance usually goes unreported, or is measured from a fixed point and not normalized with respect to stature (Cork et al., 2012). Ball release height and release distance are dependent on and limited by both physique and technique, furthermore the nature of the bowling action dictates that an increase in release distance tends to accompany a decrease in release height, and vice versa, as found in this study. Release height variations of the magnitudes found in bowling have a very limited influence on the time of flight and consequently on the range of the ball in flight, as illustrated by Dupuy et al.

(2000) for an underarm throwing task. At the typical release speeds and angles of bowlers in this study, the 1.8 percentage point difference in Release Height % makes a difference of about 0.1 m to the range. So the influence of changes to release height and release distance on the horizontal distance from the heel of the front foot to the point where the ball bounces are individually small, and in combination negligible.

The minimal change in front foot position between pitch lengths gives no indication that the players tried to compensate for the pitch length difference by adjusting their run ups, for example by bowling from in front of the bowling crease (“No Balling”) on the 19 yard pitch, or further behind the crease on 16 yards. The bowlers were given no specific instructions about from where they should bowl but, with one exception, usually bowled with at least part of their front foot behind the bowling crease, in accordance with the No Ball law (Law 21; MCC, 2017b). In the exceptional case, although most of his deliveries were slight No Balls, his foot placement was very similar on both pitch lengths, again indicating that he was not using this as a means to adapt to the change of pitch length.

Ball release speeds in this study were slightly faster on average than the 20.1 m.s⁻¹ reported by Elliott et al. (2005) for players of the same age bowling as fast as they could, possibly indicating a slightly higher average standard of player in the current study. Elliott et al. (2005) stated that on a shorter pitch bowlers “do not have to develop the same ball speed to attain a ‘good length’” (p. 662), which is clearly true mechanically. Nevertheless in their study of bowlers from three age groups (under 11, 13 and 15) who were asked to complete a target bowling task on 16, 18 and 20.12 m pitches, they found no significant differences in ball release speed between pitch lengths for any of their age groups. Their players were specifically asked to bowl as fast as they could, which might have prevented them from using release speed as a means of adjusting for the pitch length alteration. Our players were simply asked to bowl at their usual pace, but again no difference between release speeds on the two different pitch lengths was found. Phillips, Portus, Davids and Renshaw (2012) studied three groups of different standards of bowler (national and emerging adults, and national or regional representative standard older juniors) and similarly found no differences between bowling speeds for each group when they were asked to bowl short, good and full length deliveries “at match intensity” (speed).

Assuming negligible aerodynamic influences, for a ball projected horizontally from the average release height found in this study, the 0.13 m.s⁻¹ speed difference found between pitch lengths would make less than a 0.08 m change to the horizontal range from release to bounce. By contrast, releasing the ball 3.4° below horizontal at the same speed would reduce the range by in excess of 2.4 m, nearly 88% of the pitch length change in this study. The implication is that the ball release angle is the critical parameter for bowlers to control.

Artificial turf, as used in this study, typically has a higher bounce than natural turf (Ball & Hrysomallis, 2012) which will influence the bowlers’ judgements of length. However this study looked at intra-individual changes on one surface therefore the influence of the surface on the bowlers’ adaptations is limited and extrapolating the findings to turf pitches is reasonable.

Individual variability has not often been reported in cricket bowling studies but some comparisons are possible. The mean individual release speed standard deviation of 0.51 m.s⁻¹ at an average bowling speed of 21.1 m.s⁻¹ here corresponds to a coefficient of variation of approximately 2.4%, which is very similar to the 2.5% calculated from the data Justham et al. (2008) reported for eight emerging national

adults. It is also similar to the 2.3% calculated from Phillips, Portus, Davids, Brown and Renshaw (2010) for elite juniors, but greater than the 1.6% for their elite adults. Renshaw and Davids (2004) reported front foot placement variability (standard deviation) averaging 0.11 m for six professional medium to medium-fast paced bowlers, similar to the 0.12 m for the junior bowlers in this study. Individual standard deviations in release angle averaging 1.8° were found by Justham et al. (2008) for eight emerging national adults bowling at an average of $32.3 \text{ m}\cdot\text{s}^{-1}$, just under half the 3.7° for the young bowlers we analysed. As discussed earlier, given the importance of the release angle to where the ball pitches and the effect of speed on this range, the reduced variability in release angle at the much higher release speeds elite bowlers achieve should come as no surprise.

It would have been possible to exclude No Ball deliveries, balls bowled from too far behind the bowling crease, or balls bouncing outside of a prescribed range from the batting end stumps. However this would have increased the number of deliveries required of the young bowlers beyond the limits set down by the governing body (ECB, n.d.) and would have influenced the variability measures which were part of the investigation. Including all deliveries but using individual medians rather than the means was chosen as a compromise which also avoided any potential for experimenter bias.

The variability of the release parameters were similar on both pitch lengths although it had been anticipated that release speed and release angle in particular would be more variable on the longer pitch if the bowlers have to struggle to bowl a good length. However the bowlers in this study were of a high standard for their age, having demonstrated an ability to bowl on the 19 yard pitch in order to be selected as bowlers for their county squads or be rated as the best at their clubs. It might be more revealing to study bowlers of this standard bowling on a 22 yard (20.12 m) pitch to determine whether the increased distance resulted in more variability. Similarly, average club standard players bowling on a 16 yard pitch might achieve an improvement in consistency compared with bowling over 19 yards that was not apparent in county standard bowlers.

Compared with -0.7° on the 19 yard pitch, the mean release angle of -4.2° on 16 yards was closer to the -7° of emerging national bowlers (Cork et al., 2012; Justham et al., 2008; Worthington, 2010). Shortening the pitch does appear to be a means of encouraging young bowlers to bowl more like adults by projecting the ball at a more downward angle. However the release angle difference between elite bowlers and junior bowlers on a 16 yard pitch in this study might seem to suggest that the pitch should be shortened still further. For a number of reasons this might not be the case. Firstly, on both pitch lengths the young bowlers bowled on average 0.36 m behind the bowling crease and were therefore further from the batter's end than necessary. Bowling from closer to the crease would reduce the distance and theoretically lead to a steeper release angle if aiming to land the ball on the same spot. Secondly, in common with most elite pace bowlers, Worthington's 20 bowlers were very tall, mean height $1.88 \pm 0.08 \text{ m}$ and the median height percentile for the group was the 90th (Worthington, 2010), compared with the juniors in this study for whom the median height percentile for their age was the 58th. Although the plausible range of individual differences in release height has little effect on the ball flight distance, the release height difference between very tall and average height players would be expected to have more of an influence; for a given speed of delivery, in order to bowl to the same point on the pitch, taller players need to release the ball at a steeper downward angle than shorter players.

For junior seam or pace bowlers to bowl exactly like very tall, elite bowlers may not be realistic, but it is clear from this study that even good bowlers for their age are not close to releasing the ball in a similar manner on a 19 yard pitch. These bowlers were also taller than average for their age (only four were below the 50th percentile), suggesting that the trend towards seam bowlers being tall starts at an early age, perhaps because the pitches they play on are relatively long. In fact on currently recommended pitch lengths, bowling like adults is probably an unrealistic expectation for all but the most physically mature and technically able for their age. If young players are to develop techniques more like the best bowlers the pitch length needs more closely to match their physical capabilities. Elliott et al. (2005) pointed out that a shorter pitch for juniors means “performance requirements are much easier to achieve, so players are more likely to focus on the correct execution of their action” (p.662). As a consequence success and enjoyment should follow, in contrast to the current situation where the difficulty of bowling the required distance may put some children off playing cricket entirely.

The shorter pitch length in this study encouraged the bowlers to bowl “into the pitch” more which will enable them to get more movement and bounce off the surface, but further research is required to determine optimum pitch lengths for junior age groups. A shorter pitch length may mean that a genuine short delivery, a “bouncer”, becomes a possibility for the quicker young bowlers, which also raises the demands placed on batters as an issue requiring consideration.

CONCLUSIONS

In response to an alteration in pitch length, junior bowlers adjusted the angle at which they projected the ball without substantially changing ball speed or release position. The variability in ball release parameters was comparable to other studies, with the exception of the ball release angle which was less consistent than for elite adults, and pitch length did not affect variability. On the shorter pitch players bowled the ball with a more downward trajectory, approaching that of elite adult players. This should lead to greater success and enjoyment, as well as facilitating further technique improvements.

DISCLOSURE STATEMENT

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