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ARTICLE

Use of a Ball Alignment Mark Improves Putting Performance in Golf

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Golfers place alignment marks on their balls in the belief that this improves the ability to align and hole more putts. The purpose of this study was to determine the effect of using an alignment mark on a golf ball on the number of putts holed. Twenty-nine amateur golfers (handicap 7.6 ± 4.06) performed 10 straight putts from a distance of 1.7m to ascertain putting ability. Based on putting ability they then performed 30 putts from a distance of 1.7m, 2.3m or 2.6m, with better putters putting further from the hole. Fifteen of the putts were performed using a ball with an alignment mark (AM) and 15 with no alignment mark (NAM). The order of putts with each ball was randomized. On average participants holed 17.1 ± 3.9 putts out of the 30 putts completed using both balls. The number of putts holed at each of the three distances from the hole did not differ (p = .60). More putts were holed with AM compared with NAM at a distance of 2.6m (AM 9.7 ± 2.4 putts, NAM 7.6 ± 2.8, p < .01), but not at the shorter distances of 1.7m (p = .67) and 2.3m (p = .39). The use of an alignment mark on a golf ball improves putting success for straight putts from a distance of 2.6m.

***Keywords*:** golf, putting, performance, alignment

In the game of golf, putting accounts for approximately 40% of the total strokes taken by an average golfer in each round (Beslow & Evans, 2011; Gwyn & Patch, 1993; Wiren, 1992). Since putting makes up such a large component of each round of golf, variation in putting performance can impact significantly on overall scoring. Indeed, putts per round has been shown to significantly account for variance in scoring for professional golfers, with correlations of 0.31 (Quinn, 2006), 0.32–0.48 (Belkin et al., 1994) and 0.36 (Finley & Halsey, 2004) between putts taken per round and average score. Thus, it has been suggested that improving putting skills is the fastest way to lower one's score (Wiren, 1992).

Despite limited statistical data being kept on putting statistics for amateur golfers, putting still comprises a substantial component of the game, and is likely

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to be related to final score. Thus, it is likely that improving putting success could not only improve scores for professional golfers, but also for amateurs. As a result, there has been considerable interest in evaluating methods for improving putting success over the past decade (Delphinus & Sayers, 2012; Karlsen, Smith, & Nilsson, 2008; Mackenzie, Foley, & Adamczyk, 2011; Short et al., 2002; Smith & Holmes, 2004; Vine, Moore, & Wilson, 2011).

One method that is currently being promoted as improving putting success by golf ball accessory manufacturers (Softspikes.com, 2012), and golf ball manufacturers is the concept of using a line on the golf ball to assist with alignment of the putt. Correct alignment of the putt should improve the chances of successfully hitting the putt on the desired line and holing the putt. Karlsen et al. (2008) describe 'aim' as one of the four primary factors influencing putting direction, and that training and technique changes should focus upon improving ability to read greens and aim correctly. Johnston, Benton, and Nishida (2003) describe the common errors made when aligning a golf ball on the intended line and Shim, Miller, and Lutz (2012) also found that expert players (handicap <3) did not correctly align the alignment mark on a golf ball with the intended putting line and made consistent errors related to address, impact and path of the putter. However none of these authors published effects on the number of putts holed. Whether this method improves the numbers of putts holed has not been evaluated scientifically. The aim of this study was to determine whether using a golf ball with an alignment mark improved putting success (i.e., number of putts holed) in A-grade amateur golfers (i.e., handicap ≤ 12).

Methodology

Participants

Recruitment was conducted through semiprivate metropolitan golf clubs in Adelaide, Australia. Golfers who regularly used an alignment mark on the ball when putting were excluded from the study. The study was approved by the Human Research Ethics Committee of the University of South Australia. All participants provided written informed consent before participation. Where participants were minors, assent to participate was provided by their parent/guardian. All participants were male. The average age of participants was 45.2 ± 19.7 years (range 13–69), average numbers of years playing golf was 20.9 ± 16.0 years (range 3–55): average handicap was 7.6 ± 4.0 (range +2–13). Of the 29 golfers in study, 27 were right handed.

Procedure

Participants were asked to putt 10 golf balls from a distance of 1.7m from a golf hole. All putts were undertaken using the participants own golf balls and putter and were straight putts undertaken on a flat green of natural bent grass. Straight putts were selected to avoid any influence on putting performance that might occur through incorrectly reading the break of the putt, and participants were able to see the result of the putt on each occasion. Depending on the number of putts holed, participants were assigned a putting distance for the remainder of the

study that should allow them to hole approximately 40–50% of putts. If 8 putts or more were holed from the distance of 1.7 m, they were assigned to putt from a distance of 2.6m from the hole for the experiment, if they holed 6–7 putts they were assigned to putt from 2.3m, if they holed 3–5 putts they were assigned to putt from 1.7m, and if they holed <2 putts they were assigned to putt from 1.4m. This method has been used previously to control for differences in putting ability for studies evaluating the effects of interventions on putting performance (Short et al., 2002). Four (4) participants putted from 1.7m, 15 from 2.3m and 10 from 2.6m.

Before participation, all participants were allowed to practice on the putting green to become accustomed to green speed, however were not allowed to practice on the test hole. All participants then attempted 30 putts from the assigned distance. Fifteen of the putts were made with a golf ball with an alignment mark (AM), and the other 15 with a ball with no alignment mark (NAM), the latter being the control condition (see Figure 1).

Figure 1 — View from above AM vs. NAM

The order of putting with each ball type for each participant was randomized, and each participant had a different randomly allocated order of putting with each ball type. The primary outcome was the number of putts holed with each ball type.

Data Analysis

Statistical analysis was performed using Statistica version 5.1 (StatSoft Inc., Tulsa, Oklahoma, USA). Normality of data distribution was tested using the Shapiro-Wilk test before analysis. The number of putts holed with each ball type at each putting distance was compared using 2-way analysis of variance (ANOVA), with ball type being the within-participant repeated measure, and putting distance being the between-participant measure. Where ANOVA showed a significant main effect, pairwise comparisons of means were made post hoc using the test of least significant differences (LSD). Statistical significance for the ANOVA analysis was set at $p < .05$. However, due to the use of a less conservative post hoc test (i.e., LSD) to compare AM with NAM at each of the three putting distances, adjustment was made for multiple comparisons, and statistical significance for the post hoc analysis was set at $p < .0125$ (i.e., 0.05 divided by 3). Data are presented as mean ± *SD*.

Results

There was a significant interaction between ball type and distance putting away from the hole ($p = .038$). Post Hoc analysis identified that when putting from a distance of 2.6m from the hole on average two more putts were holed when using a ball with AM compared with NAM ($p = .009$; Figure 2). There were no differences in the number of putts holed with each ball type when putting from 1.7m ($p = .67$) and 2.3m ($p = .39$). No golfers putted from 1.4m.

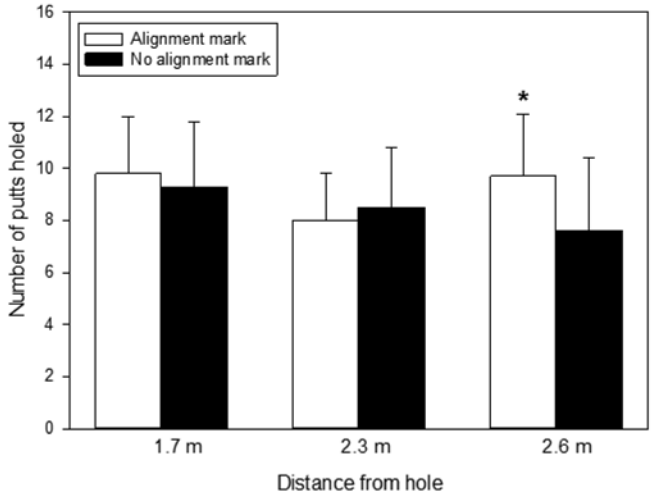

Figure 2 — Number of golf putts holed out of 15 attempts when putting from a distance of 1.7 m, 2.3 m or 2.6 m from the hole on a flat green using a golf ball with an alignment mark or a golf ball without an alignment mark. Values are mean ± *SD* * significantly different from no alignment mark ($p = .009$).

Discussion

The principal finding of this study was that the use of an alignment mark on a golf ball improved putting success when putting a straight putt on a flat green from a distance of 2.6m. Tour professionals, on average, make 44.9% of all 2.6m (8–9 feet) putts, regardless of break ("PGA Tour" 2013). In this study, the percentage of successful straight putts made with NAM from 2.6m was on average, 50.7%. The percentage improvement between putts holed with AM vs. NAM was substantial, with participants successfully holing 27% more putts with AM from 2.6m. Given that putting accounts for approximately 40% of the total score during a round of golf (Gwyn & Patch, 1993; Laidlaw, 2009; Wiren, 1992), it could be expected that a golfer with a handicap of 8 (the average handicap of the golfers in this study) would be expected to have ~32 putts during a round of golf on a par 72 golf course. Thus, given the average 2 putt out of 15 putt advantage with AM from 2.6m from the hole in the current study, for such a golfer playing on a par 72 golf course the

use of an alignment mark might be expected to see an improvement by fewer putts being taken per round. The potential advantage of using AM compared with NAM for an 8 handicap golfer playing a par 72 course is based on the assumption that the majority of putts would be straight putts taken from a distance within 2.6m from the hole, as it is unclear whether AM provides an advantage for putts longer than 2.6 m, or for putts that break.

To control for differences in putting ability between participants, the distance from which participants were required to putt was adjusted based on the number of successful attempts from 10 putts performed from a distance of 1.7m. This method of adjusting for differences in putting ability appeared to be successful as there was no difference in the total number of putts holed at each distance from the hole ($p = 0.60$). Interestingly however, there was only an effect for those putting from a distance of 2.6m, and not 2.3m, despite the handicap mean and *SD* for each of the groups being the same (2.3m—7.4 ± 4.0; 2.6m—7.4 ± 4.5).

The mechanism by which the use of AM improved putting success is not clear from the current study. It is an assumption of the method that the alignment mark assists the golfer with alignment of the putt, and thus improves the chance of successfully hitting the putt on the desired line, and holing the putt. However, data from Shim et al. (2012) suggest this is not the case as they showed no benefit for correct putt alignment with the use of an alignment mark. Instead, in the current study participants who holed more putts using AM compared with NAM anecdotally reported feeling that when using AM the line on the ball facilitated greater concentration and mental focus, and promoted a more repetitive preshot routine. This may have contributed more to the greater putting success than any benefit for putt alignment. The mechanism by which AM improves putting success should be evaluated in future studies. Shim et al. (2012) also used players that indicated they use an alignment aid when putting in competition. In our study, players who did use the alignment aid in competition were excluded from participating, in an attempt to control for bias that might be introduced as a result of participants existing perceptions of the potential effect of this technique on putting success.

A potential limitation of this study is that participants were all A-grade golfers (handicap ≤ 12), and it is not clear whether similar benefits of using AM might be evident in golfers with higher handicaps. Given that quality of stroke execution alone has only a minor influence on direction consistency (Karlsen et al., 2008), it would be of interest to determine whether an alignment mark assists higher handicap golfers, who typically have poorer and less consistent putting strokes. Golfers with a lower handicap were selected for the study to reduce variation in putting success, thus improving the ability to identify a difference between treatments using a smaller sample size. Furthermore, the design of the study did not allow for determination of whether AM is effective at a distance of 2.6 m because the better putters putted from this distance and AM therefore, only provides an advantage for better putters who might have a more consistent putting stroke, or because there is only an advantage of using AM over longer putting distances. The latter would appear to be the most likely explanation as differences in putting ability were accounted for in the current study by having golfers who holed fewer putts in the initial assessment from 1.7 m subsequently putting from a closer distance for the experimental putts, resulting in no difference in the numbers of putts holed a the different distances from the hole. Nevertheless, future studies should evaluate

whether the benefit of using AM is evident in putters of all abilities, for putts that break and whether the benefit is only evident for longer putts.

Conclusion

This study has demonstrated that in golfers with a handicap ≤ 12, putting from a distance of 2.6 m from the hole on a flat green, the use of an alignment mark improves putting success by 27%. Further research should seek to determine whether an alignment mark also provides a benefit for longer putts and for higher handicap golfers, as well as evaluating the mechanism by which the alignment mark improves putting performance.

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