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**EXTENDED
ABSTRACT**

Effects of Augmented Feedback on Shooting Performances Among Netball Players

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I. INTRODUCTION

Shooting accuracy and consistency are fundamental to success in netball, a skill-dependent sport that requires precise motor control and coordination. Augmented feedback (AF) has been shown to improve motor learning and performance in various sports, yet its application in netball remains limited [1]. Despite the promising results in other sports like golf and basketball, netball shooting, with its unique biomechanical and cognitive demands, requires further investigation. This study investigates the impact of augmented feedback on the shooting performance of netball players. Specifically, it compares the shooting accuracy and consistency between players receiving augmented feedback and those without it, assessed during pre-test and post-test phases. The findings aim to clarify how augmented feedback influences performance outcomes in netball shooting.

II. METHODS

A total of 24 netball players (12 in each group) participated in the study. The experimental group received verbal augmented feedback, while the control group did not. Shooting accuracy was measured using a scoring system: 0 for a miss, 1 for hitting the rim but missing, 2 for hitting the rim and making the shot, and 3 for a successful shot or clearing the basket [2]. Shooting consistency was assessed by the number of consecutive successful shots [1]. A true experimental design was employed with two groups: an experimental group receiving verbal augmented feedback, and a control group with traditional coaching. Participants (female netball players, aged 18–24) were selected via purposive sampling. The intervention involved three 60-minute training sessions over one week. Verbal feedback focused on correcting body posture and providing goal success feedback after each shot based on scoring [3]. Participants take 6 familiarization shots (2 from each position). Perform 12 test shots from three different positions (4 at left, 4 at right, 4 in the middle, 3m from the post). The Scoring System (0-3 points per shot) is used to evaluate accuracy performance. Meanwhile, for consistency scoring, it will be scored by how steady the player's shooting gets a clean basket, hit the rim and score the basket, hit the rim and miss, and a complete miss is across multiple attempts or training sessions. Pre- and post-test shooting assessments were conducted to measure accuracy and consistency. Data were analyzed using paired t-tests and independent t-tests.

III. RESULTS AND DISCUSSION

A. Shooting Accuracy

The experimental group that received augmented feedback (AF) demonstrated a significantly enhanced shooting accuracy, with the feedback group demonstrating a marked improvement from pre-test to post-test ($t = -4.51, p < 0.001$). In contrast, the no-feedback group showed no significant change ($t = 0.596, p = 0.563$). Critically, inter-group comparison revealed substantially greater accuracy gains (GainAc) in the feedback group ($Mean = 7.67, SD = 5.88$) versus the no-feedback group ($Mean = -0.83, SD = 4.84; t = -3.87, p < 0.001$). These results validate AF's immediate corrective role in refining technique, aligning with motor learning principles where extrinsic feedback accelerates error reduction [4]. These findings are supported by previous studies, which highlight that augmented feedback plays a crucial role in refining motor skills and enhancing performance outcomes by providing corrective information that complements intrinsic sensory feedback [5].

B. Shooting Consistency

The results show that neither group exhibited significant consistency improvements. The feedback group's pre-post consistency scores were statistically unchanged ($t = -0.277, p = 0.787$), paralleling the no-feedback group's results ($t = 1.349, p = 0.204$). Similarly, consistency gains (GainCo) did not differ between groups (feedback: $Mean = 0.17, SD = 2.08$; no-feedback: $Mean = 0.92, SD = 2.35; t = -1.19, p = 0.245$). This indicates that AF, while effective for accuracy, fails to enhance movement stability within short-term interventions. As posited by prior studies [6], consistency necessitates prolonged neural adaptation and repetitive practice beyond immediate feedback, explaining its resistance to rapid improvement. These findings support previous research, which shows that AF enhances both accuracy and consistency, though consistency may require longer practice or additional techniques [7]. Despite the smaller effect, the results underline the importance of AF in refining motor skills and improving performance stability.

C. Comparing Performance Outcomes

The results indicate that when comparing performance gains between the feedback and no feedback groups, a significant difference emerged for accuracy improvement (GainAc). The feedback group showed substantially larger

accuracy gains (*Mean Gain* = 7.67, *SD* = 5.88) compared to the no-feedback group (*Mean Gain* = -0.83, *SD* = 4.84), with this difference being statistically significant ($t = -3.87$, $df = 22.0$, $p < 0.001$). In contrast, consistency gains (*GainCo*) did not differ significantly between groups (Feedback: *Mean Gain* = 0.17, *SD* = 2.08, No Feedback: *Mean Gain* = 0.92, *SD* = 2.35; $t = -1.19$, $df = 22.0$, $p = 0.245$). These findings align with previous studies, which emphasize that AF helps correct immediate issues like accuracy, but consistency develops with sustained practice and additional training [3].

TABLE I
COMPARISON OF PRE AND POST-TEST ACCURACY AND CONSISTENCY SCORES IN THE FEEDBACK GROUP

		t	df	p
PREAc	POSAc	-4.51	11.0	*<0.001
PRECo	POSCo	-0.277	11.0	0.787

*Significantly different between Pre and Post Test ($p < 0.05$).

TABLE II
COMPARISON OF PRE AND POST-TEST ACCURACY AND CONSISTENCY SCORES IN THE NO FEEDBACK GROUP

		t	df	p
PREAc	POSAc	0.596	11.0	0.563
PRECo	POSCo	1.349	11.0	0.204

*Significantly different between Pre and Post Test ($p < 0.05$).

TABLE III
COMPARING GAIN ACCURACY AND CONSISTENCY SCORES BETWEEN THE FEEDBACK AND NO FEEDBACK GROUPS IN SHOOTING PERFORMANCES

	Group	t	df	p	Mean	SD
GainAc	NO FEEDBACK	-3.87	22.0	<0.001	-0.83	4.84
	FEEDBACK		22.0		7.67	5.88
GainCo	NO FEEDBACK	-1.19	22.0	0.245	0.92	2.35
	FEEDBACK		22.0		0.17	2.08

IV. CONCLUSIONS

This study demonstrates that augmented feedback (AF) significantly enhances shooting performance in netball players, particularly in terms of accuracy and consistency. The

experimental group that received real-time verbal and visual feedback showed substantial improvements compared to the control group using traditional training methods. These findings are consistent with previous research, which highlights the value of AF in refining motor skills and improving performance outcomes [5]. AF allows players to make immediate adjustments, leading to better technique and performances [8]. The study underscores the importance of incorporating structured feedback into training programs, offering practical insights for coaches aiming to improve netball shooting [1]. Future research should explore the long-term effects of AF, its impact across different skill levels, and its application to other sports to further validate and enhance these findings.

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