

The influence of elite European soccer matches on salivary immunoglobulin-A and cortisol. A case study about playing status and match outcome

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INTRODUCTION

The aim of this study was to analyse the influence of nine soccer matches and their outcome (successful and unsuccessful) on salivary immunoglobulin A (s-IgA) and cortisol (s-Cort) with respect to the playing status.

METHODS

Saliva from 19 male players (10 starters and 9 non-starters) from an elite professional soccer team (mean±SD, age 26±4 years; weight 80.5±8.1 kg; height 1.83±0.07 m; body-fat 10.8±0.7 %) was collected on the day before each match (MD-1), 60-minutes before kick-off (MDpre), 30-minutes post-match (MDpost), and 72-hours post-match (MD+3). There were five wins, one draw and three losses.

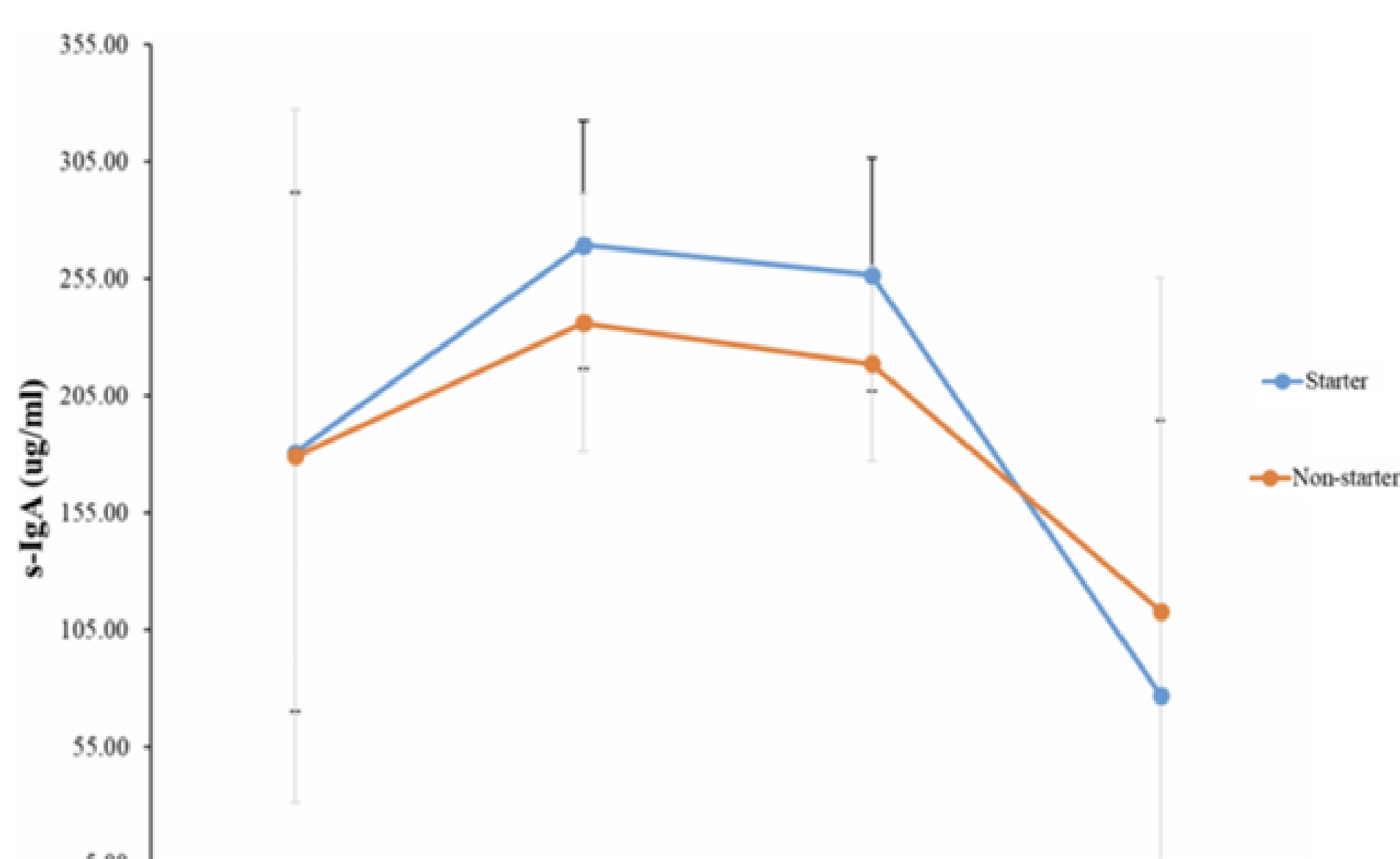


FIGURE 1 Mean and standard deviation values for salivary immunoglobulin A (s-IgA) at before each match (MD-1), 60-min before kick-off (MDpre), 30-min post-match post) and 72-h post-match (MD+3)

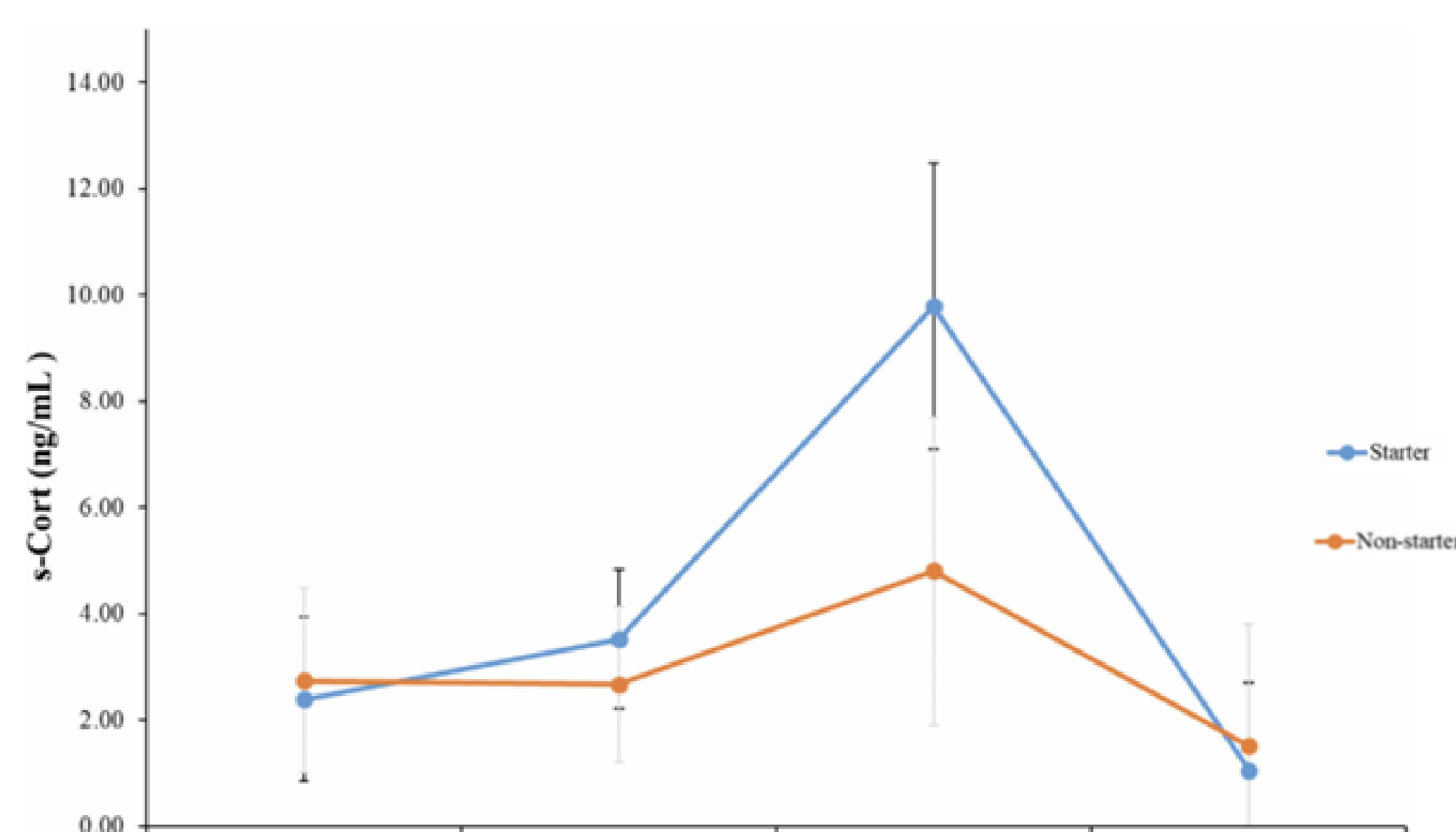


FIGURE 2 Mean and standard deviation values for cortisol (s-Cort) at before each match (MD-1), 60-min before kick-off (MDpre), 30-min post-match post) and 72-h post-match (MD+3)

TABLE 2 Mean values of s-IgA and s-Cort and a mixed ANOVA between MD-1, MDpre, MDpost and MD+3 in starting and non-starting players following successful and unsuccessful matches.

	s-IgA			s-Cort		
	Starters in successful matches	Starters in unsuccessful matches		Starters in successful matches	Starters in unsuccessful matches	
MD-1	205.73 ± 123.98 CV: 60.26	213.41 ± 125.27 CV: 58.69	<1.00 0.81 0.00	6.19 ± 3.52 CV: 58.88	5.85 ± 7.31 CV: 124.86	2.20 0.14 0.04
MDpre	132.15 ± 85.39 CV: 64.61	218.76 ± 149.30 CV: 68.25	8.10 0.01* 0.12	4.80 ± 2.10 CV: 43.74	3.46 ± 1.90 CV: 54.89	<1.00 0.86 0.00
MDpost	146.27 ± 79.46 CV: 54.32	239.31 ± 120.79 CV: 50.47	13.13 0.001** 0.18	9.70 ± 5.94 CV: 61.22	11.81 ± 8.06 CV: 67.19	<1.00 0.59 0.00
MD+3	167.68 ± 136.87 CV: 81.62	237.55 ± 172.82 CV: 72.75	3.15 0.08 0.05	6.55 ± 3.80 CV: 58.01	7.05 ± 6.60 CV: 93.56	3.96 0.05* 0.06
	Non-Starters in successful matches	Non-Starters in unsuccessful matches		Non-starters in successful matches	Non-starters in unsuccessful matches	
MD-1	163.30 ± 93.81 CV: 57.44	179.39 ± 90.95 CV: 50.70	<1.00 0.56 0.01	5.85 ± 7.31 CV: 124.86	5.01 ± 3.81 CV: 76.06	<1.00 0.63 0.01
MDpre	169.30 ± 143.01 CV: 84.46	149.52 ± 72.87 CV: 48.73	<1.00 0.57 0.01	3.46 ± 1.90 CV: 54.89	3.97 ± 2.11 CV: 53.24	<1.00 0.70 0.02
MDpost	181.09 ± 106.90 CV: 59.03	177.81 ± 97.88 CV: 55.04	<1.00 0.92 0.00	11.81 ± 8.06 CV: 67.19	11.60 ± 7.17 CV: 61.85	<1.00 0.93 0.00
MD+3	152.90 ± 77.15 CV: 50.45	209.70 ± 137.62 CV: 65.62	2.72 0.11 0.06	7.05 ± 6.60 CV: 93.56	6.61 ± 4.46 CV: 67.60	<1.00 0.95 0.00

Note: * denotes significance at $p < 0.05$, and ** denotes significance at $p < 0.01$. Coefficient of Variation (CV); Before each match (MD-1), 60-min before kick-off (MDpre), 30-min post-match (MDpost), and 72-h post-match (MD+3). Salivary immunoglobulin A (s-IgA) and cortisol (s-Cort).

RESULTS

The mean s-IgA value was found to be lower at MD+3 compared to MDpre and MDpost ($p < 0.001$). s-Cort was higher at MDpost compared to MD-1 and at MDpost compared to MDpre ($p < 0.001$). When compared to MDpre, a decrease in s-Cort was observed at MD+3 compared to MDpost ($p < 0.001$). s-IgA values of starting and non-starting players from successful and unsuccessful matches did not reveal a significant difference between groups. However, s-Cort in matches won, showed a difference between starters and non-starters in MDpre ($p = 0.02$). s-IgA values were higher in MDpre and MDpost in starters in unsuccessful matches than starters in successful matches ($p < 0.01$). Furthermore, s-Cort values were higher in MD+3 in starters in unsuccessful matches than starters in successful matches ($p = 0.05$).

CONCLUSION

The present study suggests that in elite level soccer players, both playing status and match outcome influence s-IgA and s-Cort responses, specially for starters. Specifically, s-IgA was lower for starters before and after the match following successful outcomes. Moreover, higher s-Cort values were found before the match while lower values occurred after the match for starters in successful matches.

TABLE 1 Mean values of s-IgA and s-Cort and a mixed ANOVA between starting and non-starting players following successful and unsuccessful matches

	Successful matches									
	s-IgA			s-Cort						
	Starters	Non-starters	F	p	η^2 partial	Starters	Non-starters	F	p	η^2 partial
MD-1	205.73 ± 123.98 CV: 60.26	163.30 ± 93.81 CV: 57.44	1.92	0.86	0.06	6.19 ± 3.52 CV: 58.88	5.85 ± 7.31 CV: 124.86	0.05	0.82	0.00
MDpre	132.15 ± 85.39 CV: 64.61	169.30 ± 143.01 CV: 84.46	1.48	0.23	0.03	4.80 ± 2.10 CV: 43.74	3.46 ± 1.90 CV: 54.89	5.97	0.02*	0.10
MDpost	146.27 ± 79.46 CV: 54.32	181.09 ± 106.90 CV: 59.03	1.92	0.17	0.03	9.70 ± 5.94 CV: 61.22	11.81 ± 8.06 CV: 67.19	1.26	0.27	0.02
MD+3	167.68 ± 136.87 CV: 81.62	152.90 ± 77.15 CV: 50.45	<1.00	0.65	0.00	6.55 ± 3.80 CV: 58.01	7.05 ± 6.60 CV: 93.56	<1.00	0.72	0.00
Unsuccessful matches										
MD-1	213.41 ± 125.27 CV: 58.69	179.39 ± 90.95 CV: 50.70	1.19	0.28	0.02	4.88 ± 3.38 CV: 69.19	5.01 ± 3.81 CV: 76.06	<1.00	0.90	0.00
MDpre	218.76 ± 149.30 CV: 68.25	149.52 ± 72.87 CV: 48.73	3.84	0.06	0.07	4.68 ± 3.49 CV: 74.69	3.97 ± 2.11 CV: 53.24	<1.00	0.41	0.01
MDpost	239.31 ± 120.79 CV: 50.47	177.81 ± 97.88 CV: 55.04	3.68	0.06	0.07	10.46 ± 4.90 CV: 46.92	11.60 ± 7.17 CV: 61.85	<1.00	0.51	0.01
MD+3	237.55 ± 172.82 CV: 72.75	209.70 ± 137.62 CV: 65.62	<1.00	0.51	0.01	4.85 ± 2.72 CV: 56.12	6.61 ± 4.46 CV: 67.60	3.19	0.08	0.06

Note: * denotes significance at $p < 0.05$, and ** denotes significance at $p < 0.01$. Coefficient of Variation (CV); Before each match (MD-1), 60-min before kick-off (MDpre), 30-min post-match (MDpost), and 72-h post-match (MD+3). Salivary immunoglobulin A (s-IgA) and cortisol (s-Cort).

Keywords: football; immune function; hormonal response; recovery; starting status.

References

Morgans R, Oliveira R, Rhodes D, Orme P, Ceylan HI, González-Fernández FT, Liñán-González A and Moreira A (2024), Does elite European match-play affect salivary immunoglobulin-A and cortisol in soccer players? The influence of playing status and match outcome. *Front. Physiol.* 15:1253417. doi: 10.3389/fphys.2024.1253417