



## **ANALYSIS OF SALIVARY CORTISOL AND SALIVARY TESTOSTERONE LEVELS OF MORNING AND EVENING TRAINING SESSIONS AMONG UNIVERSITY LEVEL HANDBALL PLAYERS**

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### **Abstract:**

The major objective of this study was to find out the effects of salivary testosterone and cortisol level hormone on the performance of university level handball players. For the purpose of the study a total of 20 university levels of handball players were selected from Sacred Heart College. Thevara The age ranges shall be from 18- 24. In this study the investigator collected the salivary testosterone and cortisol hormone after the morning and evening training sessions. The collected data was statistically tested by using ANOVA method. The level of significance was fixed at 0.05 level of confidence. The administration of the test was make us realize that in which time of working activity duration of these players produce higher level of salivary testosterone and cortisol hormone. By finding out this factors the coaches, trainers, physical education teachers can understand their students stress and coaches to find out the body stress and hormonal changes.

**Key Words:** Salivary, Cortisol, Handball

### **Introduction:**

Saliva is gaining broader acceptance as a biological fluid for monitoring steroid hormones in sports medicine, psychology, stress research and chronobiology especially the androgen testosterone and the glucocorticoid cortisol. In comparison to other biological fluids examples urine, sweat, venous blood), saliva is relatively easy to collect, stress-free with high compliance among different populations, and it enables rapid and repeated sampling under conditions. sports competition where the collection of other fluids are difficult or undesirable. Recent developments in enzyme-linked immunoassays are also contributing to greater use of salivary steroids among researchers, practitioners and clinicians alike, due to their simplicity, high sensitivity and low cross reactivity, as well as reliability.

Under resting conditions, salivary testosterone and cortisol measures correlate with blood total testosterone and cortisol respectively in healthy and clinical populations, but more so blood-free testosterone and cortisol .Hence, saliva is thought to represent the biologically active hormone. Recent work suggests that saliva is a separate matrix with its own binding protein properties, though salivary testosterone ostensibly mirrors blood-free testosterone. Still, the saliva-blood testosterone relationships are stronger among males, because female salivary testosterone is often assessed at the lower detection limits of many assays and are strongly influenced by binding protein activity. Cortisol is a much larger molecule and less affected by the same detection issues. It is also present at comparable levels in men and women; hence, cortisol data from both sexes are often pooled for comparisons with moderate to strong relationships reported.

### **Statement of the Problem:**

Purpose of the study is to assess effect of testosterone and cortisol level in saliva among university level handball players from Sacred Heart College. Thevara.

### **Selection of the Subjects:**

For the purpose of the study a total of 20 university levels of handball players were selected from Sacred Heart College. Thevara. The age ranges shall be from 18 - 24.

### **Selection of Variables:**

The variables are the conditions and characteristics that the researcher manipulated, controls or observes. The saliva samples of university level of handball players are selected as the variables of the study. That is morning and evening training section. For the present study the investigator administrated salivary cortisol and testosterone test in order to find out the stress and physical and psychological stimulus and subsequent effects on rphysical performance. Salivary cortisol test is to find out the amount of cortisol in human and cortisol is a stress indicator. Salivary testosterone test is to find out the amount of testosterone in human and testosterone is a physical and psychological stimulus factor's indicator.

### **Description of the Test:**

The test item selected for the study was salivary cortisol and testosterone. In order to find out the stress of the university level handball players by cortisol and testosterone to identify the physical and psychological stimulus factors, the salivary test is recommended. The test involves simply spitting into a test tube. The cortisol and testosterone measured two times; before and after the assigned 30 minutes training programme. The pure

saliva must be collected as sample; there should not be even single bubble in the saliva. In order to collect the saliva sample, the xeroid bottles are provided the collected saliva samples are measured through architect, a fully automatic machine which shows the amount of cortisol and testosterone of selected athletes. 24 national level athletes were selected for the analysis of the salivary cortisol and testosterone level.

**Tools Used In Present Study:**

The tool or instrument used in the present study is architect, a fully automatic machine for measuring salivary cortisol and testosterone. It is diagrammatically represented as follows



Figure 1: Architect ci4100

**Features of ARCHITECT ci4100:**

ARCHITECT ci4100 is made by Abbott. it is a very big interment. It measures multiple samples. It is very fast and accurate. Take unlimited number of samples. It requires external water supply. The architect which is used for the present study is ARCHITECT ci4100. through this architected salivary cortisol and testosterone is accurately and recorded in Nano grams.

**Collection of Data:**

The collection of the data is administrating in the following methods. The data were be collecting continuously for two days from the saliva samples of 20 university level players (N=20) of Sacred Heart College Thevara. The saliva is collected four times. The samples are collected in the training day of handball players. The pure saliva must be collecting as samples, there should not have single bubble in the saliva. The collection of the data involves simply spitting in the tube a tube. The testosterone and cortisol in saliva is measure in the four times. For few step having in the collecting morning and evening practice section.

**Scoring and Consolidating of Data:**

Normal cortisol levels are usually highest early in the morning and lowest about midnight. Normal ranges vary depending on the type of test. For most tests, normal ranges are: 6 to 8 a.m.: 10 to 20 micrograms per deciliter (mcg/dL). According to recent guidelines from the American Urological Association, a testosterone level of at least 300 nanograms per deciliter (ng/dL) is normal for a man. A man with a testosterone level below 300 ng/dL should be diagnosed with low testosterone.

**Statistical Procedures to be Employed:**

Descriptive statistics such as mean, standard deviation and ANOVA are using for the study.

**Table 1:**

Computation of mean and standard deviation of salivary cortisol and salivary testosterone level between before and after the exercise among university handball players at morning and evening practice section.

Variables	20 University Men Handball Players							
	Morning				Evening			
	Before Exercise		After Exercise		Before Exercise		After Exercise	
	AM	SD	AM	SD	AM	SD	AM	SD
Salivary Testosterone	7.018	0.018	8.75	0.782	7.012	0.012	7.98	0.756
Salivary Cortisol	21.75	0.582	15.85	0.138	12.05	0.368	11.11	0.610

Note. This Table shows that mean and standard deviation of salivary testosterone level in morning before exercise was 7.018 and 0.018 and in after exercise was 8.75 and 0.782 respectively. Mean and standard deviation of salivary testosterone level in evening before exercise was 7.012 and 0.012 and in after exercise was 7.98 and 0.756 respectively. Mean and standard deviation of salivary cortisol level in morning before exercise

was 21.75 and 0.582 and in after exercise was 15.85 and 0.138 respectively. Mean and standard deviation of salivary testosterone level in evening before exercise was 12.05 and 0.368 and in after exercise was 11.11 and 0.610 respectively.

**Table 2:**

Summary of ANOVA on salivary cortisol level among university handball player's morning and evening activity section.

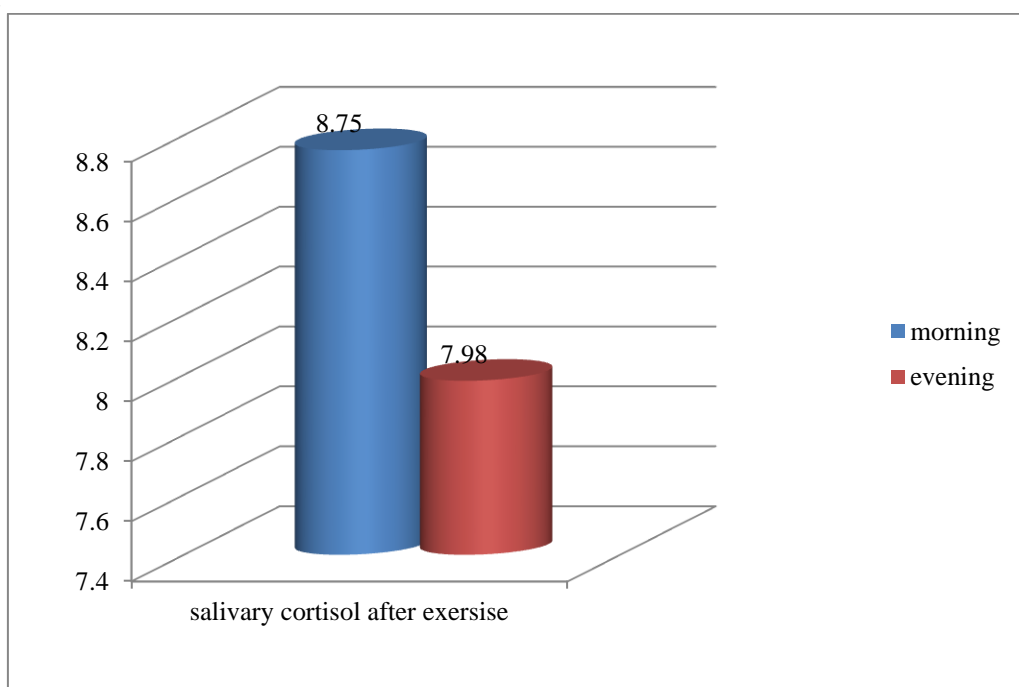
The F-ratio value is 1106.17. The p-value is .00001. The result is significant at  $p < .05$ .

Source of Variance	Sum of Squares	DF	Mean Sum of Squares	F Cal	F Table
Between Groups	225.15	1	225.15	1106.17	4.1
Within Groups	9.6625	38	0.2543		
Total	234.8125	39			

The table 2 reveals that the calculated F - ratio with degree of freedom (38, 1) is 1106.17 is greater than the F table value with degree of freedom (38, 1) is 4.10 at 0.05 level of significance. Hence we conclude that there is a significant difference exists between salivary cortisol levels of after the exercise between morning and evening section.

**Figure 2:**

Comparison of salivary cortisol level among university handball player's morning and evening activity section.



Note. The above graph shows that the mean score of university handball players of morning salivary cortisol level on after the exercise is greater than the evening section.

**Table 3:**

Summary of ANOVA on salivary testosterone level among university handball player's morning and evening activity section.

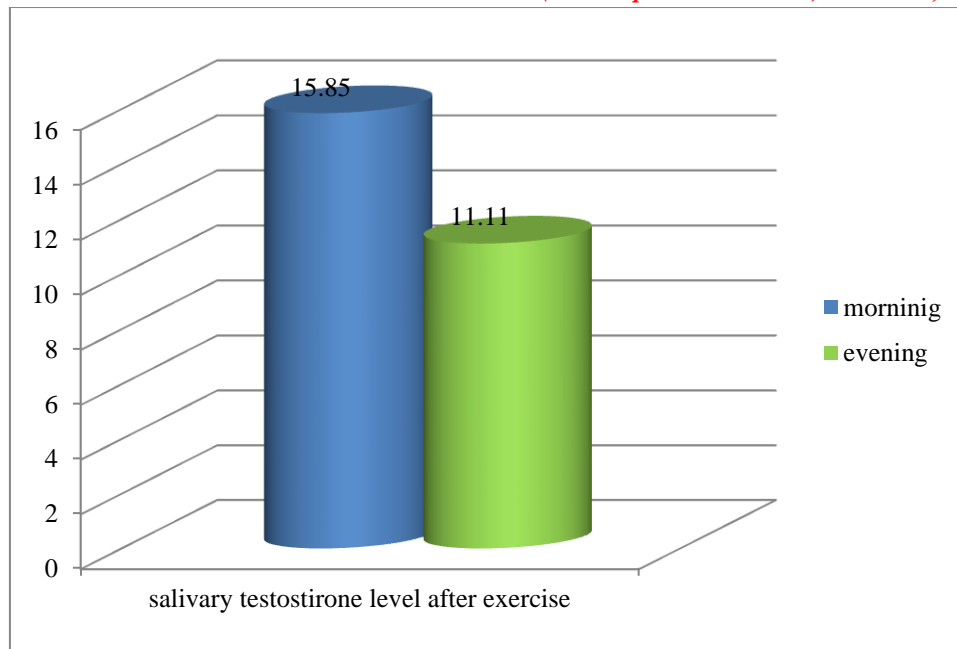
Source of Variance	Sum of Squares	df	Mean Sum of Squares	F Cal	F table
Between Groups	5.776	1	5.776	11.49	4.1
Within Groups	22.5	38	0.5921		
Total	28.276	39			

The F-ratio value is 11.49. The p-value is  $< .00306$ . The result is significant at  $p < .05$ .

The table 3 reveals that the calculated F - ratio with degree of freedom (38, 1) is 11.49 is greater than the F table value with degree of freedom (38, 1) is 4.10 at 0.05 level of significance Hence we conclude that there is a significant difference exists between salivary testosterone levels of after the exercise between morning and evening section.

**Figure 3:**

Comparison of salivary testosterone level among university handball player's morning and evening activity section.



Note. The above graph shows that the mean score of university handball players of morning salivary testosterone level on after the exercise is greater than the evening section.

**Conclusion:**

The conclusion of the present study is stated as follows.

- In the present study the investigator made an attempt to study the effect of cortisol and testosterone in saliva on handball players.
- The major findings have helped the investigator realize the effect of cortisol and testosterone in saliva on handball players.
- The result of the study also reveals that there is a significance difference in the cortisol and testosterone level of handball players in their training session.
- The result of the study also reveals that there is a significance increase the level of cortisol and testosterone hormones in handball players at morning after the training session when compared to evening training session.

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