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The Diversity Of Rally Kicks Of Olympic Badminton Athletes, The Analysis Of Loading And Resting Relationship

Olimpik Badminton Sporcularinin Ralli Vuruş Çeşitliliği, Yüklenme Ve Dinlenme İlişisinin Analizi

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ABSTRACT

Badminton is an Olympic sports branch that all age groups can play easily and that its playing and watching are rather high. Since this sports branch that is rather widespread in many countries has a very suitable structure as both performance sports and as for public health, has become quite widespread.

This research was made in order to determine what kind of kick diversity of the competitions had that Olympic badminton players on the elite level did in Olympic Games at rally basis. In addition to this, in order to determine whether badminton sports has a different character or not in terms of gender factor by making time analysis of loadings and resting taken place during the game and in which direction it shows similarity or doesn't constitutes another aim of this research.

Six top-level semi-final, third and fourth competition and final competition that the Olympic badminton players on the elite level made realize during Olympic Games constitute the universe of this study. In this study, totally six competitions were dealt from badminton single matches and 14 set, 505 rallies and 5791 kicks were analyzed in these competitions.

The total period of the competitions whose analysis was made was 5 hours and 51 minutes and it was determined that the six out of total nine kick diversities was affected from the gender factor and that kick diversity and preferences showed differences according to gender ($P>0.05$). While there was not any difference statistically among the groups in terms of game time played at every rally ($T_h = 0,1461$, $P>0.05$), it was found that men athletes had 1: 2.76 unit, women athletes had 1:2.50 unit loading and resting rates in terms of resting periods between rallies. Besides, it was concluded that there was a significant difference statistically in terms of resting periods between men and women athletes ($P<0.05$).

As the result of the research, it was concluded that even though the game rules were the same, men and women Olympic badminton athletes showed a different game character and performance depending on kick diversity.

Key words: Badminton, Olympic Athletes, Game Analysis, Kicking Diversity

ÖZET

Badminton her yaş grubundan insanın rahatlıkla oynayabileceği, oynaması ve seyir zevki oldukça yüksek olan olimpik bir spor dalıdır. Birçok ülkede oldukça yaygın olan bu spor dalı gerek performans sporu olarak gerekse toplum sağlığına yönelik çok uygun bir yapıya sahip olması nedeniyle ülkemizde de oldukça yaygınlık kazanmıştır.

Bu araştırmada, elit düzeydeki Olimpik badmintoncuların Olimpiyat Oyunlarında yapmış oldukları müsabakalarının ralli bazında ne tür bir vuruş çeşitliliğine sahip olduğunu belirlemek amacıyla yapılmıştır. Bunun yanı sıra oyun içinde gerçekleşen yüklenme ve dinlenmelerin zaman analizi yapılarak badminton sporunun cinsiyet faktörü açısından farklı bir karakteristik yapıya sahip olup olmadığı ve hangi yönden benzerlik gösterip-göstermediğini belirlemek bu araştırmanın diğer bir amacını oluşturmaktadır.

Elit düzeydeki Olimpik badmintoncuların Olimpiyat Oyunları sırasında gerçekleştirmiş oldukları altı en üst düzey yarı final, üçüncülük, dördüncülük müsabakası ile final müsabakası bu çalışmanın evrenini oluşturmaktadır. Bu çalışmada badminton tekler müsabakalarından toplamda altı müsabaka ele alınmış bu müsabakalarda analizi yapılan toplam dokuz vuruş çeşidinin altısının cinsiyet faktöründen etkilendiği, toplam 14 set, 505 ralli ve 5791 vuruş analiz edilmiştir.

Analiz yapılan müsabakaların toplam süresi 5 saat 51 dakika olup vuruş çeşitliliği ve tercihlerinin cinsiyete göre farklılık gösterdiği tespit edilmiştir ($P > 0,05$). Her bir rallide oynanan oyun süresi açısından gruplar arasında istatistiksel olarak bir fark bulunmazken ($T_h = 0,1461$, $P > 0,05$), ralliler arası dinlenme süreleri açısından erkek sporcuların 1: 2,76 birim, bayan sporcuların ise 1: 2,50 birim yüklenme dinlenme oranına sahip oldukları bulunmuştur. Ayrıca, erkek ve bayan sporcular arasında dinlenme süreleri açısından istatistiksel olarak anlamlı bir fark olduğu sonucuna ulaşılmıştır ($P < 0,05$).

Araştırma sonucunda, oyun kuralları aynı olmasına rağmen erkek ve bayan olimpiik badminton sporcularının farklı bir oyun karakteri ve vuruş çeşitliliğine bağlı olarak performans gösterdikleri sonucuna ulaşılmıştır.

Anahtar Kelimeler: Badminton, olimpiik sporcular, oyun analizi, vuruş çeşitliliği

1. INTRIDUCTION

Badminton is an Olympic sports branch that all age groups can play easily and that its playing and watching are rather high. Since this sports branch that is rather widespread in many countries has a very suitable structure as both performance sports and as for public health, has become quite widespread.

Badminton is a sport requiring rather high performance, and requiring short-term, intensive loading as a sport. At elite level, players have to realize running techniques and basic kicking technique moves one after another that will force the limits of agility, flexibility, durability and power to the end (Salman and Salman, 1994; Grice, 1996).

Badminton is an extremely complex sport branch and it contains important difficulties for athletes and trainers from every levels. While the single rally in the game is made realized by using unique movement models, it is a sport branch hosting rather difficult movements when it is compared with other sport branches. The length of rally is realized generally about 6-12 seconds for elite players. The resting period between rallies is realized average 15 seconds in portions. It is known that the competitions that are in elite level and whose competitive rate is rather high continue around 45 minutes. In this sense, since badminton requires huge effort for short time and is a long-lasting sport, it is a sport branch requiring aerobic and anaerobic endurance. Badminton is also a sport branch requiring a large explosive power, quickness and flexibility (Badminton Association of England Ltd., 2002; Salman, 2005; Salman, 2007; Chin et. all, 1995; Manrique and Badillio, 2003).

Although the game rules are the same, it was determined that there were some differences in the research made about rally length of men and women athletes, the resting between rallies and kick diversities (Salman and Salman, 2009). This research aimed at determining what kind of differences occurred in terms of kick diversities, rally length and resting period between rallies for Olympic athletes and that in which levels this difference reached on men and women athletes.

2. METHOD

In this research, six competitions were dealt including semi-final played during Olympic Games, 3.4 competition and final competition, totally 14 set, 505 rallies and 5791 kicks were analyzed.

Every one of all kicks used in badminton and prepared beforehand in order to determine kick diversities in each rally was analysed one by one and was recorded. By comparing the records taken with the other records taken by another researcher, it was provided to receive the latest form. By examining game and periods of time with the same methods, the timetable of each rally and of the resting between rallies was gotten. As the moment of the ball enters the game, the time until falling to the ground, it was accepted as game time in terms of second. The moment the ball falls to the ground was accepted as the beginning of the resting period, the period passing during activating this ball into the game again was determined as the resting period between rallies. The mandatory one minute break that is given after taking 11.number in each set was not accepted as resting period.

In addition to video analysis timer on time determination, online stopwatch (<http://www.saatkac.com/kronometre.php>.) was used, too. Depending on the gender factor of the elite badminton athletes in the research;

H0=There is no difference in terms of kick diversity and total of them of Men and Women elite badminton players.

H1= There is difference in terms of kick diversity and total of them of Men and Women elite badminton players.

H0= There is no difference in terms of game and resting periods of Men and Women elite badminton players.

H1= There is difference in terms of game and resting periods of Men and Women elite badminton players.

These hypotheses were tested. On the interpretation of research findings, descriptive statistics and t test were used.

3. FINDINGS

The findings obtained according to the game and to the resting periods in the game, and the kick in the competitions that elite badminton players played during the Olympic Games have been given in tables.

Table 1 The Percentage Distribution of All Kicks in Men Semi-Final Competitions

Kick Types	n	%
High Service	1	0.1
Short Service	68	7.8
Hit	99	12.5
Net-drop	276	31.9
Lob	221	25.5
Backhand Lift	32	3.7
Clear	29	3.4
Drop	105	12.1
Drive	26	3.0
Total	866	100.0

n- Number of kicks.

When we examine the analysis of all kicks made in men semi-final competitions, it can be seen in the Table 1 that the kick diversities the athletes used during the competitions were in turn net-drop (31.9%), lob (25.5%) and hit (12.5%) kicks. It was determined that the least used kicks in this competition were high service (0.1%), drive (3.0%) and clear (3.4%) kicks.

Table 2 The Analysis of the Kicks in All Sets of Men Semi-Final Competitions

Set No	The number of Rallies played	The percentage (%) of the number of total kicks	The number of Minimum Kicks in a rally	The number of Maximum Kicks in a rally	Arithmetic Mean \bar{X}	Standard Deviation S.D.
2 set/ 69 rallies		n %				
1 st Set	34	407 47.0	4	32	12.0	6.2
2 nd Set	35	459 53.0	2	51	13.1	8.1
Total	69	866 100.0	2	51	12.6	8.7

It can be seen that men semi-final competition realized by way of total two rallies in Table 2 actualized by way of total 866 kicks and 69 rallies. When it is looked at the overall of this competition, it can be seen that the rally with the least kick was taken place from two kicks, the rally with the most kick was taken place from 51 kicks. The number of average kick in rallies was determined as $\bar{X} = 12.6 \pm 8.7$ second in total two sets.

Table 3 The Analysis of Men Semi-Final Competition According to Game and Resting Periods

Total Set and Game Number	Minimum game period (sc)	Maximum Game Period (sc)	Total Game Period (min)	Arithmetic Mean \bar{X} (sc)	SD	Game Period / Resting Period
2 set/ 69 rallies						
Game Period	2	32	12.4	10.78	7.1	1 / 2.95
Resting Period	5	62	36.6	31.81	11.4	

It was determined that in the semi-final competition played by way of total two set and 69 rallies, the shortest term rally had a 2-second-period and the longest rally continued 32 seconds. While totally 12.4 minute net game period was obtained in semi-final competition, the resting periods were determined as totally 36.6 minutes. It was determined that the relationship between game period and resting period was realized as a 1/2.95 unity in men semi-final competition. It will be seen that this competition had the highest the resting rate between game and rallies in men competitions when other men competitions are examined (Table 6 and Table 9).

Table 4 The Percentage Distribution of All Kicks in Men 3.4 Competitions

Kick Types	n	%
High Service	0	0.0
Short Service	105	8.0
Hit	193	14.6
Net-drop	491	37.2
Lob	302	22.9
Backhand Lift	8	0.6
Clear	30	2.3
Drop	186	14.1
Drive	4	0.3
Total	1319	100.0

When the distribution of total 1319 kicks within the game, it was determined that the most used kick diversity (37.2%) was net-drop kick, (22.9%) lob and (14.6%) hit kick was followed by that kick. In the ranking of kicks at least used, it was determined that the high service kick had never been used (0.0%). This kick was followed by drive (0.3%) and backhand life (0.6%) kicks.

Table 5 The Analysis of Kicks in All Sets of Men 3.4 Competition

Set No	The number of Rallies played	The percentage (%) of the number of total kicks		The number of Minimum Kicks in a rally	The number of Maximum Kicks in a rally	Arithmetic Mean \bar{X}	Standard Deviation S.D.
		n	%				
3 set/ 105 rallies							
1 st Set	33	425	32.2	4	52	12.9	9.1
2 nd Set	36	439	33.3	2	37	12.2	8.8
3 th Set	36	455	34.5	3	46	12.6	8.8
Total	105	1319	100.0	2	52	12.6	8.8

When the distribution of 1319 kicks made in the total of the competition is examined, it is seen that the number of minimum kicks is 2, the number of maximum kick is 52. The kick average of each three set was found as $\bar{X} = 12.6 \pm 8.8$ sc.

Table 6 The Analysis of Men 3.4 Competition According to Game and Resting Periods

Total Set and Game Number	Minimum game period (sc)	Maximum Game Period (sc)	Total Game Period (min)	Arithmetic Mean \bar{X} (sc)	SD	Game Period / Resting Period
3 set/ 105 rallies						
Game Period	2	55	22.0	12.59	9.7	1 / 2.47
Resting Period	5	145	54.3	31.01	18.8	

When the game and resting relationship belonging to the foresaid competition is examined, it was determined the total game period was 22.0 minutes, the total resting period was 54.3 minutes. It was determined that while the game period of rally ended in minimum period was 2 second, the game period of the longest rally was 55 seconds.

In this competition, it was found that the average of game period was $\bar{X} = 12.59 \pm 9.7$ sc, the resting period between the rallies was $\bar{X} = 31.01 \pm 18.8$ sc. Accordingly, the relationship of game period and resting period was counted as 1: 2.47 unity.

Table 7 Percentage Distribution of Total Kicks of Men Final Competition

Kick Types	n	%
High Service	11	0.9
Short Service	95	7.5
Hit	111	8.7
Net-drop	422	33.2
Lob	298	23.5
Backhand Lift	31	2.4
Clear	66	5.2
Drop	188	14.8
Drive	49	3.8
Total	1271	100.0

It is seen that the most used kicks in Men Final competition was in turn net-drop (33.2%), lob (23.5%) and drop kick (14.8%). It was determined that the least preferred kicks to be done was high service (0.9%) backhand lift (2.4%) and drive kick (3.8%).

Table 8 The Analysis of Kicks in All Sets of Men Final Competition

Set No	The number of Rallies played	The percentage (%) of the number of total kicks	The number of Minimum Kicks in a rally	The number of Maximum Kicks in a rally	Arithmetic Mean \bar{X}	Standard Deviation S.D.
3 set/ 106 rallies		n %				
1st Set	36	477 37.5	2	37	13.25	9.0
2nd Set	30	340 26.8	2	45	11.33	8.9
3th Set	40	454 35.7	1	46	11.35	9.9
Total	106	1271 100.0	1	46	11.99	9.3

Men Final competition was realized as 3 set, totally 106 rally. The number of the minimum kick in a rally was 1 kick, maximum was 46 kicks. The number of kicks in Rallies was found as $\bar{X} = 11.99 \pm 9.3$ kicks, total in all three sets.

Table 9 The Analysis of Men Final Competition According to Game and Resting Periods

Total Set and Game Number	Minimum game period (sc)	Maximum Game Period (sc)	Total Game Period (min)	Arithmetic Mean \bar{X} (sc)	SD	Game Period / Resting Period
3 set/ 106 rallies						
Game Period	1	44	18.2	10.28	8.4	1 / 2.89
Resting Period	2	82	52.7	29.81	14.2	

It was determined that, in the final competition played by way of total three sets and 106 rallies, the period of 1 second game was the shortest period rally, the longest period rally took 44 seconds time. While total 18.2 minutes net game period was obtained in the final competition, the total of resting periods was determined as 52.7 minutes. Accordingly, the relationship between game period and resting period was determined as 1: 2.89 unity.

Table 10 The Percentage Distribution of All Kicks in Women Semi Final Competition

Kick Types	n	%
High Service	16	2.4
Short Service	52	7.8
Hit	82	12.3
Net-drop	159	23.9
Lob	144	21.6
Backhand Lift	4	0.6
Clear	80	12.0
Drop	108	16.2
Drive	21	3.2
Total	666	100.0

In Table 10, it was determined that total 666 kicks were realized in Women semi final competition, the highest rates in this kick in total belonged to, in turn, the kicks of net-drop (23.9%), lob (21.6%) and (16.2%). It was determined that the minimum used kicks in the competition was backhand lift (0.6%), high service (2.4%) and drive (3.2%) kicks.

Table 11 Kick Analysis Between Sets of Women Semi-Final Competition

Set No	The number of Rallies played	The percentage (%) of the number of total kicks	The number of Minimum Kicks in a rally	The number of Maximum Kicks in a rally	Arithmetic Mean	Standard Deviation
2 set/ 68 rallies		n %			\bar{X}	S.D.
1st Set	34	364 54.6	1	33	10.71	7.6
2nd Set	34	302 45.4	2	32	8.88	7.0
Total	68	666 100.0	1	33	9.79	7.6

When the distribution of 666 kicks made in total of two sets of women semi-final competition is examined, it is seen in Table 11 that the number of minimum kicks made in a rally is 1, the number of maximum kicks is 33. The average of both set kick was found as $\bar{X} = 9.79 \pm 7.6$.

Table 12 The Analysis of Women Semi-Final Competition According to Game and Resting Period

Total Set and Game Number	Minimum game period (sc)	Maximum Game Period (sc)	Total Game Period (min)	Arithmetic Mean	SD	Game Period / Resting Period
2 set/ 68 rallies				\bar{X}		
Game Period	2	34	10.9	9.6	7.8	1 / 2.52
Resting Period	4	101	27.4	24.1	11.9	

In the semi-final competition played by way of two set and 68 rallies in total, it was determined that the period of 2 second game was the shortest rally and the longest rally continued 34 seconds. While total 10.9 minutes net game period was obtained in semi-final competition, the total of the resting periods was determined as 27.4 minutes. Accordingly, the relationship of game period and resting period was determined as 1: 2.52 unity.

Table 13 The Percentage Distribution of All Kicks in Women 3.4 Competition

Kick Types	n	%
High Service	33	8.7
Short Service	6	1.6
Hit	106	27.8
Net-drop	72	18.9
Lob	63	16.5
Backhand Lift	20	5.3
Clear	80	21.0

Drop	1	0.2
Drive	0	0.0
Total	381	100.0

In Table 13, total 381 kicks were realized in women 3.4 competition (the reason of the low number of this kick derived from the fact that 2nd set was not played by the reason of disability) It was determined that the highest rates in kick total in the part of competition played belonged to in turn the kicks of spike (27.8%), clear (21.0%) and net-drop (18.9%) kicks. It can be seen in table-13 that the least used kicks in competition were drive (0.0%), drop (0.2%) and short service (1.6%) kicks.

Table 14 The Analysis of Kick Between Sets of Women 3.4 Competition

Set No	The number of Rallies played	The percentage (%) of the number of total kicks n %		The number of Minimum Kicks in a rally	The number of Maximum Kicks in a rally	Arithmetic Mean \bar{X}	Standard Deviation S.D.
1 set/ 39 rallies	39	381	100.0	2	43	9.8	8.3
2 nd Set	The second set was not played due to injury						
Total	39	381	100.0	2	43	9.8	8.3

When the distribution of 381 kicks made totally in this competition that was resulted in because of disability by way of single set is examined, it can be seen that the number of the minimum kick made in a rally was 2, the maximum kick number was 43. The kick average of all rallies was found as $\bar{X} = 9.8 \pm 8.3$.

Table 15 The Analysis of Women 3.4 Competition According to Game and Resting Periods

Total Set and Game Number	Minimum game period (sc)	Maximum Game Period (sc)	Total Game Period (min)	Arithmetic Mean \bar{X} (sc)	SD	Game Period / Resting Period
1 set/ 39 rallies						
Game Period	2	44	7.0	10.69	8.6	1 / 2.08
Resting Period	3	63	14.5	22.3	11.8	

It was determined that the shortest rally of the competition played by way of total 39 rallies had a 2 second period, the longest rally continued 44 seconds. This competition had total 7 minute net game period, the total of resting period was determined as 14.5 minute. Accordingly, the relationship between game period and resting period was determined as a 1: 2.08 unity.

Table 16 The Percentage Distribution of All Kicks in Women Final Competition

The Percentage of kick types	n	%
High Service	72	5.6
Short Service	46	3.6
Hit	172	13.3
Net-drop	282	21.8
Lob	284	22.0
Backhand Lift	24	1.9
Clear	161	12.5
Drop	188	14.6
Drive	61	4.7
Total	1290	100.0

In Table 16, total 1290 kicks were realized in women final competition, it was determined that the highest rates within total of kicks belonged to in turn (22.0%), net-drop (21.8%), drop (14.6%) kicks. It was found that the least used kicks within competition were backhand lift (1.9%), short service (3.6%) and drive (4.7) kicks.

Table 17 Analysis of Kicks Between Sets of Women Final Competition

Set No	The number of Rallies played	The percentage (%) of the number of total kicks n %	The number of Minimum Kicks in a rally	The number of Maximum Kicks in a rally	Arithmetic Mean \bar{X}	Standard Deviation S.D.
3 set/ 118 rallies						
1 st Set	36	425	1	35	11.8	8.4
2 nd Set	44	526	2	43	11.9	9.5
3 th Set	38	339	2	24	8.9	5.8
Total	118	1290	1	43	11.0	8.1

When the distribution of 1290 kicks made in total of three set of women final competition is examined, it can be seen in Table 17 that the number of minimum kicks in a rally was 1, the number of maximum kicks was 43. When it is looked at the average kick number made in a rally of all competitions, it was found that it had a $\bar{X} = 11.0 \pm 8.1$ kicks number.

Table 18 The Analysis of Women Final Competition According to Game and Resting Period

Total Set and Game Number 3 set/ 118 rallies	Minimum game period (sc)	Maximum Game Period (sc)	Total Game Period (min)	Arithmetic Mean \bar{X} (sc)	SD	Game Period / Resting Period
Game Period	2	44	7.0	10.69	8.6	1 / 2.08
Resting Period	3	63	14.5	22.3	11.8	

It was determined that the shortest rally of the competition played by way of total 3 set and 118 rallies had a 1 second period, the longest rally continued 42 seconds. It was determined that women final competition had total 20,4 minute net game period and the total of resting period between rallies was 53.5 minutes. Accordingly, it was determined that the rate of relationship between game period and resting period had a 1: 2.62 unity. The resting rate between rallies has been drawing attention as a competition having the highest rate within other women competition the subject of research.

Depending on the findings obtained above, the general kick analysis of women and men who played semi-final, 3.4 final competitions in Olympic Games are given below in tables.

Table 19 T-Test Values Tables According to Gender Factor of Kick Diversity of Olympic Badminton Athletes

Kick Diversity	Gender	The Number of Total Rally		The Percentage (%) of the Total Kicks Number		Arithmetic Mean of Kick Numbers		T test	Sig
		n	%	\bar{X}	S.D.				
High Service	Male	280	12	0.3	0.35	0.2	15.100	0.000*	
	Female	225	121	5.2	0.42	0.5			
Short Service	Male	280	268	7.8	0.95	0.2	13.961	0.000*	
	Female	225	104	4.4	0.46	0.4			
Hit	Male	280	413	11.7	1.44	1.6	1.059	0.290	
	Female	225	360	15.4	1.60	1.7			
Net-drop	Male	280	1189	34.4	4.25	3.7	7.218	0.000*	
	Female	225	513	22.0	2.28	2.4			
Lob	Male	280	821	24.0	2.93	2.4	3.618	0000*	
	Female	225	491	21.0	2.18	2.1			
Backhand Lift	Male	280	67	1.9	0.24	0.6	0.375	0.708	
	Female	225	48	2.1	0.21	0.9			
Clear	Male	280	125	3.6	0.45	0.9	6.135	0.000*	
	Female	225	321	13.7	1.43	2.2			
Drop	Male	280	480	14.0	1.71	1.9	2.379	0.018*	
	Female	225	321	13.7	1.43	2.2			

Drive	Female	225	297	12.7	1.32	1.7	0.867	0.386
	Male	280	79	2.3	0.28	1.0		
Male (Total)	Female	225	82	3.5	0.36	1.1	2.290	0.012*
	Male	280	3454	100.0	12.34	8.9		
Female (Total)		225	2337	100.0	10.42	8.0		
GRAND TOTAL		505	5791	100.0				

P>0.05

The analysis results and evaluations of total 5791 kicks occurred during 505 rally period belonging to six competition including semi-final, 3.4 competition and final competition played during Olympic Games are seen in Table-19.

Accordingly, it is seen that elite men competitions had a $\bar{x} = 93.3$ rally number, women badminton players had $\bar{x} = 75.0$ rally number. When considering that the second set of women 3.4 competition was not played because of disability, it can be mentioned that women competitions are in the quality to reach average 90 rally number (Table 14). It was determined that there was a significant difference between groups statistically in the total of the number of men and women elite badminton players $T_h = 0.12, P > 0.05$). The rate of using service by men athletes was 8,1% within all kicks. This rate was 9.6% in women athletes. However, if it is thought that service kicks are special kicks that are used only in rally start, that don't have another using chance, the fact that these kick diversities should be evaluated separately comes up. While Men athletes used short service kick in 96.7% (268 kicks) out of 280 rally start, the rate of using high service (12 kicks) was 4,3%. The rate of using high service (121 kicks) by women was 53.7%, the rate of using short service (104 kicks) was found as 46.3%. Based on this information, we can mention about that athletes show a different preference and strategy while starting the game.

When the ranking of kicks that athletes prefer during competition are examined, it was determined that men athletes preferred mostly net-drop (34.4%), lob (24.0%) kicks, women athletes preferred in the same way net-drop (22.0%), lob (21.0%) kicks. While elite men badminton players use drop kicks (14.0%) as the most preferred third kick diversity, women prefer hit kicks (15.5 %).

Besides, the values of clear kicks in the total kicks between both groups are examined, it can be concluded that men athletes preferred this kick at the rate of 3.6%, women athletes preferred this kick at the rate of 13.7%, 3.8 times more than men athletes. All these kick diversities, especially drop, hit and clear kicks to be used in different diversities and percentages cause important changes in general structure and strategy understanding of the competition.

When we compare men and women athletes in terms of kick diversities, even though there was no any difference between athletes in terms of preference and number of hit, backhand lift and drive kicks ($p > 0.05$), it was determined that there was a significant difference statistically between men and women athletes in terms of the remaining six basic kicks (high service, short service, net-drop, lob, clear and drop) ($P < 0.05$).

Table 20 Analysis of Loading and Resting Relationship of Elite Badminton Athletes

Variant / Gender	Men total 3 Match	Women Total 3 Match	t	Sig. (P>0,05)
Total Game Period (min)	52.6	38.1		
Average Game Period in a Rally (sc)	11.3 ± 8.6	10.2 ± 7.8	1.461	0.145
Total Resting Period (min)	143.6	95.3		
Average Resting Period Between rallies (sc)	30.8 ± 15.5	25.4 ± 12.3	4.210	0.000*
Game Period / Resting Period Rate	1 / 2.73	1 / 2.50		

P>0.05

According to Table 20, the game periods of men badminton players in each rally come true as $\bar{X} = 11.3 \pm 8.6$ sc. The game periods of women badminton players in each rally has a $\bar{X} = 10.2 \pm 7.8$ sc. Period. Accordingly, there is no significant difference statistically in terms of game periods actualized in rallies between each group (Th = 0.1461, $P > 0.05$). It was determined that when we examine the resting periods passing between both rallies in badminton, elite men badminton athletes had a $\bar{X} = 30.8 \pm 15.5$ resting period, women elite athletes had a $\bar{X} = 25.4 \pm 12.3$ second resting period. According to this resting period, it is seen that there is a significant difference statistically between groups (Th = 4.210, $P < 0.05$). When a relationship is made on unit basis between resting period and game period played, it was determined that this rate found for men was 1:2.73, for women was 1:2.50 unity. Accordingly, it was concluded that men athletes tend to resting more between rallies.

4. CONCLUSIONS

In the research, it was determined that there was a significant difference statistically in the total of kick number for each per rally that men and women elite badminton players played ($P > 0.05$). The reasons of this difference can be explained by depending on many reasons like power, speed and quickness etc., the difference of physiological parameters, the styles of athletes' being affected from these differences, showing difference of defence and attack skills (http://www.badminton-information.com/badminton_singles.html; Heller, 2010).

When we compare athletes in terms of kick diversity, there is no a difference between men and women athletes in terms of the preferences of hit, backhand lift and drive kicks ($p > 0.05$). However, when we look them in terms of other kicks, there is no significance difference between men and women athletes in terms of remaining six basic kicks (high service, short service, net-drop, lob, clear and drop) ($P < 0.05$). Reference (Salman and Salman, 2009) examined the kick diversity of elite Turkish badminton athletes in the research they made in 2009. In this research, it was determined that women athletes used mostly lob kick (23.1%), men used net-drop kick (28.1%). It was determined that in this research men badminton players preferred mostly net-drop (34.4%) and lob (23.8%) kicks, women athletes used mostly net-drop (22.0%) and lob kick (19.5%). Both research results support each other (Salman and Salman, 2009).

The game period in each rally of men badminton players actualizes as $\bar{X} = 11.3 \pm 8.6$ sc. The game period in each rally of women badminton players has a $\bar{X} = 10.2 \pm 7.8$ sc period. Accordingly, there is no a significance difference statistically in terms of game periods actualized in rallies between both groups ($P > 0.05$). When we examine badminton rallies in terms of the resting periods passing in between each rally, it was determined that a $\bar{X} = 30.8 \pm 15.5$ second resting period was consisted in men, a $\bar{X} = 25.4 \pm 12.3$ second resting period was consisted in women. When it is looked in this perspective, it is seen that there is a significance difference between groups statistically ($P < 0.05$). When a relationship is set on the basis of unity between game period played and resting period, it was determined that the rate found for men was 1:2.73, the rate found for women was 1:2.50 unity.

Reference (Faude et. all, 2007) made the analysis of single- men competitions in 2004 Atina Olympic Games. According to similar research results, Reference (Manrique & Badillo, 2003; Docherty, 1982) determined that the period of competition lasted $\bar{X} = 28.0 \pm 5.2$ minute and $\bar{X} = 36.3 \pm 12.5$ minute, that the number of kicks of per rally was 12, that the rally game period was $\bar{X} = 6.4 \pm 1.3$ second, the resting gap between rallies was $\bar{X} = 12.9 \pm 2.7$, that the rate of loading and resting was actualized as about 1:2 unity (Faude et. all, 2007; Manrique & Badillo, 2003; Docherty, 1982). When the study results mentioned are compared with these working results, it was found that the average of game period for men was 65.9 min. (the total of game period+ resting period) and that women athletes had an 44.5 min. Average it can be commented that when the results obtained are compared with other research results, the period of each competition is rather high in comparison with other research results. It can be explained that it showed similarity with other research results in terms of the number

of kick for each per rally ($\bar{x} = 12.4 \pm 8.9$ kick number for men, $\bar{x} = 10.2 \pm 8.0$ kick number for women). It was determined that the game period of each rally lasted $\bar{x} = 11.3 \pm 8.6$ second for men, $\bar{x} = 10.2 \pm 7.8$ second for women. It was found that the resting period between rallies was $\bar{x} = 30.8 \pm 15.5$ second for men, $\bar{x} = 25.4 \pm 12.3$ second for women. The number of the longest rally played actualized as 52 kicks for men and 43 kicks for women (Table 5, Table 14). In the research mentioned, it was determined that while the relationship of game resting period was found as 1:2 unit, this rate was 1:2.73 for men, 1:2.50 was for women and the resting period increased at an evident rate according to the previous research result. It can be said that the average of the kick number in the game of the elite Olympic athletes at the top level by looking these results, in terms of the relationship of resting period and game resting between rallies, within the time passing between Atina Olympics and London Olympic Games, there occurs some differences and increases that would be important in terms of number and period from the standpoint of general structure and characteristic of the sport.

In the light of this information, in order to train the badminton performance athletes, gender plays an evident role, the kick diversity is affected from this, the resting period between rallies shows difference, importance should be given to all these subjects by trainers who aim at success in international fields. Besides, in the trainings of top level athletes, aiming at taking a minimum around 100-120 rally number performance to a condition that will be increased easily in a must for success.

REFERENCES

- Badminton Singles: Different Styles of Play. http://www.badminton-information.com/badminton_singles.html. Date of access: 24.10.2014.
- Chin, M., Wong, A.S., So R.J., Siu, O.T., Steininger, K. & Lo, D.T. (1995). "Sport Specific Fitness Testing Of Elite Badminton Players", *Journal Sports Medicine*, 29(3): 153-157.
- Docherty, D. (1982). "A Comparison of Heart Rate Responses in Racquet Games", *British Journal of Sports Medicine*, 16: 96-100.
- Faude, O., Meyer, T., Rosenberger, F., Fries, M., Huber, G. & Kindermann, W. (2007). "Physiological Characteristics of Badminton Match Play", *European Journal of Applied Physiology*, 100: 479-8.
- Fitness Training in Badminton. (2002). Badminton Association of England Ltd.
- Grice, T. (1996). *Badminton Steps to Success*. Human Kinetics Publishers, USA.
- <http://www.saatkac.com/kronometre.php>. Date of access: 01.02.2014.
- Heller, J. (2010). "Physiological Profiles of Elite Badminton Players: Aspects of Age and Gender", *Journal Sports Medicine*, (44)17.
- Manrique, D.C., & Badillo, J.J.G. (2003). "Analysis of the Characteristics of Competitive Badminton", *British Journal of Sports Medicine*, (37)1: 62-66.
- Salman, M.N. & Salman, S. (1994). *Badminton Basic Techniques and Teaching*, Onay Ajans, Ankara, Turkey.
- Salman, M.N. (2005). *Morpa Sports Encyclopedia*, Volume 1: 104.
- Salman, M.N. (2007). "Investigation of Performance Changes Due to Repeat Count in Badminton Short-Service (Forehand-Backhand) Teaching", *Kocaeli University, 3. Racquet Sports Symposium*, Kocaeli.
- Salman, M.N. & Salman, S. (2009). "Comparison of Regional Distribution of Game-Winning Strokes in Terms of Gender Factor in Badminton Sports", *Selçuk University Journal of Physical Education and Sport Science*, (11)2.

