

## **Swimming in The Olympics**

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### **Abstract**

Swimming has been a part of the Olympic program since the first modern Olympic Games. This research aims to examine the record developments of swimming in all Olympic games from the first modern Olympic Games to the present ones. Within the scope of this purpose, in our research, all degrees in the distances we have determined from the first modern Olympic Games (1896, Athens) to the last (2020, Tokyo) Olympic Games were scanned using 'PubMed, GoogleScholar, Scopus, YökTez' databases in the literature and the data obtained was input Microsoft Excel and analyzed by graphics. As a result of the study, when the development process of the records in the graphics was examined, it was determined that there were sudden breaks in the graphics. Although there are many factors that cause these breaks, the most significant factors affecting the records are taken into consideration.

**Keywords:** Olympic games, Swimming, Record, Performance.

## Olimpiyatlarda Yüzme

### Öz

Yüzme branşı modern ilk olimpiyat oyunlarından itibaren olimpiyat programının bir parçası olmuştur. Bu araştırmanın amacı ilk modern olimpiyat oyunlarından günümüze kadar gerçekleşen tüm olimpiyat oyunlarında yüzme branşındaki rekor gelişimlerini incelemektir. Bu amaç kapsamında araştırmamızda, ilk modern olimpiyat oyunlarından (1896, Atina) son gerçekleşen (2020, Tokyo) olimpiyat oyunlarına kadar belirlemiş olduğumuz mesafelerdeki tüm dereceler literatürde 'PubMed, GoogleScholar, Scopus, YökTez' veri tabanları kullanılarak taranmış olup elde edilen veriler Microsoft Excel'e girilmiş ve grafiğe dökülerek incelenmiştir. Çalışmanın sonucunda grafiklerdeki rekorların gelişim süreci incelendiğinde grafiklerde ani kırılmalar olduğu tespit edilmiştir. Bu kırılmalara neden olan birçok faktör olmakla birlikte rekorlara etki eden en belirgin faktörler değerlendirilmeye alınmıştır.

**Anahtar Kelimeler:** Olimpiyat oyunları, Yüzme, Rekor, Performans.

## Introduction

Swimming is a popular sport, the second largest by the number of athletes in the Olympic Games (Hořub et al., 2021). This discipline started its journey in swimming in the middle of the 19th century, with the establishment of the world's first swimming organization in London in 1837. In 1844, a group of Indians brought to England from North America outperformed their competitors in all the races in London with different swimming techniques. In 1860, an English named Arthur Trudgeon who had been to South America, showed the techniques of swimming that he learned from Indians to European swimmers and ongoing European style of swimming by scissoring underwater has been crossed out. These styles are La coupe, La marinier, Over arm side stroke, Trudgeon and Backstroke breaststroke. (Bozdoğan, 1988)

Swimming has been a part of the Olympic program since the first modern Olympic Games in 1896. Until the London 1908 Games, Olympic swimming events took place in open water. The post-WWII era brought better technology, facilities, and improved training techniques, resulting in significantly shorter times compared to first wave-fighting competitions. Initially, both male and female swimmers wore swimsuits that increased resistance and slowed them down, but as the sport progressed, the swimsuit became more hydrodynamic. Racing swimsuits began to be made of materials such as lycra that reduced friction and consequently reduced lap times. While only men participated in the Olympic swimming events in the first years, female competitors were only included in the competition in this branch at the 1912 Olympic Games in Stockholm. Women initially competed in only two events, the 100m freestyle and the 4×100m freestyle relay, and the experimental debuts brought some unique events to these old games.

Competitive pools also experienced a great change during this period, which led to the transition from outdoor tournaments to indoor tournaments. The introduction of drainage in Olympic swimming pools marked lanes, and guidelines for pool depths in 1924 contributed to a better overall competitive standard in the years that followed, this exciting period of development helped to pave the way for elite swimmers. (Olympics, the History of Olympic Swimming, <https://olympics.com/en/news/the-history-of-olympic-swimming>, accessed 3 Oct 2022).

The aim of this research is to examine the record developments in swimming in all Olympic Games from the first modern Olympic Games to the present and to convey the factors affecting the records.

## Material and Method

Within the scope of our research, from the first modern Olympic Games (1896, Athens) to the last (2020, Tokyo) Olympic Games, in both genders free swimming competitions (50m, 200m, 400m), backstroke, breaststroke and butterfly style competitions (100m, 200m) and finally in individual medley competitions (200m, 400m) record scores were searched in the literature using 'PubMed, GoogleScholar, Scopus, YökTez' databases. 5 different keywords were used for national and international databases while searching, the keywords 'olimpiyat oyunları, yüzme, rekor, performance' were used for national databases and 'olympic games, swimming, record, performance' keywords were used for foreign databases. The data were input Microsoft Excel and analyzed by graphics.

## Findings

In a 124-year period from the first modern Olympics in freestyle competitions to the present, the development of record performance was taken as a basis in terms of distance, while 3 different events (50m, 200m, 400m) as anaerobic and aerobic were included. In addition to the butterfly, backstroke, and breaststroke techniques, to examine the effects of developments affecting performance such as turning, starting, finishing, changing, and developing FINA guidelines, technique, and tactics in individual medley competitions, 100m and 200m distances in butterfly, backstroke, breaststroke techniques are used in individual medley events. (200m, 400m) distances were examined.

**Table 1.** Freestyle 50m, 200m, and 400m record development table for male swimmers in the modern Olympic Games

Year	Men 50m	Men 200m	Men 400m
1896	-	-	-
1900	-	2:25.02	-
1904	-	2:44.02	6:16.02
1908	-	-	5:42.02
1912	-	-	5:24.04
1920	-	-	5:26.08
1924	-	-	5:04.02
1928	-	-	5:01.06
1932	-	-	4:48.04
1936	-	-	4:44.05
1948	-	-	4:41.04
1952	-	-	4:30.07
1956	-	-	4:27.03
1960	-	-	4:18.03
1964	-	-	4:12.02
1968	-	1:55.02	4:09.09
1972	-	1:52.78	4:02.27
1976	-	1:50.29	3:51.93
1980	-	1:49.81	3:51.31
1984	-	1:47.44	3:51.23
1988	22.14	1:47.25	3:46.95
1992	21.91	1:46.70	3:45.00
1996	22.13	1:47.63	3:47.97
2000	21.98	1:45.35	3:40.59
2004	21.93	1:44.71	3:03.10
2008	21.30	1:42.96	3:41.86
2012	21.11	1:42.82	3:48.92
2016	21.40	1:44.65	3:41.55
2020	21.0	1:44.22	3:43.36

In the swimming branch, 50m free sprint competitions were included in the Olympics in 1988, unlike other swimming distances. The 200m freestyle competition took place in the Olympics experimentally in 1900 and 1904, and it continues to maintain its place in the 1968 Seoul Olympic Games and afterwards. Compared to other swimming distances, 400m freestyle swimming competitions have been in the Olympics uninterruptedly since the 1904 Olympic Games. When table 1 is examined, a continuous improvement is observed in the freestyle swimming competitions, but since the first and the last (50m, 200m, 400m) freestyle

competition, (1.14, 40.08, 2:32.66) second improvement in athletic performance has been detected, respectively.

**Table 2.** Freestyle 50m, 200m, and 400m record development table for female swimmers in the modern Olympic Games

Year	50m	200m	400m
1896	-	-	-
1900	-	-	-
1904	-	-	-
1908	-	-	-
1912	-	-	-
1920	-	-	-
1924	-	-	06:02:00
1928	-	-	5:42.08
1932	-	-	5:28.05
1936	-	-	5:26.04
1948	-	-	5:17.08
1952	-	-	5:12.01
1956	-	-	4:56.04
1960	-	-	4:50.06
1964	-	-	4:43.03
1968	-	2:10.05	4:31.08
1972	-	2:03.56	4:19.04
1976	-	1:59.26	4:09.89
1980	-	1:58.33	4:08.76
1984	-	1:59.23	4:07.10
1988	25.49	1:57.65	4:03.85
1992	24.79	1:57.90	4:07.18
1996	24.87	1:58.16	4:07.25
2000	24.32	1:58.24	4:05.80
2004	24.58	1:58.03	4:05.34
2008	24.06	1:58.82	4:03.22
2012	24.05	1:53.61	4:01.45
2016	24.07	1:53.73	3:56.46
2020	23.81	1:53.50	3:56.69

Female swimmers started to take place in the Olympics 20 years after male swimmers at the 1912 Stockholm Olympic Games. Female swimmers started to compete in the 1988 Seoul Olympics in partnership with male swimmers in the 50m freestyle event. When table 2 is examined, 1.68, 16.55, 2:05.31 second improvement in athletic performance has been observed among female athletes since the first and last 50m, 200m, and 400m freestyle competitions. When the record progress of female and male athletes in the modern Olympic Games is compared based on the time to complete the distance, male swimmers showed 0.54 milliseconds less improvement than females in 50 meters competitions. In the 200m distance, male athletes improved by 23.53 seconds more than female athletes. In the 400m freestyle competition, male athletes showed 27.35 seconds more improvement than female athletes.

**Table 3.** Backstroke technique (100m, 200m) record development table for male and female swimmers in the modern Olympic Games

Year	Men 100m	Men 200m	Women 100m	Women 200m
1896	-	-	-	-
1900	-	2:47.00	-	-
1904	1:16.08	-	-	-
1908	1:24.06	-	-	-
1912	1:21.02	-	-	-
1920	1:15.02	-	-	-
1924	1:13.02	-	1:23.02	-
1928	1:08.02	-	1:22.00	-
1932	1:08.06	-	1:19.04	-
1936	1:05.09	-	1:18.09	-
1948	1:06.04	-	1:14.04	-
1952	1:05.04	-	1:14.03	-
1956	1:02.02	-	1:12.09	-
1960	1:01.09	-	1:09.03	-
1964	-	2:10.03	1:07.07	-
1968	58.07	2:09.06	1:05.05	2:24.08
1972	56.58	2:02.82	1:05.78	2:19.19
1976	55.49	1:59.19	1:01.83	2:13.43
1980	56.33	2:01.93	1:00.86	2:11.77
1984	55.79	2:00.23	1:02.55	2:02.38
1988	55.05	1:59.37	1:09.89	2:09.29
1992	53.98	1:58.47	1:00.68	2:07.06
1996	54.10	1:58.54	1:01.19	2:07.83
2000	53.72	1:56.76	1:00.21	2:08.16
2004	54.06	1:54.95	1:00.37	2:09.19
2008	52.54	1:53.94	58.96	2:05.24
2012	52.16	1:53.41	58.33	2:04.06
2016	51.97	1:53.62	58.45	2:05.99
2020	51.98	1:53.27	57.47	2:04.68

The first backstroke technique competition in the modern Olympic games was experimentally held in the 200m distance (1900, Paris) for male swimmers. Male athletes (1904, St. Louis) and female athletes (1924, Paris) have been competing in the 100m backstroke event since 1924. In the swimming branch, the 200m backstroke technique competition was reintroduced to the Olympic Games, and the 100m backstrokes technical competition was not included in the Olympics in the same year (1964, Tokyo). Unlike the men, female swimmers competed in the 200m backstroke events in the year (1968, Mexico) after 1 Olympics after the male swimmers competed in the 200m backstroke event. In backstroke and butterfly swimming techniques, the 200m race distance was included later in the Olympics compared to other techniques. When Table 3 is analyzed, 25.55 and 19.04 seconds of improvement have been observed for female swimmers since the first and last 100m and 200m backstroke competition, respectively, and 24.01, 53.73 seconds of improvement in athletic performance since the first and last 100m and 200m backstroke competitions for male swimmers, respectively. detected. When the record progress of male and female athletes in the modern Olympic games is compared based on the time to complete the distance, female athletes showed 1.54 seconds more improvement in athletic performance in the 100m backstroke competition, while male swimmers showed 34.69 seconds more improvement than female swimmers in the 200m backstroke distance.

**Table 4.** Butterfly technique 100m, and 200m record development table for male and female swimmers in the modern Olympic Games

Year	Men 100m	Men 200m	Women 100m	Women 200m
1896	-	-	-	-
1900	-	-	-	-
1904	-	-	-	-
1908	-	-	-	-
1912	-	-	-	-
1920	-	-	-	-
1924	-	-	-	-
1928	-	-	-	-
1932	-	-	-	-
1936	-	-	-	-
1948	-	-	-	-
1952	-	-	-	-
1956	-	2:19.03	1:11.02	-
1960	-	2:12.08	1:09.05	-
1964	-	2:06.06	1:04.07	-
1968	55.09	2:08.07	1:05.05	2:24.07
1972	54.27	2:00.70	1:03.34	2:15.57
1976	54.35	1:59.23	1:01.13	2:11.41
1980	54.92	1:59.76	1:00.42	2:10.44
1984	53.08	1:57.04	59.26	2:06.90
1988	53.00	1:56.94	59.00	2:09.51
1992	53.32	1:56.26	58.62	2:08.67
1996	52.27	1:56.51	59.13	2:07.76
2000	52.00	1:55.35	56.61	2:05.88
2004	51.25	1:54.04	57.72	2:06.05
2008	50.58	1:52.03	56.73	2:04.18
2012	51.21	1:52.96	55.98	2:04.06
2016	50.39	1:53.36	55.48	2:04.85
2020	49.45	1:51.25	55.59	2:03.86

It was only in the 1950s that the breaststroke diverged from the butterfly technique. (Hołub et al., 2021). The first competitions in the butterfly technique took place in the 1956 Olympic Games, while the women competed in the 100m butterfly competition in the 1956 Olympics, the male athletes competed in the 200m butterfly competitions. Swimmers of both sexes jointly competed in both race distances (100m, 200m) in the 1968 Olympic Games. When Table 4 is examined, an improvement of 15.43 seconds for the 100 m and 20.21 seconds for the 200 m has been observed in the athletic performance since the first and last butterfly swimming competitions for female swimmers. Likewise, it was determined that the athletic performance improvement in male swimmers was 5.64 seconds for the 100 m and 27.78 seconds for the 200 m. When the record progress of male and female athletes in the modern Olympic games is compared based on the time to complete the distance, female athletes showed more improvement 9.79sec in the 100m butterfly swimming competition, and male swimmers showed more improvement 7.57sec in the 200m butterfly distance races.

**Table 5.** Breaststroke technical 100m, and 200m record development table for male and female swimmers in the modern Olympic Games

Year	Men 100m	Men 200m	Women 100m	Women 200m
1896	-	-	-	-

1900	-	-	-	-
1904	-	-	-	-
1908	-	3:09.02	-	-
1912	-	3:01.08	-	-
1920	-	3:04.04	-	-
1924	-	2:56.06	-	3:33.02
1928	-	2:48.08	-	3:12.06
1932	-	2:45.04	-	3:06.23
1936	-	2:41.05	-	3:04.02
1948	-	2:39.03	-	2:57.02
1952	-	2:34.04	-	2:51.07
1956	-	2:34.07	-	2:53.01
1960	-	2:37.04	-	2:49.05
1964	-	2:27.08	-	2:04.46
1968	1:07.07	2:12.22	1:15.08	2:44.04
1972	1:04.94	2:02.82	1:13.58	2:41.71
1976	1:03.11	2:15.11	1:11.16	2:33.35
1980	1:03.44	2:15.85	1:10.22	2:29.54
1984	1:01.65	2:13.34	1:09.88	2:30.38
1988	1:02.04	2:13.52	1:07.95	2:26.71
1992	1:01.50	2:10.16	1:08.00	2:26.65
1996	1:00.65	2:12.57	1:07.73	2:25.41
2000	1:00.46	2:10.87	1:07.05	2:24.35
2004	1:00.08	2:09.44	1:06.64	2:23.37
2008	58.91	2:07.64	1:05.17	2:20.22
2012	58.46	2:07.28	1:05.47	2:19.59
2016	57.13	2:07.46	1:04.93	2:20.30
2020	57.37	2:06.38	1:04.95	2:18.95

The breaststroke is the first swimming technique the others evolved from. When Table 4 is examined, an improvement of 10.13 seconds for the 100m and 74.07 seconds for the 200m improvement in athletic performance has been observed in female swimmers since the breaststroke swimming competition. Likewise, it was determined that improvement in swimming competition in male swimmers was 9.07 seconds for the 100m and 62.64 seconds for the 200m. Male athletes started competing in breaststroke technical competitions at the 1908 (London) Olympic Games 12 years after Athens. It is observed that female athletes take part in breaststroke competitions from the first stroke they throw in the Olympics (1924) swimming. When the record progress of female and male athletes in the modern Olympic Games is compared based on the time to complete the distance, female athletes showed more improvement (1.06 seconds) in the 100m breaststroke swimming competition.

**Table 6.** The record development table in the individual medley competition of 200m, and 400m for male and female swimmers in the modern Olympic Games.

Year	Men 200m	Men 400m	Women 200m	Women 400m
1896	-	-	-	-
1900	-	-	-	-
1904	-	-	-	-
1908	-	-	-	-
1912	-	-	-	-
1920	-	-	-	-
1924	-	-	-	-



1928	-	-	-	-
1932	-	-	-	-
1936	-	-	-	-
1948	-	-	-	-
1952	-	-	-	-
1956	-	-	-	-
1960	-	-	-	-
1964	-	4:45.04	-	5:18.07
1968	2:12.02	4:48.00	2:24.07	5:08.05
1972	2:07.17	4:31.98	2:23.07	5:02.97
1976	-	4:23.68	-	4:42.77
1980	-	4:22.89	-	4:36.29
1984	2:01.42	4:17.41	2:12.64	4:39.24
1988	2:01.17	4:14.75	2:12.59	4:37.76
1992	2:00.76	4:14.23	2:11.65	4:36.54
1996	1:59.91	4:14.90	2:13.93	4:39.18
2000	1:58.98	4:11.76	2:10.68	4:33.59
2004	1:57.14	4:08.26	2:11.14	4:34.83
2008	1:54.23	4:03.84	2:08.45	4:29.45
2012	1:54.27	4:05.18	2:07.57	4:28.43
2016	1:55.66	4:06.05	2:06.58	4:26.36
2020	1:55.00	4:09.42	2:08.52	4:32.08

Individual medley competitions were included in the 1964 Olympic Games, 8 years after the butterfly technique competitions. Swimmers of both sexes competed jointly at the 1964 Olympic Games in the 400m race distance. Right after the 400m, freestyle events were included in the Olympics, the 1968 Olympics included the 200m individual medley event, including joint women's and men's swimmers. In the 1976 and 1980 Olympics, male and female athletes did not participate in the 200m individual medley distance competitions. When Table 6 is examined, there has been a 15.55 and 45.99 second improvement in athletic performance since the first and last 200m and 400m individual medley swimming competition for female swimmers, 17.02 and 35.62 seconds for male swimmers since the first and last 200m and 400m individual medley swimming events, respectively, detected. When the record progress of male and female athletes in the modern Olympic games is compared based on the time to complete the distance, male athletes showed 1.47 seconds more improvement in the 200m individual medley competition, while female athletes in the 400m individual medley distance showed 10.37 seconds more improvement in athletic performance than male athletes.

### Discussion and Conclusion

The developments in athletic performance in swimming, since the first years of the modern Olympic games, are reflected in the record tables. The development process of athletic performance, and new developments as a result of research in training science and other disciplines indirectly affect training and athletes. Getting to the top during the Olympic Games is a huge challenge for swimmers, coaches, and scientists (Issurin et al., 2008). Any reliable and valid information is of great importance for athletes and their support (Issurin et al. 2008). Swimming research has increased since the inception of the 'International Swimming Symposium in Biomechanics and Medicine series in the 1970s. Since then, studies on swimming typically include physiology and biomechanics analysis (Pelayo & Alberty, 2011; Ungerechts & Keskinen, 2018). In recent years, competitive swimming research has

primarily focused on biomechanics (40% of publications in the Biomechanics and Medicine in Swimming, and less focused on swimming physiology (21% of publications). BMS series and exercise training studies cover 9% of BMS studies (Aspenes & Karlsen, n.d.).

Olympic and world records are regularly broken in competitive swimming. The literature states that the performance increase in elite swimmers is multifactorial (Barbosa, Bragada, Reis, Marinho & Silva, 2010). Planning and implementing an appropriate racing strategy is one of these key factors and is considered crucial to success in competitive swimming (Arellano, Brown, Cappaert & Nelson, 1994).

Changes that will affect the parameters such as the start, turn, and underwater in the swimming branch also have an impact on the records. In sprints, the start and turns make up a significant part of the time and distance, for example, in a 100m sprint, the swimmer may spend a total of 40m at the start (Cossor & Mason, 2001). However, it can be argued that the last 5 m of each lap may also be considered part of the race's clean swimming section and that this length will not exceed 30m. In middle and long-distance races, adding small improvements on each turn can significantly improve the final race time. For example, in the 800m freestyle competition, the swimmer does 15 laps. If this swimmer improves by just 0.1 seconds per lap, this represents an overall improvement of 1.5 seconds in the final race time (Morais et al., 2019). Since 2008 FINA has suggested that the rear of the platform surface has an adjustable sloping foot and has accepted the proposal to introduce a new starting block (OSB11, Corgémont) characterized by the addition of a footrest. The new starting block (2008, Beijing) takes part in competitions since the Olympic Games. The starter can make up about a quarter of the sprint race time. As one of the necessary technologies in swimming, an effective start is extremely important for success. (Yang, 2018)

In the history of Olympic swimming, there has been a process in which athletes can make three starts without being disqualified at the starting stage. This rule was changed in 1990 to allow two starts. The last rule change for the start took place in 2001 and the statement 'The swimmer who starts before the signal will be disqualified' was made. There have been minimal changes over the years in free technique and individual medley competitions. In breaststroke technical competitions in the 1990s, some breaststrokers were seen using the butterfly stroke at the start, in the turns, and sometimes throughout the race. As a result, rule recommendations were submitted to FINA on allowing butterfly strokes in the breaststroke technique, with the submitted rule recommendations for the 2005 edition of the published rules to initially allow a single butterfly stroke. Since the 2005 edition of the Rules, directive changes have been made to allow a single butterfly stroke at the start and during the first arm stroke on each turn. It is still valid today. In the early years of the modern Olympics, there were no restrictions on how far swimmers could go underwater from the point where they first touched the water in the starting section, but the 15m surface requirement was included in the 1998 FINA rules for the first time by some elite athletes after swimming the full distance underwater. Changes have been made to the turning rules in butterfly-style competitions to allow for more freedom, but there has been no real change to the butterfly stroke or strokes. In a study by Morais et al. (2019) the effect of the starting and turning performances of elite sprinters on the total race performance was investigated. It has been determined that the first

15m (starting) time constitutes 11-12% of the total race performance, while the effect of the return time on the total swimming degree is 19-20%. Starting and turning parameters make up 31-32% of the total race time in swimming (approximately one-third of a 100-meter race time) (Morais et al., 2019). The evaluation of competitive swimming performances is a guide for trainers and sports scientists with advanced video analysis together with advances in technology. Improvements in performance evaluation are positively reflected in the record table. Video analyzes provide the best and most comprehensive evaluation of the athlete's swimming techniques, starting, underwater, starting, turning, and finishing performances. Swimming analysts, on the other hand, provide athletes and coaches with expert information to help them make decisions and can predict performances and target times over different time periods. Increasingly, analysts are seen as part of the swim team, supporting athletes and providing quality advice to assist coaches in making decisions (Barbosa et al., 2021). Competitive swimming performances are broken down into three main elements: start, return and clean swimming, and the last 5 to 5 of the race. The finishing speed of 20m is considered the fourth element. In 1988, Japan partitioned these technical elements to analyze the Olympic trials and analyzed stroke rate, stroke length, and mid-pool swimming speed at the Seoul Olympic Games. The competitive analysis started before 1980, but performance analysis became international at the European Championships held in Bonn in 1989. (Morais et al., 2019)

The 2020 Tokyo Olympics took place in 2021 due to the COVID-19 pandemic. The literature (2020, Tokyo) has examined the record developments differently from the previous Olympic Games. In the study of Demarie et al. in 2022, swimmers' swimming time trends were analyzed by comparing Tokyo and Rio Olympics and with mathematically predicted results. The study analyzed whether swimmers regained lost performance in the following season, taking into account the difference between the gold medalist and the final finalist, and the differences between men and women. The results showed that nearly all swimmers had better times at the Tokyo Olympics compared to Rio. Analysis of performance trends highlighted that performance progress does not proceed in a linear fashion, and this is best predicted by more recent results. Women's progress was higher than men's, and the gap between the first and last finalists was constantly decreasing, except for the Tokyo Olympics. As a result, the unprecedented Tokyo Olympic Games and qualification year did not seem to impair the performance of all Olympic swimmers, suggesting that stakeholder support and the athlete's coping ability can maintain continued performance (Demarie et al., 2022).

The world record in freestyle swimming in the 1960s and 70s in different studies examining the record developments in the Olympic Games in determined swimming styles and years, similar to our study; It has shown a rapid development as 0.010 m/s in women and 0.015 m/s in men. However, during the 1980s and 90s, a limit was reached in swimming world records and a plateau in performance occurred (Buhl et al., 2013). A study by Holub et al. reveals an increasing trend toward improving performance in the results of men and women in the 100m breaststroke technical swimming competition. The only exception was a 0.30% decline in men's results at the 1980 Moscow Olympics and a 0.27% decline in women's results 12 years later in Barcelona. The most significant progress was made by men in 1972 (Munich) and

1976 (Montreal), and by women in 1976 (Montreal) and 1980 (Moscow); 3.63% and 2.61% and 3.48%, and 2.68%, respectively. They noted that the last few editions of the Olympics had made significant progress in men: 1.51 seconds (2.47%) in Beijing in 2008 and 1.65 seconds (0.96%) for women in London 4 years later (Holub et al., 2021). They noted that since the 200m butterfly race started in 1980 (Moscow) and 1988 (Seoul), performances have improved for men and women, respectively. The most significant improvement in athletic performance for women was in Munich (1972) and Montreal (1976) (6.58% vs. 4.00%) and for men in Rome (1960) and Munich (1972) (6.42% vs. 5.14, respectively) (Holub et al., 2021). Bringing a different perspective to record development, König et al. reported in a study they conducted in 2014 that there are a wide variety of different athletic collectives studied in different time periods. For example, there was research on Olympic freestyle champions from 1896 to 1980 (Schulz and Curnow 1988), elite freestyle swimmers from 1980 to 2009 (Berthelot et al., 2012), and the top ten US freestyle masters. Elite Swiss freestyle swimmers from 1993 to 2002 (Fairbrother, 2007) and from 1994 to 2012 (Rüst et al., 2014). These different time periods may have had an impact on the outcome of the results while swimming performance has consistently increased everywhere (König et al., 2014) while the human species has evolved over time with changes in body dimensions such as body size, body mass, and slenderness (Charles and Bejan, 2009). In swimming events, swimmers use equipment such as swimsuits, bonnets, and goggles during the competition. Swimming trunks have changed in terms of their features and structure since the first modern Olympic Games, and the equipment used during the competition has an impact on the records. There was much speculation that the full body, polyurethane, and the technical swimsuit were the reason for the remarkable improvement in world records. Technical swimsuits were seen as the main reason for the increase in performance. All of the athletes who broke the world record in the FINA championship wore full-body technical swimsuits. These technical suits were able to improve swimming and improve body compression while reducing friction. Further analysis led FINA to introduce new rules on January 1, 2010, limiting the types of technical swimwear that can be worn by athletes. No long-term world records have been broken since that time (O'Connor & Vozenilek, n.d.). As a result, when the development of the swimming branch in the modern Olympic Games is examined; Since the increase in the number of studies on swimming, it can be said that record developments have a positive effect on the trainers, athletes, and training techniques. It has been seen that FINA's rule changes in different swimming competitions in parameters such as start, and turn underwater, which will directly affect the lap time and total swimming degree, have affected the record developments in the first half of the modern Olympic Games. It is thought that the development of equipment specific to the swimming branch, which will be used during the competition, which is more ergonomic and reduces the lap time by minimizing friction, affects the record development and times. The literature states that the 'start' stage constitutes 4/1 (or 3/1) of the total (sprint) swimming degree. It has been observed that the new starting block had an effect on the record development in the Olympics and the following Olympics, where the new starting block was used since the 2008 Beijing Olympics. With the internationalization of performance analyzes and the development of technology since 1989, it is seen that the examination of video analyses by swimming analysts has an effect on athletic performance and record development.

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