

## A COMPARISON OF JAPANESE FINALISTS TO OTHER FINALISTS IN THE 100 m SWIMMING RACES AT THE SYDNEY OLYMPIC GAMES

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The purpose of this study was to compare the performance in 100 m swimming events at the Sydney Olympics between Japanese finalists and finalists from the other nations. The data collated by the Biomechanics Department of the Australian Institute of Sport was used for this purpose. Swimming events were divided into four phases and the time taken to perform each phase was measured for 48 finalists. Although three Japanese swimmer performances were superior in the free swimming phase, their placing did not reflect this because of inferior performances in the start and turn. In contrast, the opposite situation arose with three other Japanese swimmers. These results suggest that not only the free swimming phase but also the starting and turning phases are important in determining race results in 100 m swimming events in international competition.

**KEY WORDS:** swimming, race analysis. Sydney Olympic Games, Japanese swimmer

**INTRODUCTION:** In recent years, swimming race analysis has been carried out in many countries. Last year, at the Sydney Olympic Games, the Australian Institute of Sport (AIS) undertook this analysis.

In this research, swimming races were classified into four phases. These were the starting phase, the free swimming phase, the turning phase and the finish phase. The time taken to perform each phase was measured and stroke length, stroke rate, swimming velocity and an efficiency index were computed for the free swimming phase. These results were provided to the swimmers and coaches in order to evaluate their race performances. It was especially effective to compare the data between swimmers, because the swimmers' weaknesses and strengths could then be identified.

The purpose of this study was to compare the swimming performances between Japanese finalists and finalists from other nations in 100 m events at the Sydney Olympic Games.

**METHOD:** In this study, the data provided by the Biomechanics Department of the AIS at the Sydney Olympic Games was used.

The subjects were 48 Olympic swimming finalists who participated in 100 m events. These events were the men's breaststroke and butterfly and the women's freestyle, backstroke, butterfly and breaststroke. There were two Japanese finalists in the women's 100 m backstroke and one Japanese finalist in every other event.

Each swimming race was videotaped by five cameras (50 Hz). Superimposed on all footage was timing information, which was triggered from the official timing system.

Swimming races were divided into four phases for the analysis. These were the starting phase, the free swimming phase, the turning phase and the finish phase. The starting phase was expressed as the period from the starting signal until the swimmer reached the 15 m line. The turning phase was expressed as the period from 7.5 m before until 7.5 m after the wall. The finish phase was expressed as the final 5 m period of the race. The free swimming phase was the remainder of the race (65 m). The head was used to denote when the swimmer passed by a particular location. The time taken to perform each phase was measured for each finalist.

**RESULTS:** Figure 1 shows the comparison of each phase between the Japanese finalist (TY) and the other finalists in the men's 100 m butterfly. TY's race time was 52.58 s and placing was 5th. The difference between LF (1st) and TY was 0.58 s. The difference between IC (4th) and TY was 0.14 s. During the free swimming phase, TY was the fastest swimmer. TY was between 0.12 s and 0.92 s faster than the other swimmers. However, in the starting and the turning

phases, TY was the slowest. TY was between 0.08 s and 0.48 s slower than the other swimmers in the starting phase and between 0.08 s and 0.36 s slower in the turning phase. Although TY's performance was superior in the free swimming, TY placed 5th because of an inferior performance in the start and the turn. A similar tendency was identified for two other Japanese swimmers. These were KK, 4th place in the men's 100 m breaststroke and JO, 6th place in the women's 100 m butterfly.

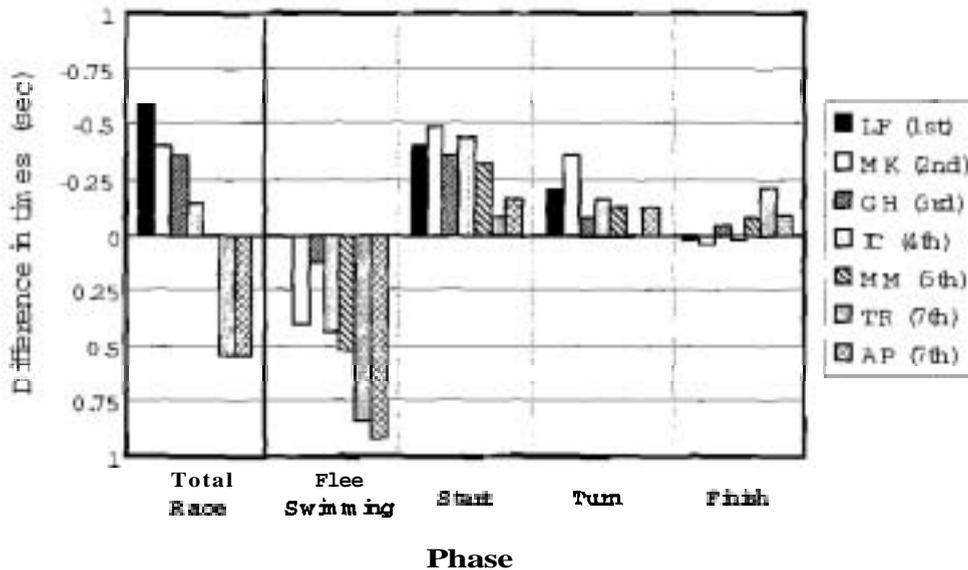


Figure 1 - The differences in the total times and the times required for each phase between the Japanese finalist (TY) and the other finalists in the men's 100 m butterfly.

Figure 2 shows the comparison of each phase between the Japanese finalist (MN) and the other finalists in the women's 100 m backstroke. MN's race time was 60.55 s and placing was 2nd. The difference in race time between DM (1st) and MN was 0.34 s. During the free swimming phase, MN was placed 4th. MN's performance was 0.72 s slower than DM (1st) who was the fastest swimmer in the free swimming phase. MN's performance was also 0.24 s slower than NZ (3rd) who was placed 3rd in the free swimming. However, in the starting and the turning phases, MN was faster than all but one other swimmer. MN was the fastest swimmer in the starting phase and performed between 0.13 s and 1.09 s faster than all other swimmers. MN was 0.04 s slower than BB (7th) who was the fastest in the turn. MN was placed 2nd in the turn overall, and was between 0.08 s and 0.36 s faster than all but one other swimmer.

Although MN was not as fast in the free swimming phase, MN placed 2nd because of a superior performance in the starting and the turning phases. A similar tendency was identified for two other Japanese swimmers. These were NI, 5th place for the women's 100 m backstroke and MT, 6th place for the women's 100 m breaststroke.

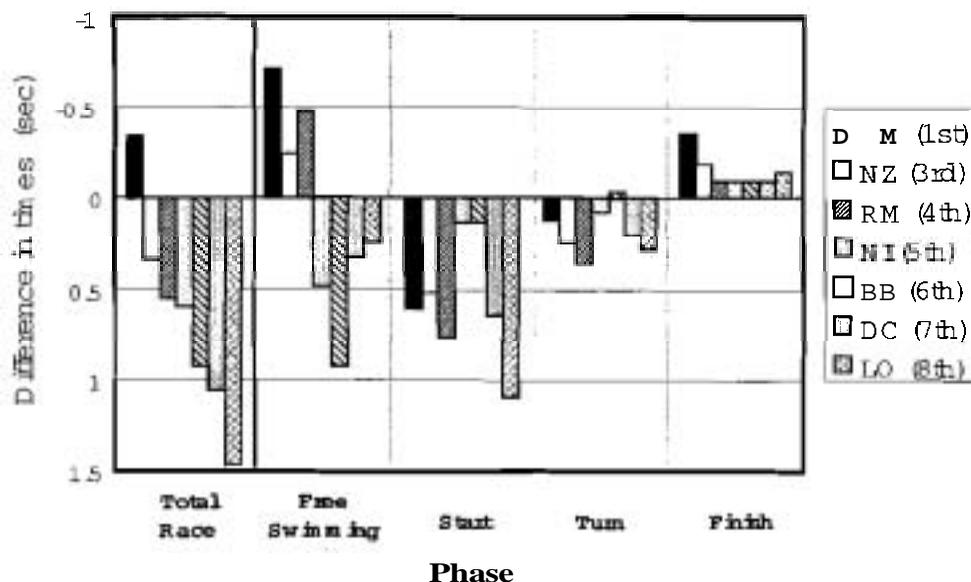


Figure 2 - The differences in the total time and the times required for each phase between the Japanese finalist (MN) and the other finalists in the women's 100 m backstroke.

DISCUSSION: In the Australian method of competition analysis at the Sydney Olympic Games, the distance in 100 m events was 15 m for the starting phase, 15 m for the turning phase, 5 m for the finish phase and 65 m for the free swimming phase. The time spent in the free swimming phase was higher than the combined time of all other phases. Previous research has demonstrated that free swimming velocity was significantly correlated to the race time in 100 m events. It was reported that the correlation between race time and free swimming time was higher than between race time and the time taken to perform in start, turn and finish (Arellano et al., 1994; Mason & Cossor, 2000; Wakayoshi et al., 1992). It was concluded that the free swimming phase was the most important phase of the four phases in determining the race result.

According to the comparison between the Japanese finalist and the other finalists in this study, it was evident that TY was the fastest swimmer in the free swimming phase for the men's 100 m butterfly. However, TY was unable to win the race because TY's performance was inferior in the start and the turn. In contrast, MN, who was not as fast in the free swimming phase for the women's 100 m backstroke, finished in 2nd place due to a superior performance in the start and the turn. These results suggest that performance, not only in the free swimming phase, but also in the starting and the turning phases are important in determining the race results for 100 m events.

CONCLUSION: From the comparison between the Japanese finalists and the other finalists in this study, it was evident that their abilities in the starting and the turning phases affected the race results for the Japanese swimmers in 100 m swimming races at the Sydney Olympic Games.

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