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Effectiveness of Amendments of the Laws of the Game to the Goal Keeper in Soccer

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Field players had been frequently seen to gain time with deliberate back passes to the goalkeeper to keep the ball in safe possession in football matches. Aiming to eliminate this tactic, a series of rule amendments have been implemented since 1990. The present study tries to confirm the effectiveness of these amendments, empirically analyzing changes in the performance of goalkeepers with enforcement of the amendments, by examining data gained from matches in the 4 most recent FIFA World Cups. The result shows the rule amendments substantially reduced the number of back passes to the goalkeeper, and the goalkeeper's ball possession time, which unnecessarily delayed matches. In addition, it was confirmed that the importance of the goalkeeper's performance increased in such situations as when the goal keeper converts a pass to a teammate without using hands, which had seldom been seen before the amendments came into force.

1. Introduction

Federation Internationale de Football Association (FIFA) sensed a crisis in the fact that the 1990 World Cup Italy was relatively unspectacular, with conspicuously rare goals and malicious infringements. As a result, it established Task Force 2000 to discuss measures to improve the game of football (Asami, T., 2002). Task Force 2000 tried to identify problems in the 1990 World Cup, and to seek a new orientation, including rule amendments to solve them (FIFA, 1996). The rule amendments were then implemented one after another to bring about substantial change in the game of football. Amendments were wide-ranging, including such major modifications as amendments to increase chances to score, amendments to increase substantive time for in-play and amendments to enhance penalties against malicious infringements. Among all these, a series of rule amendments to limit the activity of the goalkeeper (GK, hereafter) were unprecedentedly large in scale (Asami, T., 2002).

Behind these amendments was the fact that the GK frequently wasted time when receiving a back pass in spite of less pressure from opponent players during in-play in the 1990 World Cup. Such situations inevitably disrupt the flow of the game and increase the time wasted, with virtually no defense or offense. Moreover, the action of using a back pass to a GK to gain time, especially for the leading team in a close match, became problematic, considered as a detraction to the attractiveness of soccer.

In 1992, the International Football Association Board (IFAB, hereafter), which is responsible for the Laws of the Game and the interpretation of them, made an amendment of the Laws to prohibit the GK's handling of the ball when a field player kicks a pass to the GK deliberately, with the purpose to eliminate such tactics described above. The amendment aimed to prevent unnecessary time wasting through a rapid back pass to the GK and thereby to speed up the game. Adding to this amendment, in 1997, it was stipulated that an indirect free kick will be awarded, to be taken from where the GK directly handles the

Table 1 The rule amendments concerning GK from 1990 to 2002 GK's possession time per game.

1992 (Rule amendments) ✱[1]

An indirect free-kick will be awarded if the goalkeeper handles the ball after receiving it from a back pass his own team.

1997 (Rule amendments)

An indirect free-kick will be awarded if the goalkeeper handles the ball after receiving it from a throw-in his own team.

1997 (Instructions for referees) ✱[2]

1. Following instructions of Law−12, the referee must not allow a goalkeeper to takes more than 4 steps while controlling the ball with his hands before releasing it from his possession.

2. The referee has to give an indirect free-kick as time wasting if a goalkeeper takes more than 5-6 seconds while controlling the ball with his hands before releasing it from his possession.

1998 (Decisions of the International F.A. Board) ✱[3]

The goalkeeper is considered to be guilty of time-wasting if he holds the ball in his hands or arms for more than 5-6 seconds.

2000 (Rule amendments)

Take more than six seconds while controlling the ball with his hands before releasing it from his possession.

✱1; Rule amendments: Amendments of the text of Laws of the game.

✱2; Instructions for referees: Referees are intended to clarify the correct application of the Laws of the game.

✱3; Decisions of the International F.A. Board: Additional sentence of the Laws of the game.

ball from a throw-in taken by a teammate.

Amendments to limit the GK's activity followed thereafter and IFBA instructed the referees to apply the Laws strictly, specifically referring to the following point in 1997. That is the strict application of the 4-Step Rule approved for the GK when possessing the ball, precisely indicating the possession time to be five or six seconds. Then in the next year, 1998, an article to stipulate that the GK is regarded to have committed the offense of time-wasting when he possesses the ball in hands or arms for more than five or six seconds was included in Law 12 of the Laws of the Game. In 2000, the four-step limitation on the GK's movement was abolished and only the time limitation remained, which permits the GK to possess the ball for six seconds. Chart 1 shows these rule amendments relating to the GK's performance revised between 1990 and 2002 collectively (Japan Football Association, 1990-2002).

The rule amendments described above aim to improve the soccer game, and it is necessary to examine these changes concerning whether the game has actually improved with these amendments.

However, the effect of the series of amendments implemented after 1990 has been little studied (Suenaga, T. et al., 2001). Looking at historical changes in terms of the rule amendments relating to the GK (Nagashima, M., 1988; Downer, O. O., 1997), cases are various, including one in which the effect did not last long, even concerning the temporal effect, and another in which no effect was observed (Ikeda, K. et al., 1982). When examining the effect of the rule amendments, objective understanding of the effects from a long-term perspective is certain, although no report from such a perspective has yet appeared.

Therefore, this study was conducted with the purpose of analyzing and confirming the effectiveness of a series of rule amendments relating to the GK's performance implemented after 1990, examining matches in the 4 most recent FIFA World Cups (1990, 1994, 1998 and 2002).

2. Methods

2.1. Subjects

181 matches in the recent 4 FIFA World Cups were examined, including 12 matches in the 1990 World Cup Italy (WC90, hereafter), 48 matches in the 1994 World Cup USA (WC94, hereafter), 60 matches in the 1998 World Cup France (WC98, hereafter) and 61 matches in the 2002 World Cup Korea/Japan (WC02, hereafter). TV pictures from the NHK satellite channel BS-1 were used for the matches from WC90 to WC 98 and those of SKY perfect TV! were used for the matches in WC02.

2.2. Methods of analysis

2.2.1 Number of back passes to GK per match

The total number of back passes to the GK per match were counted in order to examine the change in frequency after the restriction was implemented. Furthermore, back passes were subdivided into three kinds, including those by foot (BP-F, hereafter), by throw-in (BP-TI, hereafter) and by heading (BP-H, hereafter) and frequency of each classified back pass was counted.

2.2.2. Number of GK plays per match

The total number of GK performances per game

were counted in order to examine the change in the GK's performance frequency after the restriction was implemented. Based on Ono et al. (1986), the GK's performance was roughly classified into four play patterns, according to the combination, among receive, kick and throw, and the frequency of each play pattern was counted. The first play pattern consists of the GK's direct kick (1-P, hereafter). The second pattern consists of the combination of two movements (2-P, hereafter), that is, receive and then throw/kick, and dribble and then kick. The third pattern consists of the combination of three movements (3-P, hereafter), that is, dribble, then hold and throw/kick, and hold, release to dribble and then kick. The fourth pattern consists of the combination of more than four movements (4-P, hereafter), including such movements as after receiving the ball, once letting a field player to touch it and then resuming play.

2.2.3. GK's possession time per play and GK's possession time per match

The amount of time for the GK to possess the ball per performance according to each pattern described above (1-P was excluded from the analysis of possession time because the ball is kicked directly without possession) and the amount of time for the GK to possess the ball per match were measured in order to examine how the GK's total ball possession time per match has changed with the restriction on the GK's ball possession time. The GK's ball possession time was defined as starting from holding the ball and ending the release it. This possession was measured using a stopwatch while watching TV coverage.

2.3. Statistical analysis

Each value of measured items was determined with respect to each game, and the average value and the standard deviation were calculated with respect to each World Cup. One-way analysis of variance was used to test the difference among average values for each World Cup. Multiple comparison (Tukey Method) was applied only when significant difference was observed among World Cups. The significance level was set to below 5 % in each test.
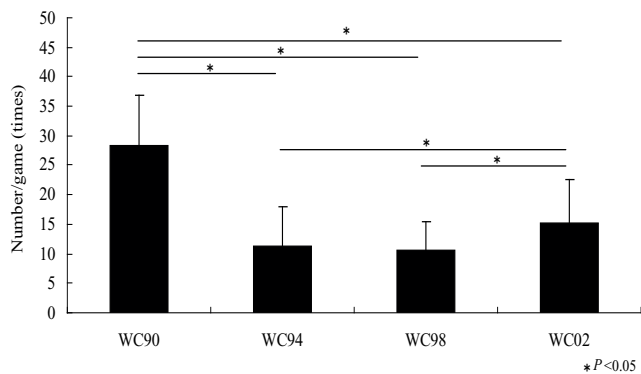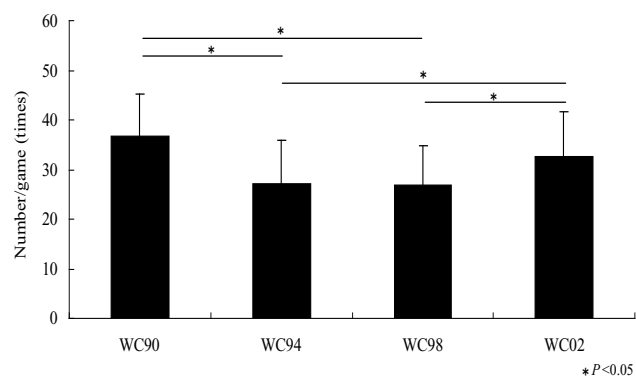
Figure 1 Number of Back pass to GK per game.
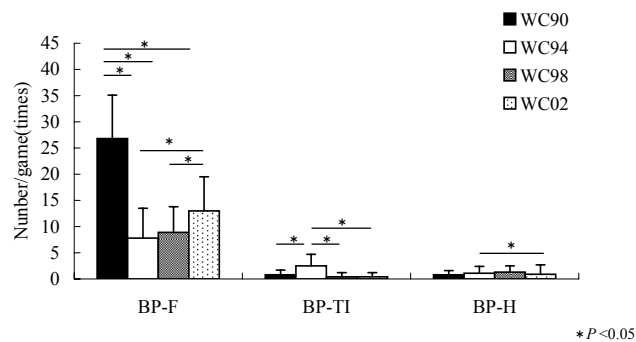

Figure 2 Number of Back pass to GK per game in each category.

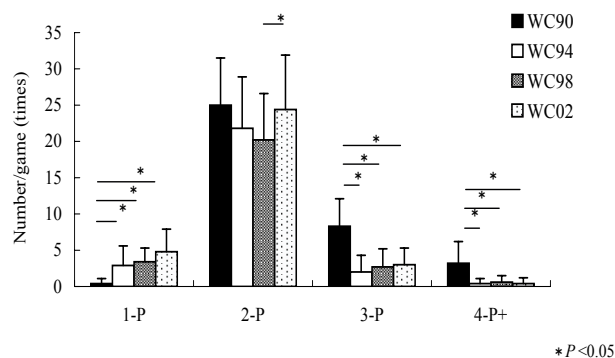**Figure 3** Number of GK's play per game.

Figure 4 Number of GK's play per game in each category.

3. Results

3.1. Number of back passes to GK per game

Figure 1 and **2** show the numerical value of back passes to the GK, by total and by category respectively. In respect to the total number of back passes to the GK, significant difference was observed between WC90 and every other WC. The rate of decrease was particularly high from WC90 to WC94. In contrast, the number of back passes increased significantly from WC98 to WC02. Relating to categorized passes, although the number of BP-F decreased markedly from WC90 to WC 94, it constantly increased after WC94. Significant difference was observed between WC94 and every other WC in the numerical values of BP-TI. Significant increase was observed between WC94 and WC02 in the numerical values of BP-H.

3.2. Number of GK plays per match

Figure 3 and **4** show the numerical values of the GK's performance frequency per match, by total and by category respectively. In respect to the total number of the GK's performance frequency, a significant decrease was observed in WC94 and WC98 compared to WC90, while significantly higher values were observed in WC02 compared to WC94 and WC 98. Regarding categorized patterns, significant difference was observed between WC90 and every other WC in the numerical values of 1-P. Significant difference was also observed between WC90 and every other WC in the numerical values of 3-P and 4-P. The rate of decrease was high from WC90 to WC94 in particular.

3.3. GK's possession time per one play and GK's possession time per match

Figure 5 and **6** show the total time of the GK's ball possession per match and per performance respectively.
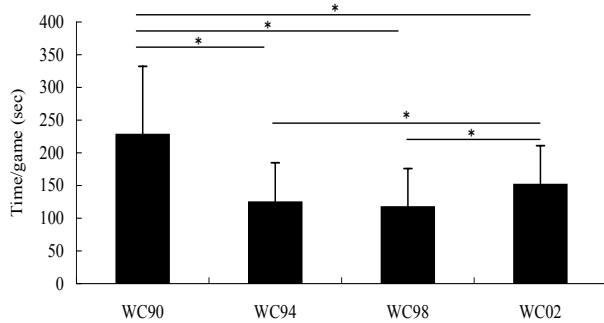
Figure 5 GK's possession time per game.

Figure 6 GK's possession time per one play in each category.

Concerning the total time of the GK's ball possession per match, significant difference was observed between WC90 and every other WC, while the rate of decline was high from WC90 to WC94 in particular. In contrast, the time increased significantly from WC98 to WC02. In respect to classified patterns, significant difference was observed between WC90 and every other WC in 3-P.

4. Discussion

In this study, an analysis was conducted on the 4 most recent World Cups in order to examine the effectiveness of a series of rule amendments to the GK after 1990. The study can be regarded as meaningful in terms of having objectively reviewed changes in the GK's performance by analyzing the effect of rule amendments from a long-range perspective.

The total number of back passes to the GK declined significantly from WC90 to WC94 and WC98 (**Figure 1**). One of the reasons of this decline is considered to be the limitation effect of rule amendments which have a psychological impact on the DF side not to back pass the ball to the GK. In addition, it is probable that the teammates tended to avoid back passing the ball to the GK because after the amendments came into force the GK was not accustomed to controlling the ball by foot for such a short period of time. This can be applied also to the reason for the significant decrease in back passes by throw-in in WC98. However, the significant increase in the total number of back passes to the GK per match in WC98 and WC02 compared to WC94
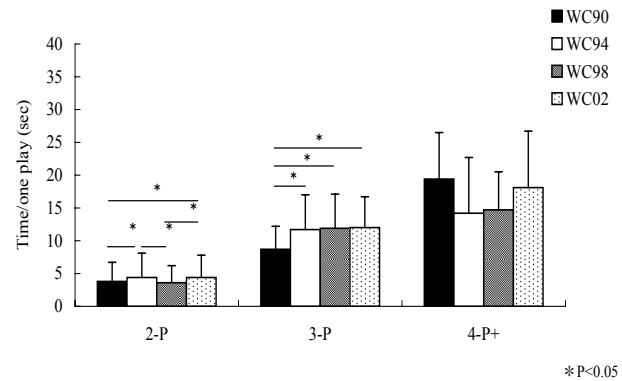
and the constant increase in the number of BP-F after WC94 suggest the possibility that teammates increasingly tried to actively use the GK as he became accustomed to controlling the ball by foot.

The rule amendments to eliminate back passes to the GK were implemented in 1992 and 1997. In order to examine whether these amendments caused a change, the total number of GK's performance frequency per match (the total number of performances including receive, kick and etc., except goal kicks) were counted. Significantly lower values were observed in WC94 and WC98 compared to WC90 in respect to the total number of GK's performance frequency per match, and significantly higher values were observed in WC02 compared to WC94 and WC98 (**Figure 3**). When calculating the percentage of back passes in the total number of GK's performance frequency per match, it was 77 % in WC90, 41 % in WC94 and 39 % in WC98, which shows a decrease of nearly 40 %. It was 47 % in WC02, which increased by 8 % from WC98. These results suggest that the increase and decrease of back passes has a large impact on the total number of GK's performance frequency per match.

The GK's performance was examined by classifying performances into four categories, in order to review whether the play pattern of the GK has changed with the rule amendments. As a result, the frequency of 3-P and 4-P, which would impede speedy development of the match, declined in all the WCs after WC90. It is considered that the GK became less advantageous for gaining time or for safety because of the limitation of rapid back passes to the GK, who was prohibited

by the amendments from using his hands. On the contrary, the ball possession time of the GK per play increased significantly in 3-P in all the WCs after WC90; WC90:8.7s, WC94:11.7s, WC98:11.9s and WC02:12.0s. The GK was not allowed to hold the ball for good and allowed to take just four steps before releasing the ball (the rule amendment in 2000 abolished the four-step rule and replaced it with the six-second time limit only), while the step restriction is not applied when the GK releases a ball from hands and starts dribbling by foot. The increase in the frequency of GK dribbles in releasing the ball from hands in order to avoid the step restriction may be considered to have caused the increase in the ball possession time of 3-P after WC90.

The amount of GK's ball possession time per match decreased significantly from WC90 to WC94 and WC98. The present study does not consider whether the GK possesses the ball intentionally to gain time or not. However, a large decrease in the ball possession time of the GK per match is clearly observed in fact after the rule amendments were enforced. The analysis of GK's performance categorized into four groups indicates that the frequency of 3-P and 4-P, which would impede speedy development of the match, decreased significantly. This fact implies that the amendments were effective in eliminating time wasting by the GK with the ball in his possession. Although the analyzed results from WC98 to WC02 indicate a significant increase in the GK's ball possession time per game, it is presumed to be affected by the increased number of back passes.

Thus the rule amendments concerning the GK after 1990 have proved effective in their implementation. The effect was most significant in WC94 and WC98 among the four WCs. In contrast, the results of WC98 and WC02 indicate significant increase from WC98 to WC02 in the number of back passes to the GK, the frequency of GK performances per match and the GK's ball possession time per match. A consideration follows on how this increase should be most properly interpreted.

FIFA Technical Study Group (2002) reports on changes in the GK's play styles caused by the rule amendments in recent years. It suggests that the GK began to be required to play a role as the last defender, which is verified by the frequent adoption of the flat line defense, both in club teams and national teams, in recent matches. Takii, T. (1995), pointing out the risk of no man's land turning up behind the defense line in the compact football style in which field players positively press the defense line, recommends maintaining advantage space behind the defense line constantly as a way to counter the risk. It is also noted that defense tactics such as the offside trap and the GK's function as the second sweeper are required. These remarks suggest the importance of the GK's movements to receive the passed ball without using hands and control it by foot, which had not been required before the rule amendments. More specifically, although in WC94 when the rule amendments were newly introduced, teammates tended to avoid back passes to the GK, who was not accustomed to controlling the ball by foot the GK became accustomed to play by foot well enough that teammates began to take advantage of it after WC94, which resulted in an increase of back passes to the GK by foot from WC to WC. The increase in the frequency of 1-P, in which the GK treats the ball directly, from WC to WC seems to reflect this tendency.

Again, FIFA Technical Study Group (2002) also reports that the change in the GK's play styles is reflected in the way counter attacks are initiated. This is the result of the rule amendments in 2000, which removed the restriction on the number of steps which the GK may take before releasing the ball from his possession (four-step rule removal) and allowed him to carry the ball anywhere within the penalty area for a maximum of six seconds. Suenaga et al. (2001) analyzes the effect of this modification to the six-second rule on the GK's movements and reports that the GK seems to assume the attitude of playing as fast as possible in consideration of the six-second time limitation. It has been suggested that the rule amendments require the GK' to make proper decisions and implement high quality field techniques when the ball is in his possession (Bangsbo, J. and Peiterson, B., 2004; JFA Technical Study Group, 2002).

In view of these facts, it is presumed that the increase in both the total number of back passes and the GK's ball possession time per match from WC98 to WC02 was not a resulted of gaining time, as in the cases frequently observed in 1990, but from the intensified importance of the GK's role as the last defender. It can be stated that the GK's role has certainly changed in order to adjust to the rule amendments. The result of this study will certainly

be helpful as a case study of the rule amendments that have worked effectively when discussing future rule amendments. In addition, this study revealed that unintended phenomena occur with rule amendments. Taking this into account, the change in the course of matches as a result of rule amendments should be assessed from a long-term perspective.
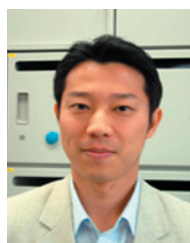
5. Summary

The purpose of present study is to analyze the change in the GK's performance by examining matches in the 4 most recent FIFA World Cups, in order to verify the effectiveness of a series of rule amendments to Goal Keeping after 1990. The result showed a significant decrease in deliberate back passes to the GK to gain time, and the time wasted during the GK's ball possession decreased in consequence with the rule amendments. Moreover, it is suggested that the GK's performance in receiving the passed ball by foot without using hands, which was not needed much before the rule amendments, became important after the amendments. In conclusion, it can be stated that the result of this study proved the effectiveness of a series of rule amendments to the GK implemented after 1990.

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