Original Article

Goalkeeper in soccer: performance and explosive strength

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Published online: March 25, 2016

(Accepted for publication March 12, 2016)

DOI:10.7752/jpes.2016.01036

Abstract:

Purpose

The purpose of this study was to assess the reliability of 20 athletes who play football as a goalkeeper during training and during the whole season in recreational amateur tournaments.

The survey was conducted for the detection of the error rates on performances (saves) performed in different positions (standing and sitting) and measuring the explosive strength of a sample of 20 goalkeepers, selected by screening among 60 athletes, aged between 40 and 53 years old.

Methods and Materials

The study aims to improve the percentage of performances and was achieved in six months from January to June 2015. The athletes were given tests focusing on responsiveness to stimuli engines, resulting in execution of technical correct movements, and the calculation of the explosive strength measured with the Sargent test.

The experiment, conducted with observational method and manual detection, implies for the division into two levels of athletes. Level I is reported to athletes who practiced the football activity on a competitive level (series A - B - C - D), while the level II included those who practiced football in amateur categories and amateur competitions.

Results and Conclusion

The results showed increases in performance both for the athletes classified Level I and for those of Level II but, as a percentage, the most compelling improvements were found for the athletes of Level II, due to the specific additional workout. As a percentage the results for both levels were good with a performance improvement of about 2-6%.

Keywords : soccer, goalkeeper, performance, explosive strength.

Introduction

The skills and ability of a goalkeeper (Vatta, 2006) are almost always assessed against performance (Barba, Tafuri 2007) and, therefore, the results obtained in relation to the effectiveness of the actions made (saves), the invincibility in one match and time calculation referring to games played over an entire season.

This process implies, but does not show, prerequisites such as the reactivity and explosive power and of course the attention that is critical to interpret adequately the various phases of the game.

Attention (Bagnara, 1984) is a cognitive function whose specificity is activated in the presence of stimuli aimed at the selection of information about the task that is taking place, the location or the distribution of mental resources in space and time, to facilitation of certain computing processes and the inhibition of others. A significant test related to the width of the attentional focus in sports is the TAIS - Test of Attentional and Interpersonal Style (Nideffer, Shoes, 1978). The effectiveness of the motor response is highlighted by the precise execution (Minelli, 1995) of the motor gesture carried out with a timely perception and processing of information related to the game situation, with a flexible management of attention in function of the situation itself, in order to acquire a head-start on the opponent. The variability of football allows athletes to highlight the personal open skills (Poulton, 1974), to master as quickly as accurately.

The synergy of components such as attention, reactivity (Minelli, 1995) and explosive strength (Verchosanskij, 1997), inspired the research development for the detection of the percentage of errors (Barnes, Marsden 2002) carried out by the goalkeepers in various positions (standing and sitting) and for the measurement of explosive strength (Woods, 1985) according to the Sargent test (Marella, Risaliti, 2007). The observation period was six months, from January to June, based on a sample of 20 goalkeepers over 40, participating in amateur football tournaments but with a football career in the National and amateur series.

The 20 goalkeepers, selected after a screening of 60 athletes were divided into two levels. The first was related to former professional athletes who practiced the football activities in national series (series A - B - C - D), while the second was made with subject-athletes who practiced football (Bonfanti, 2008) in the amateur categories and amateur competitions.

The goalkeepers belonged to football teams participating in amateur sports activity that include about 50 equipes, affiliated to the FIGC, divided into categories related to age groups. Preliminary screening has led researchers to choose the age group 40-53, where there were many athletes with the characteristics of former athletes participating in national and amateur series, as almost all the companies held two training sessions (Weineck, 1995) over the weekly tournament match. These conditions have allowed to receive a total of 18 additional meetings (Maarten, 2009) training (3 sessions in each month) without causing fatigue and stress to the goalkeepers.

Methods and materials

The study of the data and of the performances was carried out with observation method and detection manual, both for the recording of the numerical percentages and results and those metric in height for the explosive strength.

Addressee and Objectives

Twenty athletes with the role of goalkeeper in football divided into two levels:

- Level I - n. 10 athletes who practiced agonistic activity in National series (series A- B – C - D)
- Level II - n. 10 athletes who have been practicing competitive sports series in amateur categories and amateur tournaments. Detecting the percentage of error in saves conducted in different positions and conditions and the measurement of explosive strength in order to improve the performances of goalkeepers in football matches.

Research period

Six months. January-June year 2015.

Tests

1) Determining the percentage of error in saves (manual measurements for each athlete):

1. a) goalkeeper in standing position with the back to the instructor (n. 5 shoots made with hands by instructor) : to the command with a whistle turn around immediately and save the ball without the specified direction (right or left);

1b) repeat the exercise 1. a) specifying the right direction (n. 5 shoots);

1.c) repeat the exercise 1. a) specifying the left direction (n. 5 shoots);

1. d) goalkeepers in sitting position faces away from the detector (n. 5 shoots made with hands by instructor) : to the command with a whistle turn around immediately and save the ball without the specified direction (right or left);

1.e) repeat the exercise 1.d) specifying the right direction (n. 5 shoots);

1.f) repeat the exercise 1.d) specifying the left direction (n. 5 shoots);

1.g) detecting the percentage of errors in saves on n. 30 shoots made from 11 mt:

10 shoots in the central direction of, 10 shoots towards the right side, 10 shoots towards the left side;

1.h) detecting the percentage of errors in saves on n. 30 shoots made from 16 mt:

10 shoots in the central direction, 10 shoots towards the right side, 10 shoots towards the left side;

2) Detection of explosive strength through the Sargent test (with use of a rope graduated in cm on the wall)

2.a) detection in height, of metric graduation when starting:

goalkeeper positioned next to a wall, where there is a metric string in cm, with tense lower limbs and one arm outstretched. Mark the height reached by the fingers (h1);

2.b) goalkeeper in squat position (90°) performs a jump and the measurement the highest point touched by the fingertips on the metric rope (h2);

2.c) The value of the elevation explosive strength is defined as the metric difference between the height reached jumping (test 2b) and the initial (test 2a) that is $h2 - h1$.

Test n. 2 has been performed three times and was considered the best difference between h1 and h2.

Additional training (Beccarini, Madella 1997)

- lateral slipping off the line right and left;
- repeated shots on goal to varying distances and angles;
- changes in direction;
- sprint with speed changes;
- gaits: skipp high, medium, sprint jump;
- small obstacles;
- rope;
- leaps and multiple leaps;
- half-squat-jump with weight belt

Materials and resources

- football field with the use of a single goal post

- regular footballs
- cones
- weight belt
- 2 detectors of the number of saves
- 2 instructors
- 10 strikers
- 1 rope graduated in cm for height metric measurements
- 2 operators detectors of distances in height

Results

The results, related to the targets, have shown, initially, positive performance for athletes of level I compared to level II (Table 1,2). Level I reported a lower percentage of errors on the number of saves on shots compared to level II. Performance related to the explosive strength (Verchosanskij, 1997) were positive for the level I as for Level II. During the research, the percentage difference between the level I and II level was reduced with significant improvements for the level athletes II. The processed data have shown that the results are positive if the athlete's mental and physical characteristics are appropriate to those necessary for the practice of football.

Initial recognition

Initial tests about error percentages (table 1) for the tests one (1a,b,c,d,e,f,g,h), showed a surprising negative result for goalkeeper 6A of level I and for goalkeepers 3B and 10B of level II. Measuring the explosive force highlighted the positive results again for the 6A goalkeeper level I and goalkeepers 3B, 7B and 8B.

Table 1 - Percentage of errors in saves – Test one (1a, 1b, 1c, 1d, 1e, 1f, 1g, 1h)

Goalkeeper	% Total errors 1a,1b, 1c, 1d, 1e, 1f	% Total errors 1g,1h	% Average errors	Goalkeeper	% Total errors 1a,1b, 1c, 1d, 1e, 1f	% Total errors 1g,1h	% Average errors
1A	12	18,3	15,15	1B	10	31,6	20,8
2A	15	21,6	18,3	2B	24	33,4	28,7
3A	6	13,3	9,65	3B	33	28,3	30,65
4A	12	26,6	19,3	4B	20	31,6	25,8
5A	10	8,3	9,15	5B	20	35	27,5
6A	21	26,6	23,8	6B	21	26,6	23,8
7A	20	16,6	18,3	7B	24	20	22
8A	12	23,3	17,65	8B	21	43,3	32,15
9A	12	16,6	14,3	9B	12	16,6	14,3
10A	10	18,3	14,15	10B	33	28,3	30,65

Table 2 - Initial recognition of the values of explosive strength (test two)

Goalkeeper	starting elevation (cm) (h1)	Best elevation jump (cm) (h2)	explosive strength (cm) (h2-h1)	Goalkeeper	starting elevation (cm) (h1)	Best elevation jump (cm) (h2)	explosive strength (cm) (h2-h1)
1A	224	263	39	1B	203	223	20
2A	228	252	24	2B	214	243	29
3A	231	269	38	3B	221	265	44
4A	218	244	26	4B	218	241	23
5A	235	268	33	5B	221	254	33
6A	220	275	55	6B	211	234	23
7A	221	263	42	7B	209	249	40
8A	225	269	44	8B	214	247	33
9A	232	260	28	9B	217	256	39
10A	239	280	41	10B	224	258	34

Final recognition

The final results showed significant improvements in the percentage of errors (Table 3) for saves of goalkeepers for tests one (1a,b,c,d,e,f,g,h) while there have been no significant improvements in the explosive strength measures (Table 4) except for the goalkeeper 8A of the level I and for goalkeepers 6B and 10B.

Table 3 - Percentage of errors in saves - Test one (1a, 1b, 1c, 1d, 1e, 1f, 1g, 1h)

Goalkeeper	% Total errors 1a,1b, 1c, 1d, 1e, 1f	% Total errors 1g,1h	% Average errors	Goalkeeper	% Total errors 1a,1b, 1c, 1d, 1e, 1f	% Total errors 1g,1h	% Average errors
1A	10	18	14	1B	10	24,5	17,25
2A	11	19	15	2B	19	23,2	21,1
3A	5,8	12,3	9,05	3B	18	21,3	19,65
4A	11,5	22,6	17,05	4B	18	26	22
5A	10	7	8,5	5B	14	29	21,5
6A	18	20,6	19,3	6B	20	21,3	20,65
7A	16	15	15,1	7B	21	16	18,65
8A	11	19,2	15,1	8B	17	32,3	24,65
9A	12	13,6	12,8	9B	10	13	11,5
10A	8	16	12	10B	22	24,3	23,15

Table 4 – Final recognition of the values of explosive strength (test two) elaborare

Goalkeeper	starting elevation (cm) (h1)	Best elevation jump (cm) (h2)	explosive strength (cm)(h2-h1)	Goalkeeper	starting elevation (cm) (h1)	Best elevation jump (cm) (h2)	explosive strength (cm)(h2-h1)
1A	224	269	45	1B	203	235	32
2A	228	262	34	2B	214	247	33
3A	231	272	41	3B	221	267	46
4A	218	244	26	4B	218	248	30
5A	235	269	34	5B	221	257	36
6A	220	275	55	6B	211	249	38
7A	221	268	47	7B	209	251	42
8A	225	281	56	8B	214	249	35
9A	232	271	39	9B	217	259	42
10A	239	286	47	10B	224	268	44

Discussion and conclusion

The final processed data have confirmed the validity of the athletes in split levels as it is correct to compare the performances of athletes and individuals-athletes. Activity rates have been improved for both levels but the significant fact appears to be having achieved positive results in average time (six months), particularly the components of Level II. Additional training, the same for both levels, were administered on different days and the frequency of participants exceeded the average of 95% for level II compared to a rate of around 88% for Level I, considering also sick leave and injuries. Research has shown that the performance improvement (about 2-6%) can occur at any age if the planning of the training methodology appears to be appropriate to the characteristics of the athletes participating in sports. The most convincing results were recorded for the level II also considering the enthusiasm and participation of athletes therefore should be considered essential features of the trainability attentive, reactive and explosive strength.

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