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A review of the key demands for a football goalkeeper.

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8 **A review of the key demands for a football**
9 **goalkeeper.**
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Table 1 Key performance indicators for goalkeepers (adapted from Hughes et al. 12)

Physiological	Tactical	Technical – defending	Technical - attacking	Psychological
Height	Vision	Shot stopping	Passing	Concentration
Strength	Organisation	Coordination	Throw	Motivation
Power	Communication	Recovery	Ball control with feet	Attitude
Agility	Distribution	Speed	Kick	Body language
Coordination		Save	Tackle	
Reaction time		Punch		

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5. Abstract

Abstract

This review evaluates previously published findings relating to the needs of a football goalkeeper during match performance. Whilst there has been much interest in some aspects of goalkeepers training, performance analysis and needs analysis, these have been from closed skill penalty situations or reported as comparisons with outfield players. This paper identifies important demands, assesses the implications for coaching and as a result highlights where the focus for effective future research should be to further enhance the development of goalkeeping performance.

Keywords

Goalkeeper, football, demands

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Introduction.

The football goalkeeper position is often over-looked in terms of identifying specific key demands for performance [1, 2, 3]. In order to develop better training programmes reflecting the needs of goalkeepers more accurately, key performance demands need to be identified in their own merit rather than as a comparison with other players or positions [4, 5] as is currently the case in many studies. For example, Gil et al. [6, 7] found that the most significant differences in their comparisons were between goalkeepers and outfield players, in particular the forwards. Goalkeepers, as the last line of defence, can get singled out most often for media criticism [8] compared to the forwards who are more involved in attacking play than the goalkeeper. Therefore it would be expected that performance demands are so very different for these positions. Furthermore, the position of goalkeepers is somewhat neglected as the strikers score the goals and tend to get a larger share of positive media coverage [8].

Goalkeepers seem to have longer careers in both men's and women's football and Martínez-Lagunas et al. [9] suggest this could be due to the less intensive role they play throughout a game. However, goalkeepers do carry out mainly crucial and high-intensity activities at both elite and non-elite level [1]. Where these activities are effective, they have the capacity to change the game, re-energising and re-awakening the fighting spirit of a team [10]. Although, the specialist nature of the goalkeeping position requires more specific focus for match analysis to identify and explore key performance indicators (KPI's) and performance demands further helping both the goalkeeper, and the goalkeeper coaches, improve training and performance [11]. For example, effective and useful analysis of a goalkeeper making a save in full flight and at full stretch needs to take into consideration, where the attack started and where the goalkeeper started from in order to be relevant [10].

More specific information about key performance demands for the goalkeeper should include: goalkeeper's position when they carried out the action; the type of attack initiated by the opposition; where the ball was struck from; type of shot; outcome of shot; goalkeeper's action; where the ball ended up; and the goalkeeper's response to loose balls [11]. Hughes et al. [12] mapped a number of KPI's for football including goalkeeper demands (See table 1). This information was compiled using match analysis information and supported through coding, for example successful and unsuccessful actions [12] rather than relying on coach opinion [13]. Additionally, information about physical characteristics and physiological attributes are also important to help develop players [14]. This information should incorporate a longitudinal approach, including match analysis of physical responses during a game and developing testing procedures and protocols more specifically related to the goalkeeper position [3, 14]. Other important factors to consider in a goalkeeper specific assessment include the underpinning requirements to make various saves [10] and perceptive skills to identify the progressive developments in the game and ability to respond effectively [15]. At the youth level keepers tend to be selected for this position if they have a lack of general football skills in comparison to the outfield players [3]. These foot skills are also often neglected in favour of diving and hand skills as the hand skills are used most often during match play [11, 13]. This information could then be attained longitudinally and help long-term development of goalkeepers through better informed coaching [3, 16].

Table 1 Key performance indicators for goalkeepers (adapted from Hughes et al. 12)

Physiological	Tactical	Technical – defending	Technical - attacking	Psychological
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Reaction time		Punch		

The purpose of this review is to identify and bring together the range of data already assessed in relation to goalkeeper performance. These known demands will be evaluated in terms of their usefulness in developing goalkeeper performance in the light of changing and dynamic demands of the game of football. Finally, a section highlighting implications for coaches will be collated based on the demands previously identified and gaps in our understanding of the goalkeeper's performance will be highlighted.

Physical demands.

In this section, the focus of many of the papers was a comparison between goalkeepers and outfield players. Unsurprisingly, the goalkeepers were found to be taller and heavier than outfield players [3, 4, 5, 6, 7, 14, 17]. Youth and amateur goalkeepers are selected on their taller and larger build [6]. This is also reflected further up the talent identification process as Gil et al. [7] found that selected goalkeepers were bigger and generally older than non-selected goalkeepers and players. Whilst Mala et al. [18] also found keepers were heavier and taller, additional findings showed the goalkeepers they tested had greater absolute amounts of lean body mass, vital for strength and power performances. However, Gil et al. [6] measured amateur and youth level goalkeeper's fat percentages and body mass index (BMI) finding that ~10% of goalkeepers tested had higher BMI and body fat percentage scores than sedentary men. Whilst body fat percentage scores might seem unlikely requirements for a football goalkeeper, Zerf et al. [19] found that higher body fat percentage significantly decreased the agility scores for goalkeepers using specific agility tests.

Height is considered an advantage for football goalkeepers and many coaches and scouts will select taller goalkeepers. For example, in the English Premiership for the 2017-2018 season goalkeepers mean height is 191.83 ± 5.24 cm, this is compared with 1992-93 season in the same league where goalkeepers mean height was 188.50 ± 4.83 cm and 2005-06 season in the same league where goalkeepers mean height was 190.83 ± 3.88 cm. This focus on height for football goalkeepers is more obvious when compared with other players in the English

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3 Premiership 2017-18 season, (defenders mean height 187.00 ± 4.53 cm; midfielders mean
4 height 182.06 ± 7.08 cm; forwards mean height 182.06 ± 4.53) [20]. This is also the case for
5 handball goalkeepers who share some similar roles to football goalkeepers. Justin et al. [21]
6 found that height was an important factor for elite performance. However, Justin et al. [21]
7 found differences between shorter and taller goalkeepers in athletic flexibility and jumping
8 tasks with the shorter goalkeepers reporting better scores. This suggests that the taller
9 goalkeepers need to train these abilities more and that shorter goalkeepers should not be
10 overlooked in their selection [21]. DiCicco [10] provides an additional reason for height as a
11 factor as taller goalkeepers can start farther off their line, however, acknowledging that taller
12 goalkeepers also need to develop explosive power for height and distance across the goal.
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15 Explosive power is a key demand for high level football performance [22] and particularly
16 for goalkeepers [15]. Strength and power are very important for diving, blocking, catching
17 and deflecting shots on goal and developing power helps produce these skills more quickly,
18 diving higher and further [4]. Chamari et al. [22] found that jump tests were significantly
19 related to explosive strength (5jump test $r = .82$, $p < .0001$). Vertical jumping is considered to be
20 an essential skill for football goalkeepers [17] although improper use of arm swing at the
21 propulsion phase may lead to corrections during take-off and flight resulting in lower jump
22 heights [23]. Some goalkeepers were found to perform better at explosive power jump tests
23 than outfield players [17]. Whilst goalkeepers might be expected to jump higher than outfield
24 players, Gil et al. [7] found that outfield players jumped higher than goalkeepers in their
25 study. However, Justin et al. [21] explain the underpinning variables leading to better jump
26 performance such as leg strength and power should be more of a focus in goalkeeper training.
27 Certainly, Ziv and Lidor [14] found similar jump heights between goalkeepers and outfield
28 players in squat jumps (35.8 ± 5.3) and counter movement jumps (38.0 ± 5.6), but goalkeepers
29 had higher power values (1451 ± 233 w) than outfield players (1349 ± 196 w). Explanations for
30 this suggests that, asymmetrical and co-ordination difficulties may have arisen due to over-
31 reliance on a single limb, ineffective rehabilitation [23], or the greater body mass of the
32 goalkeepers [14]. Furthermore, Rebelo-Gonçalves et al. [3] found that at younger age groups
33 (U11 to U14) goalkeepers had lower counter movement jump scores than outfield players of
34 the same age. Whereas at the higher age groups (U17 to U19) the goalkeepers were out
35 jumping the outfield players, suggesting also that there is a lack of training focus given to
36 physically train younger goalkeepers [3]. This is supported by Nikolaidis et al. [4] who also
37 found lower absolute power values in U16 goalkeepers than either U16 to U19 and over 19
38 age groups. However, Nikolaidis et al. [4] further suggest there was a wide variation in
39 goalkeeper scores leading to assumptions that some goalkeepers needed to work on power
40 and jumping whereas other goalkeepers needed to work on flexibility. Justin et al. [21]
41 comment that some focus should be on training the variables which improve better jumping
42 including, body mass, leg strength and co-ordination.
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48 Short bursts of acceleration and deceleration are vital in effective goalkeeper performance,
49 where sprint distances during matches are typically between 1-12m thus justifying the use of
50 different testing protocols than outfield player sprint tests [6]. In a comparison of 7 maximal
51 sprint times over a distance of 34.2m, goalkeepers were found to be slower than outfield
52 players (Goalkeepers: 7.49 ± 0.29 sec; Defenders: 7.37 ± 0.19 sec; Midfielders: 7.35 ± 0.25 sec;
53 and Forwards: 7.32 ± 0.32 sec) [24]. Gil et al. [7] found that goalkeepers performed better in
54 15m and 30m straight sprint tests than outfield players (Goalkeepers: 15m 2.64 ± 0.11 m/s;
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3 30m 5.05±0.20; Outfield players 15m 2.59±0.10; 30m 4.96±0.21m/s; 15m and 30m
4 p<0.001). Ziv and Lidor [14] in their review found that single instances of 20m sprints
5 goalkeeper times were similar to outfield players (see Ziv and Lidor [14] for an in-depth
6 review). In tests which used a repeated sprint protocol of up to 8 maximal sprints,
7 goalkeepers were found to pace themselves [24] and experienced greater fatigue [14]. In short
8 distance sprints, acceleration and deceleration are important components of sprinting and
9 agility testing, furthermore, body height is negatively correlated with acceleration. However,
10 Justin et al. [21] found no differences between taller and shorter handball goalkeepers sprint
11 times. Testing a goalkeeper's ability to accelerate and decelerate quickly starting from either
12 front foot, will provide additional information about the goalkeeper's performance and
13 specific individual training requirements.
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16 Goalkeepers typically score less than outfield players in aerobic protocols such as the yoyo
17 test, the progressive 30m run test and 30m flat run [3, 6, 7]. Furthermore, Gil et al. [6] found
18 that more goalkeepers dropped out and dropped out sooner in an endurance test than outfield
19 players. Supporting these findings, Sporis et al. [17] found that goalkeepers had lower VO₂
20 max values and blood lactate concentration values than outfield players. More specifically,
21 Ziv and Lidor [14] found that VO₂ max values for goalkeepers were 48.41±11.10 mL O₂·kg⁻¹·
22 min⁻¹ which were lower than outfield players ranging from 57.7 to 62.4 mL O₂·kg⁻¹·min⁻¹. A
23 high aerobic capacity can help to delay fatigue through indirectly enhancing recovery
24 between intensive activities and actions which might enhance match play performance [6, 7,
25 14].
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28 A goalkeeper does not just sprint, they also have to move laterally across their 18 and 6-yard
29 boxes. Although lateral movement is also potentially negatively related to height and body
30 mass, again Justin et al. [21] found no significant differences between shorter and taller
31 handball goalkeepers. When goalkeepers move laterally, the final movement is often a take-
32 off or landing and strength is needed to absorb the contact and perhaps change direction [2,
33 10]. Strength and flexibility test scores were found to be different between goalkeepers of
34 different ages with the 16 to 19 age group outperforming the U16 group and the over 19 age
35 group of goalkeepers in Nikolaidis et al. [4] study.
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38 Agility and speed are required for the quick movement of the goalkeeper [5, 14] although Gil
39 et al. [7] found that goalkeepers performed worse in agility tests over 15 and 30m than
40 outfield players (Goalkeepers: 15m agility 3.03±0.15m/s; 30m agility 6.07±0.35m/s; Outfield
41 players: 15m agility 2.88±0.12m/s; 30m agility 5.81±0.28m/s; 15m agility p<0.01, 30m
42 agility p<0.05) further suggesting that a series of 10 cones placed 3m apart with players
43 slaloming through them was not specific enough to the goalkeepers activity. Mala et al. [18]
44 found that goalkeepers had significant differences between dominant and non-dominant legs
45 which can be detrimental to both diving and for jumping [23].
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49 Match analysis.

50 Sports science data has provided some key demands for the goalkeeper, however, more
51 specific match analysis data can help to identify performance and training demands for this
52 position [25]. Currently match analysis of football games often focusses on the outfield
53 players, shots on goal, distances covered and passes made, which only highlights what the
54 goalkeeper does not do [26]. In order to be more useful for goalkeepers and coaches, specific
55 goalkeeper performance analysis should be undertaken. This would include variables such as
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3 type of attack, defensive actions, goalkeeper intervention zone, goalkeeper technique and
4 outcomes which are not fully covered in previous studies [2, 11, 26].

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6 The most frequent technique used by the goalkeeper during match play is the save from shots
7 originating between the 6 and 18 yard lines [11]. The goalkeeper is actively responding to
8 attacks and shots for 7.5% of match time and spends 7.9% of match time indirectly defending
9 the goal [15]. The most common type of shot for the goalkeeper to save is made from inside
10 the penalty area towards the lower part of the goal (67.4% of shots) in world cup matches [2].
11 However, only 4% of attacks results in shots on goal with 3.4% of those being saved [11]. In
12 the course of saving these shots, the goalkeeper needs to respond instantly and relies on
13 explosive power, acceleration, agility, dexterity and flexibility which change in intensity
14 depending on the individual goalkeeper attributes and their original starting position [15].
15 Most match analysis literature generally only provides percentage information of times the
16 ball was shot on target, the goals scored and saves made, there is very little information about
17 the detail of the saves made.
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21 Foot control, including back passes (short and long passes) and clear outs (long kicked ball
22 clearances intercepted from the attack) are the next most frequent actions for a goalkeeper
23 during match play [11]. However, because most skill-specific test results include common
24 actions for outfield players; such as dribbling speed, shooting accuracy and passing; when
25 reported in the literature results rarely include the goalkeeper [3]. Where goalkeeper data on
26 these skills are reported, the goalkeeper has poorer performance scores compared to the foot
27 control of the outfield players [3]. This may be due to the slight differences in technique
28 where the goalkeeper, in the previously mentioned instances, strikes a ball moving towards
29 them generating lift and redirecting the ball fairly easily. The outfield players and the test
30 protocols tend to use stationary balls where the ball momentum is generated from the player
31 and moves away from them, thus the outfield players are more familiar with the technical and
32 proprioceptive differences. The goalkeeper does play an important role in organising and
33 controlling the defensive unit, assessing the attack and can move 15-20m to intercept a pass
34 which can occur 15.8% of game time [15]. Distribution is considered to be the start of an
35 attack and happens 69.4% of game time, from kicking a ball from the ground, out of hands or
36 throwing and includes being a passing option, culminating in short or long accurate passes
37 [15].
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41 Whilst it may be interesting to find out how far a goalkeeper travels over the course of a
42 game, it is unsurprising to see that midfielders travel the furthest, followed by forwards,
43 defenders and finally the goalkeeper who travels between 5.6-6km during a game [9, 26, 27].
44 This distance can be further broken down into the intensity of movement over this distance;
45 4025±440m walking, 1223±256m jogging, 221±90m running, 56±34m high-speed running,
46 and 11±12m sprinting [14]. Ziv and Lidor [14] found that sprint times for goalkeepers were
47 slower than outfield players as the sprint distance increased (20-60m) and that goalkeepers
48 fatigued sooner than outfield players under repeated sprint test conditions. However, this data
49 does not cover the high intensity performances made during the course of saves, which often
50 occur towards the end of each half and can lead to decisive outcomes [27]. Furthermore, there
51 is no specific data which identifies the direction of travel of the goalkeepers measured. Test
52 protocols mostly focus on sprinting forwards. Although agility tests incorporate multiple
53 changes of direction, they also include longer run distances in between the changes which is
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not truly reflective of the goalkeeper's performance and might explain the slower goalkeeper performances.

Match analysis has shown that the nature of the modern game of football is changing with mainly outfield players covering more distance at higher intensities. For example, Barnes et al. [28] found the distance covered in the season 2012-2013 was 10881 ± 885 m and was a significant increase from the distances covered in the 2006-2007 season of 10679 ± 956 m ($p < .001$). High intensity performance in the 2012-2013 season accounted for 1151 ± 337 m compared to the 2006-2007 season or 890 ± 299 m ($p < .001$) [28]. However, Barnes et al. [28] did not find significant changes in shots on goal, final third entries and tackles made between the 2012-2013 and the 2006-2007 seasons ($p = .20$). The nature of the shots on goal have been analysed and Kirkendall [13] suggest a shot to goal ratio of 10:1 is normal over a period of many matches rather than during the course of one game. Furthermore, shots on goal are mainly taken with feet (84%) rather than headed (2%) [11].

Distribution.

Changes in playing philosophies suggesting more instances for goalkeepers to be involved in distributing the ball is reflected in findings that goalkeepers used their feet more to distribute the ball in a game situation than their hands [25]. Seaton and Campos [25] also found that older goalkeepers were more accurate when throwing but younger goalkeepers kicked more and as a result were more accurate with their kicks. The emphasis on kicking for the younger goalkeeper is probably due to lack of upper body development. The distribution pattern from Seaton and Campos [25] study showed older goalkeepers to use the zones higher up the pitch more frequently whereas younger goalkeepers tended to play to the zones closer to goal. This difference provides further support for the changes in more recent playing philosophies, e.g. playing out from the back more and playing through the thirds. However, Seaton and Campos [25] findings could also be a reflection of a lack of strength and power development in the younger player. All goalkeepers demonstrated a tendency to play to more central zones when distributing the ball during matches and this was surmised as a way to avoid the ball going straight out of play from the goalkeepers throw or kick [25].

Although there are some accuracy data for distributions from the goalkeeper, Shamardin and Khorkavyy [15] found that goalkeeper distribution was largely ineffective and Kirkendall [13] found there were very few shooting possessions which started with or involved the goalkeeper. Liu et al. [1] found that goalkeepers playing at the higher levels tended to be consistent with their distribution pattern regardless of game outcome, whereas goalkeepers at the lower levels of performance demonstrated differences in their choice and accuracy of distribution techniques depending on whether the game outcome was currently winning or losing.

Technical demands.

Goalkeeper techniques such as, catching a shot, high crosses, deflections, positioning, punching, one-on-one situations and various distribution are repeated frequently in games and training [14]. However, there is very little biomechanical analysis of these skills with the possible exception of the penalty kick scenario [29]. Although penalty shots play a very small part of the overall football game performance, they seem to have been analysed the most. This might be because penalties often occur at crucial times during the game and, as in the case of penalty shoot-outs, can decide the outcomes of highly important matches. In penalty

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3 situations, the successful expert goalkeepers spend significantly more time looking at the
4 non-kicking leg and waiting longer before responding to the kick [30]. However, Woolley et
5 al. [31] found that goalkeepers spent longer looking at the kicking foot and the ball at the
6 point of final fixation. Kim and Lee [32] found that the difference in gaze behaviour between
7 successful and unsuccessful penalty save occurred when goalkeepers fixated for a longer time
8 on the approach phase of the kicker and not in the kick-swing phase. Despite these conflicting
9 findings, Roskes et al. [33] found that goalkeepers were more likely to dive right (71%) than
10 left (29%) when their team were losing.
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12 Goalkeepers are also called on to dive both left and right during open match play despite
13 dominances and preferences thus technical differences and success might vary greatly from
14 goalkeeper to goalkeeper [29]. Power generation is greater in the dominant side due to the
15 greater hip extension and better co-ordination of joints near lift off [29]. Spratford et al. [29]
16 study reported that on the non-preferred side for diving the body's centre of mass travelled an
17 extra 34cm when diving low, 31cm diving at medium height and an extra 9cm diving at
18 height and this relates to an increase of 0.14 ± 0.04 sec on dive time. Some goalkeepers have
19 had little or no coaching regarding the specific techniques of diving on either side [10] and
20 this may account for and contribute to the differences.
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24 Landing after diving saves have been made or attempted, creates a landing force of between
25 4.2 and 8.6 times body weight and often dispersing this force can be achieved through rolling
26 over [34]. However, landing solely on the hip results in higher forces than can be dispersed
27 through a rolling motion [34]. Coaching, including constant and regular practice of diving
28 and landing techniques, will help with posture and preparation for the saves needed and this
29 will also free up some attentional focus to enable the goalkeepers to think about the cues and
30 anticipatory responses making a successful outcome more likely [2, 10, 30].
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33 Ryu et al. [35] found that guiding novice goalkeeper's attentional focus to specific and
34 relevant cues enhanced their ability to anticipate the direction for the kick. However, Ryu et
35 al. [35] went on to show that a combination of guided and non-guided cues produced the
36 most successful results. Woolley et al. [31] concluded that when goalkeepers spend more
37 time looking at less things this suggests they know which are the most important cues to
38 focus on. This cue perception could also be used to organise the defence of the unfolding
39 attack, therefore reducing the opportunity for attacking and goal shooting situations [2].
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41 Skills analysis for goalkeepers in recent work again tends to compare the goalkeeper and
42 outfield players and as such focuses on foot control skills. Rebelo-Gonçalves et al. [3] found
43 that goalkeepers dribbled the ball less distance and were less accurate with shooting than
44 outfield players in specific ball skills testing. This is unsurprising as the goalkeepers training
45 and match play performance would focus more on the techniques mentioned above rather
46 than developing their dribbling skills. Whilst outfield players may be able to 'get away with'
47 preference for using a dominant foot and having a dominant side, Spratford et al. [29]
48 suggests the goalkeeper should be able to use both feet effectively, as attacking play can
49 develop down either side of the pitch.
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52 Psychological demands.

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54 Goalkeepers need superior movement detection from presented pre-shot cues which influence
55 their decision making [36]. Much cue utilisation and gaze behaviour research has focused on
56 closed skill penalty shot situations, however in open play situations there will be a number of
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3 unknowns including when the shot might be played and therefore, extrapolating the closed
4 skill techniques to an open skill situation might be ineffective [37]. The goalkeeper may not
5 have a clear sight of the ball or the pre-shot cues and may have to rely on their observations
6 of attacking team formation and strategies for both the current and the next phase of play [35,
7 37, 38]. When the shot is long distance, the goalkeeper has more time to reposition if the ball
8 curves and execute an intervention, however for short distance shots, the quick speed aspects
9 of training helps the goalkeeper decide and react quickly to the shot [37]. Where a goalkeeper
10 demonstrates ineffective strategies related to decision making and cue utilisation, this can
11 impact on the confidence of the goalkeeper which further affects their 'presence' and
12 attentional focus [36].
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15 Fear of failure, making mistakes and losing or expecting to lose the ball are real concerns for
16 the goalkeeper [36]. One mistake can cost the team success and this creates a feeling of high
17 pressure for the goalkeeper in many situations [25]. However, Tedesqui and Orlick [37]
18 found that when goalkeepers are fully focussed on extracting the best information from cues
19 and formations that they were less likely to worry and be distracted about the outcomes or
20 previous mistakes. The coach plays a vital role here both helping the goalkeeper identify
21 appropriate cues and providing constructive feedback when the outcome was unsuccessful
22 [8].
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25 Focus, attention and 'presence' are considered to be important psychological skills [36].
26 Often mistakes occur due to improperly executed actions [29], hesitation and poor timing and
27 these can be related back to concentration and self-confidence [36]. Kajtna et al. [16] found
28 that goalkeepers had high levels of guilt when opponents scored and due to an all-consuming
29 cognitive involvement in the game, these feelings were not dispersed as easily as outfield
30 players. Confidence in the goalkeepers ability to make the save, concentrating, focus,
31 composure, readiness and courage have all been found to be important psychological
32 demands for the goalkeeper [10].
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35 Motivation is a critical psychological skill for improving and maintaining optimum
36 performance in training and matches [10]. Van-Yperen and Duda [39] found that young
37 Dutch elite players demonstrated a tendency to rely on high task orientation rather than the
38 ego orientation which might be expected at a competitive professional academy. This study,
39 covered all players rather than just goalkeepers however, the underlying reasons behind these
40 findings suggested that players believe effort and collaboration were under their control and
41 could be worked on and improved [39]. In a penalty shot stopping situation, Roskes et al.
42 [33] found that strikers were motivated to avoid failure whereas the goalkeepers were more
43 motivated to succeed. **In the penalty situation the goalkeeper is not necessarily expected to
44 save the shot (10.5% saved for low shots up to 1m from the goalpost and 26.5% saved within
45 the middle area of the goal) [40]. Therefore, the goalkeeper may perceive that there is less
46 pressure on their performance in this instance leaving them free to make an attempted save
47 almost regardless of the outcome (e.g. they are not expected to make the save anyway).**
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51 Coaching implications.

52 Based on scientific evidence, identification of performance demands is crucial in order to
53 fully prepare the goalkeeper for situations they are faced with in match play [14]. Exercises
54 should include recognising aspects of play resulting in; coming off the line, goal line
55 clearances, one-on-one's and diving situations [36]. Park et al. [2] states that goalkeepers
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3 need constant technical training to enhance the physical response needed during game play.
4 However, where the coach works with a large age range of goalkeepers, different approaches
5 and skills may be needed for each goalkeeper [4]. **Younger goalkeepers will need more work**
6 **on fundamental techniques such as footwork and movements towards the ball also catching**
7 **shots around the body, whereas older goalkeepers might want practice at taking a crossed**
8 **high ball in opposed situations [41]. Furthermore, the identification of individual needs for**
9 **goalkeepers necessitates a focus on different aspects or styles of play; for example, different**
10 **diving side dominance, landing backwards, power stepping into the lateral save or set**
11 **positioning in readiness for the shot.** Nikolaidis et al. [4], Sainz de Baranda et al. [11] and Gil
12 et al. [7] found that when matching the needs of individual goalkeepers with identified match
13 play demands, the goalkeepers developed and progressed faster and produced better match
14 play performances. However, many of the match play demands identified for football
15 goalkeepers tends to focus on shots on target, goals scored and some patterns of distribution.
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19 In terms of training intensity, younger goalkeepers perceived their role as less intensive than
20 outfield players and therefore do not tend to train as hard [6]. Clemente et al. [26] show that
21 goalkeepers do spend more time at low intensity activity and cover less distance than outfield
22 players. However, more time should then be spent on training and practising the unique
23 goalkeeper skills required during match play [13, 15]. Although jumping, short sprints and
24 diving are a key training focus in order to help prevent mistakes from fatigue [25], repeated
25 sprints of 30m are not necessarily a good indicator of performance for a goalkeeper [24]. Ali
26 [42] suggests instead that a combination of fitness testing within a skill performance is the
27 most effective for enhancing performance and assessing progress. **For example, a lateral**
28 **agility footwork test into a set position culminating in a save, or accelerating towards a ball**
29 **for either a back pass or intercepting a long attacking ball and playing that ball into a target**
30 **area mimicking the quick transition to an attacking situation (targets could be both short and**
31 **long range passes).** Furthermore, regular collection of goalkeeper relevant data is needed in
32 order to assess progression, development and suitability of the training programme [14].
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36 The psychological skill of imagery is an underused training method in many coaching
37 situations, although goalkeepers have reported using imagery to help regulate arousal,
38 increase self-confidence and reduce stress [43]. Where the team has more than one
39 goalkeeper, the goalkeeper on the bench reported using more imagery because they were
40 watching the other goalkeepers and team mates perform [43]. Using imagery during training
41 simultaneously with technical and tactical training can help improve performance in match
42 play [43]. **Pairing goalkeepers together where one works and the other rests and watches is an**
43 **ideal situation in which to encourage imagery processes. This can be effective if the**
44 **goalkeepers are tasked to rotate every 2-3 shots. Asking the watching goalkeeper what they**
45 **would do and have them imagining themselves making the save can help to reinforce good**
46 **technique and enhance feelings of competency. Furthermore, asking the working goalkeeper**
47 **to reflect on their performance in the task; particularly where outcomes were compromised**
48 **due to goalkeeper error; helps the goalkeepers to imagine themselves executing the task more**
49 **effectively prior to their next attempt. Thus, not only enhancing their imagery skills but again**
50 **helping to reinforce technical and decision making processes.** Where coaches can encourage
51 goalkeepers to adopt a task orientated focus, the goalkeepers were more able to stay focused
52 on performance and this served to enhance self-confidence [8]. **The development of technical,**
53 **physical and psychological skills for the goalkeeper would benefit from an integrated**
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3 approach rather than each discipline in isolation. The imagery example above can be
4 manipulated to include specific requests to imagine more powerful or quicker footwork and
5 positioning. Asking goalkeepers to feel the power in the initiation of their movement can help
6 enhance proprioceptive processes and positively influence future performance. Finally,
7 during periods of physical training or pre-season, asking goalkeepers to identify the benefits
8 of these movements in successful technical practices can help to empower the goalkeeper and
9 further enhance future performance.
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