Chapter II

REVIEW OF RELATED LITERATURE

Ian J. Deary\(^1\) to study difference is mental abilities is to share the predicament of meteorologists. These scientists deal with an aspect of our everyday lives about which most of us feel free to speak with authority unlike, for example, atomic theory or place tectonic. Metrologist must simultaneously develop constructs and give practical predictions, which affect our lives. Their measurement tools and the mathematical frame work behind them are formidable. They are playing a stochastic game, getting it more right than wrong over the entire season. However we want them and IQ testers to be right every time or for every person deterministic rather than stochastic.

P. John Jhonston and Victor M. Catano\(^2\), cognitive ability. The general classification test, from 3-Revised (GCI-R) was used as the primary measure of cognitive ability (N=205). The Tc3-R is a reliable and valid predictor of NcM Q13 training (Angus & Hali Well 1987). It is a paper-and-pencil speed test that strongly correlates (r=.75):p.

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General Aptitude Test Battery (GATB). The psychomotor scales (sub tests 8-12) of the GATB were used to measure the psychomotor abilities of Manual Dexterity, Fiser Dexterity, and motor coordination (United States Department of Labour, 1986)) Test-retest reliability for the psychomotor scales of the GATB range from .70 to .84 across time periods of up to three years (Jaeger, Linn & Tesh, 1980). Predictive validities of composites based on the psychomotor ability subscales range from .10 to .30 (mean validities based on 755 studies) for training performance Hartigan and Wigdor, 1989, Chap.8).

Cattell’s study on 154 high school football player from all different public schools were classified as being successful or unsuccessful. Seventeen physical and motor ability variables relating to athletic ability were administered to the football players. The variables included (1) Standard Height, (2) Body Weight, (3) Calf Girth, (4) Thigh Girth, (5) Chest Girth, (6) Upper Arm Girth, (8) Back Lift Strength, (9) Leg Lift Strength, (10) Right girth Strength, (11) Left Girth Strength, (12) Bar Dips, (13) 40-yard dash, (14) Illions Agility Run, (16) Standing Broad Jump, (17) Total Body Reaction, (18) 60-yard shuttle run, (19) Football throw for distance.
After measuring the variables for each subject, the variables were subject to Cattell’s profile similarity coefficient. Results shows that the 17 variables used were effective determinants of the coaches’ classification of successful and unsuccessful football players, successful football players are taller, beavier and stronger than unsuccessful football players.³

Harre⁴ describe co-coordinative abilities are prerequisites of athletic performance. These are mainly coordinative abilities help them in learning perfection technical skill in the training period. The speed and quality of learning stabilizing and applying the technical skills of a sports. In sorts the coordinative abilities differ from technical sill in that they exist as a prerequisites for several motor abilities.

Heanerer⁵ used women students (N=36) classified as immediate tennis players as subjects. A comparison was also made between two measures of visual perception the Howard apparatus and the keystone Telebinocular. The scott French revision of the Dyer will broad test used as the measure of general tennis playing ability. The results obtained indicated no relationship between the two measure of visual

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⁴ Dietriets Harre, Principle of Sports Training (Berlin: Sportverlage) p.152.
depth perception as measured keystone telebinocula and scores in Dyer Test. Further, analysis of the data revealed that there was no significant difference between mean depth perception scores of high and low level groups of intermediate tennis ability.

Southord and Amol\(^6\) conducted a study to investigate the rhythm city of performance ritual. Rhythmic behaviour is important variable regarding motor performance. Observation of performance in a variety of skilled situations reveals definite rhythms according to activity and level of performance studied by Southord and Miracle (1993) and Wrisberge and Pein (1992) indicated that rhythmicity is also important to diosgretion pre performance behaviour that maintaining a consistent rhythm during performance behaviour that maintaining a consistent rhythm during performance behaviour for free throw shooting in basketball were more likely results in success performance. Southward and Miracle (1993) conducted that maintaining rhythm was more important than anyone type of behaviour display during performance ritual.

Slater and Hammel\(^7\) undertook another study to compare

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\(^7\) A. T. Slater and Hammel, "Comparison of Reaction Time Measures to a Visual Stimulus and Arm Movement", *Research Quarterly* 36 (December, 1995).
reaction time measures to visual stimulates and arm movement. The purpose of study was to compare reaction time measure for arm displacement and visual stimulus. Compare reaction time measures for selected group of physical education measures and liberal art measure. Analysis of the data revealed that only a modest relationship exited between the two reaction time measures. Significant difference in reaction time existed among several group for both reaction measures.

Haines\(^8\) study sequencing relationship are studied in sample of 1013 children selected from an existing data set of 3750. Associations are analyzed between scores for motor coordination tasks and a rhythm repetition task performed in the routine school beginners medical examination by 4, 5 and 6 years old children and class teacher assessment of their coordination activities and language performance when 6, 7 and 8 years old together with scores for a routine reading test. Association between successive motor tasks and language and reading are found to be stronger in boys and hopping and reading strong in girls.

Fletcher IM and Jones B\(^9\) carried out of this study was to

\(^8\) Haines, Dr. Cicely, “Sequencing, Coordination and Rhythm Ability in Young Children,” Journals (33 Park Lane, Norwhich, Norfolk, NR 32 3EE, U.K).

determine the effect of different static and dynamic stretch protocols on 200-M sprint performance. The 97 male rugby union players were assigned randomly to 4 groups: passive static stretch (PSS; n=28), active dynamic stretch (ADS; n=22), active static stretch (ASST; n=24) and static dynamic stretch (SDS; n=23). All groups performance a standard 10 minute jog warm-up; followed by two 20 meter sprints. The 20 meter sprints were then repeated after subjects had performed different stretch protocols. The PSS and ASST groups had a significant increase in sprint time (p<or = 0.05), while the ADS group hand a significant decrease in sprint time (p<or non significant (p<or =0.05). The decrease in performance for the 2 static stretch groups was attributed to an increase in the muscle otendinous unit (MTU) compliance, leading to a decrease in the (MTU) ability to score elastic energy in its eccentric phase. The reason why the ADS group improved performance is less clear, but could be linked to the rehearsal of specific movement. Patterns, which may help increase coordination of subsequent movement. It was concluded that static stretching as part of a warm-up may decrease short sprint performance, whereas active dynamic stretching seems to increase 20 meter sprint performance.
According to Lakomy J and Haydon DT,\textsuperscript{10} The nature of multiple sprint sports such as soccer, hockey and rugby and is such that deceleration plays a important part in the movement patterns of players during a game and training. The purpose of this study was investigate the effect of decelerations on fatigue during repeated spring efforts. A group of 18 elite field hockey players (all men) performed a running repeated sprint ability test (6x40 m) using maximal effort and deported every 30 second. In one conduction there was no deceleration zone and in the second condition, the test had a deceleration component (rapid deceleration to a stop within 6 m of the end of each sprint), sprint times under each conduction were compared using a repeated measures analysis of variance. No significant difference was seen between the 2 conditions for mean sprint times (P>0.05) or for the mean fatigue in dex (p<0.05) would have been seen at the 11\textsuperscript{th} sprint although this study found that the deceleration component would have shown an effect, giving rise to greater fatigue and slower spring times, if the number of sprint had been increased. The implications are that deceleration training should be introduced in to general fitness training programs for those competing is multiple

\textsuperscript{10} Lakomy and DT Haydon, “The Effect of Enforced Rapid Declaration in Multiple Sprint Test,” \textit{Journal Strength and Research} (2004 August 14).
sprint sports.

Aprianton T, Nusome H, Ikeqami Y and Sano S, the aim of the this study was to examine the effect of leg muscle fatigue on the kinetics and kinematics of the instep football kick. Fatigue was induced repeated, loaded knee extension (40% body weight) and flexion (50% body weight) motions on a weight training machine and until exhaustion. The kicking motions of seven male players were captured there-dimensionally at 500 Hz before and immediately after the fatigue protocol. The significantly slower ball velocity observed in the fatigued condition was due to both reduced lower leg swing speed and poorer ball contact. The reduced leg swing, speed represented by a slower toe liner velocity immediately before ball impact and slower peak lower leg angular velocity, was most likely due to a significantly reduced results suggest that the specific muscle fatigue induced in the present study not only diminished the ability to generate force but also disturbed the effective action of the interactive moment leading to poorer inter-segmental coordination during kicking. Moreover, fatigue obscured the eccentric action of the knee flexors, immediately before ball impact. This might increase the supeetibility to injury.

Ford P, Hodges NJ, Williams AM\textsuperscript{12} are focuses of attention of the study step-by-step control of a skill has been shown to be detrimental to experts performance but to have no significant effect on novices' performance (e.g., S.L. Beilock, T.H. Care, C MacMohan & J. L. Strakes, 2002) contrary to the results of multipulations of the direction of attentions focus (e.g. G. Wulf, M. Hoss & W. Prinz, 1998). In previous studies, researchers have not separated the focus of attention from the nature of the instruction provided or the skill level of the participants. In the present experiment 10 skill and 10 less skilled soccer players dribble a ball after receiving instruction directing attention to as internal, skill relevant feature (foot); on internal skill – irrelevant feature (arm); or skill – irrelevant task (word-monitoring), performance was evaluated in relation to one attentional focus control condition. For skill performers, an internal focus control condition. For skill performers, an internal focus on the arms and word monitoring had detrimental effect. No significant difference were observed across the three attentional manipulations when the skill performers used the non dominant foot. The results general supported the deautomization of skill hypothesis.

\textsuperscript{12} P Ford, NJ Hodges, AM Williams, "Online Attentional- Focus Manipulation in Soccer Dribbling Task; Implications for the Proceduration of Motor Skill" \textit{Journal Motor Behaviour} (2005 September, 37 (3): 386-94.
French KE, Spurgeon J H, and Nevett ME\textsuperscript{13} was study to examine difference during cognition and skill components of game performance in young baseball players (N=159) with varying level of expertise. Three level of expertise (low-average and high skilled players) were identified at each level (7,8, 9 and 10 years of age). Game performances was videotaped and measure of skill execution (throwing accuracy, throwing force, fielding, catching, batting average and batting contract) and cognitive components (positioning, decision) were developed from observation analysis. The result indicated that baseball skill execution during game play maximally discriminated expertise level.

Reilly T, Williams AM, Nevill A and Ranks A\textsuperscript{14} study for soccer play are multifunctional and distinguishing characteristics of elite players can be investigated using multivariate analysis. The aim of the present study was to apply comprehensive test battery to young players with a to distinguishing between elite and sub-elite groups on the basis of performance on test items. Thirty one (1 elite, 15 sub-elite) young players matched chronological age (15-16 years) and body size were


studied. Test items included anthropometric (n=15), physiological (n=8) psychological (n=3) and soccer specific skills (n=2) tests. Variables were split and into separate groups according to somatotype. Body composition, body size, speed endurance, performance measures, technical skill, anticipation anxiety and task and ego orientation for purpose of univariate and multivariate analysis of variance and stepwise discriminate function analysis. The most discriminating of the measures were agility, sprint time, ego orientation and anticipation skill. The elite player were also significantly learner, possessed more aerobic power (9.0+/0.1.7 Vs 55.5+/0.38 ml × kg (-1) × min (-1) and were more to iert of fatigue (p<0.05). They were also better at dribbling the ball, but not shooting we conducted that the test baseline battery used may be useful is establishing baseline reference data for young players being selected on to specialized development programmers.

Impellizzeri FM, Sassi A and Reilly T\textsuperscript{15} study was to compare the effect of specific (small sided games) Vs generic (running) aerobic in soccer. Forty junior players were randomly assigned to either generic (n=20) r specific (n=20) interval training consisting of 4 bouts

of 4 min at 90-95% maximum heart rate with 3 min active rest periods completed twice a week. The following out comes were measured at base line (pre), after 4 weeks of preseason training (Mid), and after a further 8 week of training during the regular season (post), maximum oxygen uptake lactate threshold (Tlec) running economy at Tale, a soccer-specific endurance test (Ekblom’s eircut) and indices of physical performance during soccer matches (total distance and time spent standing, walking and at low and high intensity running speed). Training load, as quantified by heart rate and rating of perceive exertion, was recorded during all training session and was similar between groups. There were significant improvements in aerobic fitness and match performance in both groups of soccer players, especially in response to the first 4 week of pre-season training. However, no significant difference between specific and generic aerobic interval training were found in any of the measured variables including soccer specific tests. The results of this study shows that both small side games and running are equality effective modes of aerobic interval training in junior soccer players.

Dupont G, Akakpo K, Berthoin S\textsuperscript{16} study was the effect on in

season, high intensity interval training on professional male soccer players running performance were investigated. Twenty-two subjects participated in 2 consecutive training periods of 10 weeks. The first period was considered a control period and was compared with a period when 2 high-intensity interval training exercise were included in the usual training programme. Intermittent runs consisted of 12-15 runs lasting 15 seconds at 120% of maximal aerobic speed alternated with 15 seconds of rest. Sprint repetitions constituted of 12-15 all out 40 m run alternate with 30 seconds rest result from the high-intensity interval training have shows that maximal aerobic speed was improved (+8.1+/−3.1% P<0.001) and that the time of the 40 m sprint was decreased (-3.5+/−1.5, P<0.001), whereas no change in either parameters were observed during the control period. This study shows that improvements in physical qualities can be made during the in season period,

Hoff, J17 study was the elite soccer players spend a substantial amount of time trying to improve physical capacities, including aerobic endurance and strength derivatives of speed and power. The average oxygen uptake for international soccer teams ranges from 55 to 68 ml

kg=1 min⁻¹ and the half squat maximal strength from 120 to 180 kg. These values are similar to those found in other team sports. Recently, it has been shows that the heat’s stroke volume is the element in the oxygen chain that main by limits aerobic endurance for altered. These findings have given rise to more intensive training interventions to secure high stroke volumes, which in turn, have proved positive in changing both maximal oxygen consumption and soccer performance in terms of distance covered, contacts of 4x4 min. “intervals” running uphill at 90-95% of maximal heat rate interspersed with 3 min jogging at 70% of maximal heart rate to facilitate remove of lactate. Research has revealed that a soccer specific training routine with the ball might be as effective as plain running. Strength training in terms of “one repetition maximum”, but also sprinting velocity and jumping height, in elite soccer players without any change in body mass. The same training has also improved running economy and thus aerobic endurance performance. The training regimen used for a European Champions League team was 4x4 repetitions of half squats with the emphasis on maximal mobilization of force is the concentric action.

Macmillan K, Wilson J, Hoff J¹⁸ was study the examine the

changes in aerobic endurance performance of professional youth soccer players throughout at the soccer season. Nine youth soccer players were tested at six different time points throughout the soccer season by sub-maximal blood lactate assessment, using an intermental treadmill protocol. Whole blood lactate concentration and heat frequency (HF) were determined at each exercise stage. Running velocities at the first lactate inflection point [V-T (lac)] and at a blood lactate concentration of 4 mmol (1(-1) (v-4mM) were determined. Running velocity at the two lactate thresholds increased from the start of pre-season training to the early weeks of the competition season from 11.67 (0.29) to 12.96 (0.28) km to h(-1) for [V-t (lac)], and from 13.62 (0.25) to 14.67 (0.24) km to h (-1) for V-4m (P<0.001). However, V-T (lac) and V-4mM when expressed related to maximum heart frequency [Hf (max)] remained unchanged. The Hf to blood lactate concentration relationship was unchanged after the pre-season training period. The two expression of locate threshold did not reveal difference between each other. Running velocity at V-T (lac) and V-4 mM increased significantly over the pre-season periods, but v-t (lac) and V-4 mm were unchanged when expressed related to Hf (max). This finding may indicate that increased endurance performance may be mainly attributable to alterations in [VO (2max)]. Although lactate
assessment of soccer players is useful for determining endurance performance [VO (2max)] and running economy may more useful information for determining physiological adaptations resulting from soccer training and training interventions.

Dottavio S. and Consttqa C\(^{19}\) was study describe the work-rate profile of Italian Soccer referees (n=23). The referees were examined during official games (n=26) of the 1992-1996 first division Italian championships (series A). Subjects were all experienced, top-level referees enrolled in the commission. Arbitri Nazionali and officiated in the series A and B Italian championships. Mean age of the referees studied was 37.8+/- 2.1 years. Match analysis was performed using a technology similar to that reported by Ohashi et.al in 1988. Average match distance was 11469+/-983 m referees, on average, covered 17.2% of the entire match distance at speed faster than 18.1 km × h(-1) A<.1-1%. Decrement of the total distance covered was evident during the second half (P<0.001). Furthermore, less distance covered running back word and sideways during the second half compared to the first half (P<0.01). Never the less the referees experienced no determent in the distance covered at speed faster than 18-1 km × h (-1) through the

match. Match analysis revealed the intermittent nature of the referees activities. Their intensity varied from situation to situations frequently reaching near maximal intensity. However, sprint bouts never lasted for more than a few seconds (2-4 seconds). Therefore, refereeing at least at top level, placed unique stress on the official, and thus specific training and fitness assessment are needed.

Dorge H C, Anderson T B, Sorensen H, and Simonsen E B\textsuperscript{20} were to examine the release speed of the ball in maximal instep kicking with the preferred and the non-preferred leg and to relate ball speed to biomechanical difference observed during the kicking action. Server soccer player performed maximal speed place kicks with the preferred and the non-preferred leg; their movements were filmed at 400 H. The inter-segmental kinematics and kinetics were derived. A coefficient of restitution between the foot and the ball was calculated and rate of forced development in the hip flexors and the knee extensors was measured using a kin-con dynamometer. Higher ball speeds were achieved with the preferred leg as a result of the higher foot speed and coefficient of reinstitution at the time of impact compared with the non-preferred leg. These higher foot speeds were caused by greater

amount of work on the shank originating from the regular velocity of the thigh. No difference were found in muscle movements or rate force development and conclude that the difference in maximal ball speed between the preferred and the non-preferred leg in caused by better inter segmental motion pattern and a transfer of velocity from the foot to the ball when kicking with the preferred leg.

Dorge HC, Anderson TB, Simsons EB, and Angarrd H21 purpose of the study was to develop method to record inter muscular electromyogram (EMG) from the illoposas muscle and to relate this activity to the kinetics during soccer place kick. Seven skilled soccer players performed 3 maximal velocity place kick. The kick were filed with the high speed camera (400 Hz) and EMG recording were obtained from 5 muscle of the kicking leg, including wire electrodes inserted into the m illioposas. The EMG signals were compared to the kinetics of the kicking leg, which were calculated from the digitized film. The results showed handy and torque reversal about the hip joint before impact. Angular deceleration of the high segment did not increase the angular velocity of the sank (work-3.37 to 0.0-) M ilioposas was active during the entire kicking motion (average EMG

65.1-100.97), ever in the period when the thigh was decelerating wire 
electrodes can successfully be applied to EMG recording of fast 
unloaded movements.

Manolopoules E, Papadopoulos C and Kellies E\textsuperscript{22} aim of this 
study was to examine the effect of a soccer (strength and technique) 
training programmed on kinematics and electromyographic (EMG) 
muscle activity during a instep kick. Ten amateur soccer players (aged 
19.9+/-0.4 years, body mass 74.8+/-9.1 kg, height 177.4+/-6.7 cm) 
constituted the experimental group (EG) whereas 10 players (age 
21.6+/-1.3 years, weight 71.5+/-6.7 kg height 175.2+/-3.4 cm) served 
as control group (CG). The EG followed 10 week soccer specific 
training programme combining strength and technique exercise. All 
participants perform an instep soccer kick using a two step approach 
while three dimensional data and EMG from six muscles of swinging 
and support legs were recorded prior to and after training. Maximum 
isometric leg press strength, 10-m sprint performance and maximum 
speed performance on bicycle ergo meter were also measured. 
Analysis of variance designs with repeated measured showed that the 
EG improved significantly (P<0.05 maximum ball speed, tac liner

\textsuperscript{22} E M Manolopoulos, C Papadopoulos and E Kellies, "Effect of Combined Strength and Kick 
Coordination Training on Soccer Kick Biomechanics in Amateur Players," \textit{Scand Journals Medical 
Science} 2006 April, 16 (2) 162-10.
velocity of the foot, ankle and angular velocity of all joints during final phase of the kick. Training had significant effects on EMG values apart from an increase in the average EMG of the vastus medial’s whereas maximum isometric strength and sprint time significantly improved after training \( (P<0.05) \). The present result suggest that the application of the training programmes using soccer specific strength exercise would be particularly effective in improving of soccer kick performance.

Monolopoulous E, Papadopoulos C, Salonickidis K, Katartzi E and Poluha S\textsuperscript{23} was to examine effects of lower limb strength training on physical can dationing and kinematic characteristics of instep kick in 16 young amateur soccer players who participated in initial and final laboratory tests. In addition to their standard preseason soccer program, 8 players comprise the experimental group, who performed and 8 week strength-training program. Maximal and relative isometric forced of the lower limbs were significantly improved. Moreover, toe and hip angular velocity during ball contact, ball velocity as well as ankle, knee and hip angular velocities of the kicking leg were significantly increased. It is concluded that conditioning and kinematics indices of

the kicking performance could be improved after strength training of
the lower limbs.

Mognoni P Narici MV, Sirton MD and Lorenzelli F\textsuperscript{24} study is
to assess if there is any correlation between isokinetic testing and field
performance of young soccer players. The isokinetic peak torques of
the knee extensor soccer muscle in sitting position (TKE), and those of
the hip flexor muscle in standing position (THE) were measured in 24
junior players. Four angular velocities (\(\omega = 1.05, 3.14, 4.19, 5.23\)
rad. S-100, 60 180, 240, 300 deg 5-1) were used for the knee extensors
and three (1.05, 3:14, 4.13 rad s-1) or hip flexors. On the field the
subjects were asked to kick a stationary soccer ball as fast as possible
against a barrier and the mean liner velocity over at 10 a path (\(v\)) was
measured. TKE of the non dominated limbs were higher than those of
the opposite on at the three highest omega (\(p<0.05\)). On the contrary
the THF of the dominant limbs were higher than those of controlateral,
at the highest omega. When the ball was kicked by the dominant or
non dominant limbs, the means value and standard deviations (+/-SD)
of \(V\) were 23.6 (+/2.5) and 21.4 (+/-2.6)m.s-1. Torques and \(V\) were
always positively correlated to each other. However, only in few cases

\textsuperscript{24} P Mognoni, MV Halrici, MD Sirrri and F Lorenzelli, "Isokinetic Torques and Kicking Maximal
Ball Velocity in Young Soccer Players," Journals Sports Medicine Physical Fitness, 1994 Dec. 24
(4) 375-61.
was this relationship statistically significant. In conclusion the isokinetic torques do not seem to be good predictors of \( v \), one of the several factors which determine the global performance of the soccer players.

Mclean BD and Tumilty DM\textsuperscript{25} the ability to kick with both feet is regarded as a desirable skill high level soccer players; however, most players display a dominance of kicking ability on one side. This study investigated the characteristics of asymmetry in two types of soccer kick. A low drive and a chip kick from both the left and right foot of 12 elite junior soccer players were analyzed. Kick velocity, kick accuracy position on the plant foot from the ball centre and time from foot plant to ball contract were measured for each kick-knee extension and flexion strength were also determined for each leg at of degree S-1 180 degree S-1 and 240 degree S-1 on a cybex II isokinetic Dynamometer. A single factor repeated measure analysis of variance was applied to velocity plant, foot position and timing parameters to compare between sides and between shorts. Chi 2 analysis was used to compare strength parameters between sides. Pearson's product moment correlation analysis was used to examine the relationship between velocity and

both leg strength and the time from foot plant to ball contact. Significance was set at P<or = 0.05. The results showed that this group had strength dominance at all speeds tested on the right side and better drive kick performance with their right leg as determined by mean (S-d) velocity 79(6) versus 66(8) km h-1 and accuracy (66.6% versus 33.3%). There was no difference in these parameters between side for chip kicks.

Ford P, Hodges N J and William A M\textsuperscript{26}, A focus of attention on the step-by-step control of a skill has been shown to be detrimental of experts performance but to have no significance on novices performance (e.g., S. L. Beilock, T.H. Carr, C Machaon, & J. L. Starkes, 2002). Contrary to the results of manipulations of the direction of attentional from the nature of the instruction provided or the skill level of the participants. In the present experiment, 10 skilled and 10 less skill –relevant feature (foot): an interna, skill – irrelevant feature (arm); or skill –irrelevant task (world – monitoring) performance was evaluated in relation to a no antinational focus control condition. For skilled performer an internal focus on the arms and feet interfered with performance. For less skilled performers, an internal, yet skill-relevant,

focus of attention (foot) did not degrade performance, whereas attention to the arms and world monitoring had a detrimental effect. No significant differences were observed across the three attentional manipulations when the skilled performers used the non dominated foot. The results generally supported the deautomization of skill hypothesis.

Ford P, Hodges NJ, Huys R & Williams A M\textsuperscript{27} the importance of action–effects for the performance of a soccer kick was examined. Novice, intermediate, and skill players performed soccer chip task with the intention of getting the ball over a high barrier to a near after ground level target under three conditions; Full vision, no vision of the ball trajectory resulted in increased radial error, irrespective of the presence or absence of KR but in a skill eve and target dependent manner. At the near target, novice participant relied on ball trajectory information intermediate performance were affected by the removal of ball vision. Variability is knee ankle coordination significantly decreased when vision of the ball trajectory was removed, irrespective of KR and skill level. Although across skill level there was evidence that action-effects information is used to execute the action when it is

available, only at the lower levels of skill did this information’s and outcome attainment. There was no evidence to suggest that which increase skill the dependence of this information increase.

D I Anderson and Sidway B\textsuperscript{28}, the purpose of this study was to examine the change is coordination associated with practice of a soccer kick video recorded were collected on 6 novice right footed soccer players prior to and after 20 regularly scheduled kicking practice season. Three experienced players were also videotaped for comparison. Movement of the right leg was digitized and analyzed using motion analysis software. As a result of practice, subjects were able to significantly increase the maximum resultant linear velocity of the foot, and these increases were accompanied by changes in the pattern of coordination underlying the movement. These changes were assessed qualitatively through the topological characteristics of the relative motions of the hip and knee and quantitatively through three different timing variables. The results provide some support for Bernstein’s (1967) ideas on the acquisition of skilled behaviour as well as for the two stage model of motor learning proposed by Newell (1955).

Hodges NJ, Hayes S, Horn RR and William AM\textsuperscript{29} were examine this issue by monitoring the performance of a non-skilled individual learning a soccer chip shot with his non-dominate leg over 9 days of practice (425 trails), principal component analysis was used to examine dimensional change. The most dramatic change occurred at the hip with the range of motion decreasing during the first 5 days of practice and then increasing there-after. A reverse pattern was observed at the knee and ankle. While showing a progression in control from proximal to distal a further phase was observed where primary control was passed back to the hip. The degree of liner coupling between the joints also increased with practice until day 5, after which independent control was observed. The number of controlled dimensions did not change across practice. Radial error, especially early in practice and kinematics relating to the hip were most predictive of error, especially early in practice. Raising degree of freedom was a strategy implemented across the first half of practice after which point independent control was gradually restored enabling successful consistent performance.

\textsuperscript{29} N J Hodges, S. Hayes, RR Horn & AM William, "Change in Coordination, Control and Outcome as a Result of Extended Practice on a Novel Motor Skill," Ergonomics, 2005 Sep. 15, Nov. 15 48 (11-14) 1672-85.
Young W, Clothier P, Otago L, Bruce L, Liddell D, was to determine the effect of static stretching in a warm-up on hip flexor and quadriceps flexibility as measured by a modified Thomas test and on range of motion (ROM) of the leg and foot speed at impact in kicking a football with minimum effort sixteen Australian Rules (AR) footballers performed two different warm-ups on different days. One warm-up involved five minutes of sub-maximal running followed by seven practice kicks. While the other also included 4.5 minutes static stretching of the hip flexors and quadriceps after the running. A modified Thomas Test was conducted before and after each warm-up players performed maximum effort drop punt kicks in to a net while being videotaped to determine the ROM of the kicking leg and food speed at impact with the ball. There were no significant changes in flexibility (P>0.05) as a result of either warm-ups in the kicking variables (P>0.05). It was concluded that the Thomas test may not have been sensitive to possible acute changes in flexibility from the warm-ups, and that stretching had no influence on kicking ROM or foot speed, possibly because of the complexity of the kicking skill.

Zakes A, Garmmatikopoulou MG, Zakas N, Zahariadies P and

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Vanvakoadis E\textsuperscript{31} were study eighteen adolescents team soccer players participated in this study performing 3 different flexibility training protocols in separate training sessions. In the first treatment stretching protocol a general warm-up was performed where subjects jogger for 20 minutes. The seconds treatment stretching protocol consisted of the same general warm-up followed by passive stretching of the lower extremities and the trunk, whereas third and final treatment stretching protocol consisted of passive stretching alone without any jogging. Passive range of joint motion was examined in hip flexion, and trunk flexion using a goniometer and flexometer. The general warm-up session induced a significantly increased range of motion only at the ankle dorsiflexion joint \((P<0.05)\). Results also suggests that passive stretching alone and passive stretching after a general warming-up bout both induced a significantly increased range in all lower extremity joints and trunk flexion \((P<0.001)\). Improvements in flexibility are observed after passive muscle elongation irrespective of warm-up.

Numome H, Asai T, Ikegame Y, Sakurai S\textsuperscript{32} study was to identify the kinetic aspect of side foot and instep soccer kicks to


understand the different mechanics underlying the two kicks. The motions of both kicks were captured using a three dimensional cinematographic technique. The kicking leg was modeled as a three link kinetic chain composed of thigh shank, and foot, from which joint torques and angular velocity were computed. The ball velocity of the side-foot kick (23.4+/−1.7 m/s (-1) was significantly slower than that of the instep kick (28.0+/−2.1 ms(-1). Significant differences were also observed between the two kicks for the magnitude of hip external rotations torque (56+/−12 N. m in the side foot kick; 33+/−8 nm in the instep kick) and hip external rotation angular velocity (11-1+/−2.4 rad×s(-1) in the side foot kick 6.0+/−2.0 rad ×cs (-1) in the instep kick. These result indicated that to hit the ball with the medial side of the foot, a complicable series of rotational motions are required for the side food kick. The hip external rotation of high shank plane at the later stage of kicking. This may allow the hip external rotation motion to increase directly the forward velocity of the side foot, with which players can squarely impact the ball.

Brophy RH, Brakus SI, Pansy BS, Lymon S, and William RJ\textsuperscript{33} to quantify phase duration and lower extremity muscle activation an

alignment during the most common types of soccer kick the instep kick and side foot kick. A second purpose was to test the hypothesis that different patterns of lower extremity muscle activation occur between the 2 types of kicks and between the kicking limb compared to the support limb. Soccer players are at risk lower extremity injury rascally at the knee. Kicking the soccer ball is an essential common and distinctive part of soccer player activity that plays a role in soccer players injury. Thirteen male soccer players underwent video motion analysis and electromyography (EMG) of 7 muscle in both the kicking and supportin extremity (iliacus, gluteus, medius, vastus, lateralizes, vastus medicalis, hamstrings, gastrocnemous) and 2 additional muscle is the kicking limp only (hip adductors, tibialis anterior). Five instep and 5 side-foot kicks were recorded for each player. Analysis of variance models were used to compare EMG activity between type of kicks and between the kicking and non kicking lower extremity. Five phase of kicking were identified (1) preparation (2) backswing (3) limb locking (4) acceleration and (5) follow through. Comparing the kicking limb between the 2 types of kick significant interaction effects were identified for the hamstrings (p=.02) and the tibialis anterior (P=.01). Greater activation of the kicking limb iliacus (p<.01) gestroenemius (p<.01) vastus medics (P=0.016), and hip adductors (p<.01) occurred
during the instep kick. Significant differences were seen between the kicking limb and the support limb for all muscles during both types of kick. Certain lower extremity muscle groups face different demands during the soccer instep kick compared to the soccer side-foot kick. Similarly the support limb muscles face different demands than the kicking limb during both kicks. Better definition of lower extremity function during kicking provides a basis for improved insight in to soccer player’s performance, injury prevention and rehabilitation.

Massuda K, Kikuara, Demura S, Katsuta S, and Yamanaka K,34 study was carried out to examine relationship between muscular strength and ball velocity with respect to 3 different approach angles and focusing on both the kicking leg and the supporting leg among soccer players of different skill level. Fourteen university soccer players were divided in to 2 groups (Superior groups, average groups), and kicked the ball with maximal effort towards a target 15 m away. The angles of approach to the stationary ball varied in 3 directions (free, 1.57, 2.36 rad to the kick direction). Mean ball velocity and the success rate to striking the target with the ball were measured.

Maximal isokinetic and concentric muscular strength was measured in terms of motions of the knee Ext./Flex, hip ext/flex and hip abd/add using and isokinetic dynamometer. The mean ball velocity at free and 1.57 rad approach angles related significantly with hip add but not with knee exit strength for the kicking leg. In contrast, the ball velocity at an approach angle of 2.36 rad significantly correlated with knee ext and hip flex of the kicking leg. Although ball velocity at the free and the 1.57 rad approach angles showed no relation to strength of the supporting leg, the ball velocity at the 2.36 rad approach angle showed significant relationship with knee flex, hip extend hip, abd strength of the supporting leg. Furthermore, the superior group had more strength variables related to performance than the average group. Different approach angles would alter the requirement on muscle strength potential of both kicking and supporting leg during kicking. Especially and angled approach to the kick direction could require greater hip extension and abduction strength on the supporting leg for a higher capability for stabilization body balance. Besides, skill level may alter the importance of muscle strength requirement to kick performance.

Saliba L and Hnyszomalii C,\textsuperscript{35} the relationship between lower

limb strength and two Australians football (AF) skills were assessed for 19 sub-elitel AF players. Knee extension (KE) and Knee Flexion (KF) strength were assessed during a biodex, Isokinetic Dynamometer at angular velocities of 60, 240 and 360 degree. The two AF skills evaluated were running vertical jump (VJ) and kicking performance (KP). VJ performance was defined as the maximal jump height measured with a yard stick device. KP was gauged through video analysis, as the post contact resultant ball velocity (BU) during maximal effort drop punt kicking. Strength was measured as the isokinetic peak torque (PT value) no significant correlation were detected between the isokinetic knee strength values and maximal kicking velocity. Low to moderate significant correlations (r=0.55-0.69, p<0.05) were detected between the isokinetic measured and UJ height. It may be inferred that additional strengthening of the knee musculature may enhance running UJ performance, but not necessarily kicking velocity for this group of sub-elitel AF players.

Rahnama N, Lee A and Bambaeciochi E\textsuperscript{36} study was designed to determine whether asymmetry in strength and flexibility are present (age 23.4+/-.3.8 years; height 1.81+/-.06 m; body mass 81.7+/-.9.9 kg)

\textsuperscript{36} N Rahnama, A Lee & E Bambaeciochi, “Comparison of Muscle Strength and Flexibility between the Preferred and Non-preferred Leg in English Soccer Players,” \textit{Ergonomics} 2005 Sep 15 Nov 15, 48 (11-14) 1568-75.
were studied data are presented as meant (+/-SD). The dynamics strength of knee flexors (hamstring) and knee extensors (quadriceps) was measured using an isokinetic dynamometer at angular velocities of 1.05, 2.09, 5.23 ready (in a concentric mode) and 2.09 ra/s (in a eccentric mode). The concentric strength ratio (hamstrings (cone) quadriceps) (cone) were computed. Hip joint flexibility (in flexion) was measured using a goniometry. A significant difference between the preferred and non-preferred leg was found in the knee flexors at 2.09 rad/s (119 +/- 22 versus, 126 +/- 24 Nm; P<0.05) and for the dynamics control ratio (0.79 +/- 0.13 versus 0.84 +/- 16 Nm; P>0.05).

Siegler J, Gaskill S and Ruby B^{37} study was to evaluate changes in soccer specific power endurance of 34 female high school soccer players throughout a season either with or without on intermittent, high intensity exercise protocol. Thirty four female high school soccer players were tested prior to the 2000 fall season and again 10 week later. The tested included an abridged 45 minute shuttle test (IST), hydrostatic weighing, vertical jump, 20 m running start spring, and 30 second wingate test. The experimental group (EG; n=17, age 16.5 +/- 09 years) completed a 10 week in season plyometric, resistive training,

and high intensity anaerobic program. The control group (n=17, age 16.6+/-.1.4 years) completed only traditional aerobic soccer conditioning statistical significance was set at alpha <0.05. The experimental group showed significant improvements in the LIST (EG=delta 394 seconds +/-124 second), 20-m sprint (EG=delta 1.14 kg+/-.10 seconds), increase in fat free mass (EG= delta 1.14 kg +/-1.22 kg), and decrease in fat mass (ET=delta ~ 1.40 kg +/-1.47 kg) comparing pre to post season. This study indicates that a strength and plyometric program improved power endurance and speed over aerobic training only. Soccer specific power endurance training may improve match performance and decrease fatigue in young female soccer players.

Spinks CD, Murphy AJ, Spinks WL and Lockie RG, study examined the effect of resisted sprint (RS) training (weighted sled towing) on accelerating performance (0-15 m). Leg power (countermovement jump (CM), 5-bound test (5 BT) and 50-cm drop jump (5 DJ), gait (foot contact time, stride length, stride frequency, step length a flight time) and joint (shoulder, elbow, hip and knee) kinematic in men (N=30) currently playing soccer, rugby union or

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Australian football. Gait and kinematic measurements were derived from the first and second strides of an acceleration effort. Participant were randomly assigned to 1 to 3 treatment condition. (a) 8 week sprint training of two session × wk (-1) plus RS training (RS group, n=10), (b) 8 week non-resisted sprint training program (a) significantly improves acceleration and leg power (CM and 5 BT) performance but is no more effective that 8 week NRS training program, (b) significantly improves reactive strength (50 DJ), and (c) has minimal impact on gait and upper and lower body kinematics during acceleration performance compared to as 8 week NRS training program. These findings suggest that RS training will not adversely no more effective than NRS training, this training modality provides an overload stimulus to acceleration mechanics and recruitment of the hip and knee extensors, resulting in greater application of horizontal power.

Newman MA, Tarpenning KM and Marino FE\textsuperscript{39} study was to examine the relationships between leg strength, single-sprint speed, and repeated sprint ability. Thirty-eight football players form 3-codes (soccer, rugby league, rugby union) completed a 12-×20 m repeated

sprint protocol and were evaluated for peak isokinetic knee extension and flexion torque at of regress. S (-1), 150 degrees, S (-1), and 240 degrees S(-1). Although single-sprint performance correlated with peak extensor and flexor torque at all velocity, the strongest correlation was observed between relative knee extensor torque at 240 degrees. S(-1) and initial acceleration phase (0-10 m) of the data suggest that factors other than strength contribute to repeated sprint ability. This finding provides new evidence in elevating the relationship between strength and repeated sprint performance.

Mercer TH, Gleeson NP and Wren K\textsuperscript{40} study investigated the effect of an acute, prolonged intermittent, high-intensity single-leg pedaling exercise tack (PIHIET) on the isokinetic leg strength of the knee flexors in six male and seven female collegiate soccer players. Following determination of single-leg VO (2 peak), subjects completed a PIHIET designed to simulate the energetic of soccer match play (approximately 90 min in total; approximately 70% single leg VO (2 peak) pre-mind and POS PIHIET gravity correlated indices of knee flexion peak torque (PT) and range of motion – relativized torque at 15% of knee flexion (RRT 15%); 0%. Full knee extension were

\textsuperscript{40} TH Mercer, NP Gleeson & K Wren, "Influence of Prolonged Intermittent High-Intensity Exercise on Knee Flexor Strength in Male and Female Soccer Players", \textit{European Journal Applied Physiology} 2003 June 89 (5) 506-8.
assessed at a lever-arm angular velocity of 1.05% rad, s(-1) for intervention and control limbs using an isokinetic dynamometer. Repeated measures ANOVAS revealed significant condition (PIHIET contro) × time (pre-mind-post PIHIET) interactions for knee flexion PT/F (2, 22) = 26.2 P<0.001) and RRT (15%) F (2, 22)=20.1, P<0.001). Flexion PT and RRT (15%) were observed decreased, pre to post intervention, from 92.8 (28.7) Nm to 72.1 (28.0) N.m and from 33.8 (17.5) Nm to 47.9 (18.4) Nm respectively, for the intervention imp alone. These data corresponded to 22.3% and 24.9% mean reduction pre-post intervention in PT and PRT (15%). Exploratory post hoc analysis of the pattern of the relative deterioration (%) of PT and PRT (15%), for the intervention limb alone, revealed a three-way interaction [group (male, female) × parameter (PT, RRT 15%) × assessment phase (pre to mid-PIHIET, mid to post PIHIET] (F 1311)= 12; P<0.05) This interaction characterized a greater deterioration of trength performance during the mid-to-post – PIHIET assessment phase, at the extremes of range of range of motion – post phase trength loss observed in woman near the end-range extension may potentially be implicated in the higher incidence of knee injury reported in female soccer players.
Zakes A\textsuperscript{41} study was to examine the strength balance in the extensor and flexor muscle groups as well as the hamstring to quadriceps (H/Q) ratios of both legs in professional soccer players with dominance on one or both legs. Forty two professional soccer players of the first Greek division participated in this study. Participants were divided into 3 groups according to their leg use during training seasons and matches. Fifteen players comprised the first group with dominance to the right leg. 12 players formed the second group with dominance to the left leg, and 15 players consisted the third groups with dominance to both the right and left legs. Maximum voluntary concentric torque of the hamstring and quadriceps muscles of both legs was assessed using a norm isokinetic dynamometer at angular velocities of 12 degrees, 66 degrees 150 degrees and 300 degrees No significant.

Difference in the strength balance found between the groups. The isokinetic variables comparing the right and left body side in each group, with dominance on one or both legs, did not differ. No difference were recorded in the H/Q between the right and left legs for any of the subjects groups.

\textsuperscript{41} A Zakes, "Bilateral Isokinetic Peak Torque of Quadriceps and Hamstrings Muscle in Professional Soccer Players with Dominance on One or Both Two Side," \textit{Journal Sports Medicine Physical Fitness} 2006 March; 46 (1) 28-35.
Kellis E, Katis A & Gissi I,\textsuperscript{42} was conducted the study, Ten male soccer players performed maximum kicks from 0 rad (KO), 0.81% rad (45) and 1.62 rad (K 90) angle between the players starting position and position of the ball- GRF data and 3-D kinematics and EMG activity of the vastus medial (VM), vastus lateralis (VL), and biceps femories (BF) muscle of the lower leg were recorded. Compared with K 9, K 90 and K 45 demonstrated higher medial and posterior GRF and lower anterior TRF. K 90 and K 45 also demonstrated higher external rotation displacement, maximum flexion, internal rotation abduction and adduction velocity, velocity of the tibia relative to the femur of the supporting leg compared with KO (P<0.01). The BF EMG, before and immediately after ground contact was also higher in K 90 and K 45 compared with KO (0.01), so soccer kicks using a high angle of approach increase the medial and posterior TRF which is indicative of an altered stance during kick, resulting is an altered balanced. Such kicks are accompanied by significant alteration in knee joints kinematics and on from an angled approach may induce significant loads to knee joint structure of the support leg.

\textsuperscript{42} E Kellis, A Katis & T Gissis, "Knee Biomechanics of the Support Leg in Soccer Kick from Three Angles of Approach," Medical Science Sports Exercise; (2004 June; 36 (6); 1017-29
Ford P, Hodges N J, Huges R & William AM.,\textsuperscript{43} the importance of action effects for the performance of a soccer kick was performed. Novice, intermediate and skilled players performed a soccer chip task with the intentions of getting the ball over KR height barrier to a near or far ground-level target under three conditions: Full vision, no vision following ball contact with and without knowledge of result (KR). The removal of vision of the ball trajectory resulted in increased radial error irrespective of the presence of KR but in a skill-level and target dependent manner. At the near target novice participants relied on ball transaction information. Intermediate performers were attached by it removal across both target conditions whereas skilled participants were not affected by the removal of the ball vision variability in knee-angle coordination significantly decreased when vision of the ball trajectory was removed irrespective of KR and skill level. Although across skill level there was evidence that action-effects information is used to execute the action when it is available only at the lower levels of skill did this information aid outcome attainment. There was no evidence suggest that with increasing skill the dependence of this information increase.

Davids K, Lees A, & Burawith L. the role of motor control and biomechanics in developing on understanding of soccer skill using kicking as the main vehicle. The link between these sub-disciplines of support science have not been well established in the past because of an emphasis on cognitive process in traditional accounts to motor behaviours. We argue that a dynamical systems interpretation of the processes of coordination and control in movements with multiple degrees of freedom signals a new era in the relationship between the sub-discipline of motor control and biomechanics/Although research on co-ordination and control soccer skill in currently sparse, these are indications that the relationship between motor control and biomechanics could from significant component of scientific programmes in talent identification and skill development. Further interdisciplinary work is needed to enhance understanding of coordination and control of soccer skill.

Reilly T, and Gillbourne D over the last two decades there has been a growth in research directly related to football. Although most of this research in focus on soccer (association football) there has been a


study increase in publications related to the other football codes. There is evidence of more systematic training and selection influence the anthropometric profiles of players who compete at the highest level. Fitness is being optimized to cope with match demands while accommodating the need for specific requirements of positional roles. There is evidence of work rate being higher in contemporary football game than in previous decades, with consequences for training and dietary practice. Notation analysis of action during matches is now used regularity to provide deleted objective few back on performance to players and coaches. Training regiments are designed for game – specific purpose where possible sports psychologists working in a football context have a more eclectic body of knowledge to drawn from. In the professional soccer clubs, the rewarded associated with a successful investment is youth academies have helped to focus attention on talent identification and development models. It is a challenge to those specializations is science and football to contribute to the success of such schemes.

Christou M, Similios I Sotiropoulos K, Volaklis K, Piliandis T and Tokmakidis SP\textsuperscript{46}, study examined the effect of a progressive

resistance training programme in addition to soccer training on the physical capacities of male adolescents. Eighteen Soccer players (age 12-15 years) were separated in a soccer (SOC; n=9) and a strength- = soccer (STR; n=9) training group and 8 subjects of similar age constituted a control group. All players followed a soccer training program 5 times a week for the development of technical and tactical skill. In addition, the STR groups followed a strength training program twice a week for 16 weeks. The program included 10 exercise, and at each exercise, 2-3 set of 5-15 repetitions with a load 55-80 Y of I repetition maximum (IRM). Maximum strength (IRM) leg press, bench press, jumping ability (squat jump) (SJ) counter movement jump (CM), repeated jumps for 30 seconds, running speed (30 m, 10x5 m shuttle run) flexibility (seat and reach), and soccer technique were measured at the beginning, after 8 weeks and at the end of the training period. After 16 weeks of training, IRM leg press, 10x5 m shuttle run speed and performance in soccer training alone improve more than normal growth maximum strength of lower limbs and agility. The addition of resistance training, however, improves more maximal strength of the upper and lower body, vertical jump height, and 30-m speed. Thus the combination of soccer and resistance training could for an overall development of physical capacities of young boys.
Little T, and William AG,\textsuperscript{47} the purpose of this study was to
examine the effects of different modes of stretching with in a pre-
exercise warm-up on high speed motor capacities important to soccer
performance. Eighteen professional soccer players were tested for
countermovement vertical jump, stationary 10 m sprint, and agility
performance after different warm-ups consisting of static stretching,
dynamics stretching, or no stretching. There was no significant
difference among warm-ups for the vertical jump; mean+/−SD data
were 40.4+/−4.9 cm (no stretch), 39.4+/−4.5 cm (static) and 40.2+/−4.5
cm (dynamic). The dynamic stretch protocol produced significantly
faster 10 m sprint times than did the no-stretch protocol: 1.83+/−0.08
seconds (no stretch), 1.85+/−0.08 second (static), and 1.87+/−0.09
seconds (dynamic). The dynamic and static stretch protocols produced
significantly faster flying 20-m sprint times than did the number stretch
protocol; 2.41+/−0.13 seconds (no-stretch), 2.37+/−0.12 seconds (static)
and 2.37+/−0.13 second (dynamic). The dynamic stretch protocol
produced significantly faster agility performance than did both the
number stretch protocol and the static stretch protocol: 5.20+/−0.16
seconds (no stretch), 5.22+/−0.18 seconds (static) and 5.14+/−0.17

seconds (dynamic). Static stretching does not appear to be detrimental to high speed performance when included in a warm-up for professional soccer players. However, dynamic stretch during the warm-up was most effective as preparation for subsequent high-speed performance.

Severlsbergh GJ Williams AM, Van Der Kamp J, and Ward P, used a novel methodological approach to examine skill-based difference in anticipation and visual search behaviour during the penalty kick is soccer. Expert and novice goal keepers were required to move a joystick in response to penalty kicks presented on film. The proportion of penalties saved was assessed, as well as the frequency and time of initiation of joystick correlations visual search behaviour was examined using as eye movement registration system. Expert goalkeepers were generally more accurate in predicting the direction of penalty kick, waited long before initiating a response and made fewer corrective movements with the joy stick. The expert goalkeepers used a more efficient search strategy involving fewer fixations of longer duration to less disparate areas of the display. The novice spent longer fixating on the trunk, arms and hips whereas the experts found the

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kicking leg. Non-kicking leg and ball areas to be more informative, particularly as the movement of football contact approached. No difference in visual search behaviour were observed between successful and unsuccessful penalties. The results have implications for improving anticipation skill at penalty kicks.

Williams AM, David K, Burawits L and William JG,\textsuperscript{49} study investigated will-based differences in anticipation and visual search, strategy within open-day situations in soccer. Experienced (n=15) and in-experienced (n=15) subjects were required to anticipate pass destination from filmed soccer sequences viewed on a large 3m × 3m video projection screen. MANCOVA showed that experienced soccer players demonstrated superior anticipatory performance univariate analyses revealed between group differences in speed of response but not in response accuracy. Also, inexperienced played fixated more frequently on the ball and the players passing the ball, whereas experienced players fixated on peripheral aspects of the display.

Such as the position and movements of the other players. The experienced players fixated on significantly more locations than their inexperienced counterparts. Further differences were noted in search

rate, with experienced group’s higher search rate contradicted previous research. However, this resulted from using 11 to 11 film sequence, which were never previously sued in visual search research. The increased frequency of eye fixations was regarded as being more advantageous for anticipating pass destination during open play in soccer. Finally a number of practical implications were highlighted.

Nagao T, Kato T, Fukuda T, study analyzed visual search strategies of soccer players in one-on-one defensive situations on the field. The Subjects were 4 experts and 4 novices, while subjects tackled and offensive players for possession of the ball, their eye movements were measured and analyzed statistically significant differences between the visual search strategies of experts and novices showed experts fixated more often on both the knee and the hip regions of opponents than novices did. They suggest that information gained from the movements of these areas was important in anticipating an opponent’s next move. Finding suggests the importance in soccer for players not to focus too closely on the ball, but on an opponent’s knee and kip.

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Nagano T, Kato T & Fukuda T\textsuperscript{51}, study was analyzed the visual behaviours of soccer players while they kicked with the inside of the foot, which involved near and for aiming skills. Participants (n=8) were required to step forward and kick a ball to hit a target. The top three scores were defined as the low score group. Analysis indicated that the high score group was characterized by longer quiet eye durations which were defined as the final fixation which were defined as the final fixation durations of the target prior to the preparation phase. The high-score group also set their visual pivot as the frontal space between the target as the ball in the kicking phase. These two visual behaviours of the high-score group are important for soccer players to kick a ball successfully with the inside of the foot.

Vaeyens R, Lenoir M, William AM, Mazyn L & Philippaerts RM\textsuperscript{52} were examined differences in visual behaviour and decision making skill across different microstates of offensive play in soccer using youth participants (13.0-15.8 years) varying in skill and experience. We used realistic film simulations of offensive play, movement based response measures and an eye movement registration


technique. Playing experience, skill level, and the unique constraints of the task, expressed by the number of players and relative proportion of offensive and defensive players, determined both the observed search behaviours and processing requirement imposed on players in dynamic offensive team simulations. Significant differences in performance were observed between players and non-players and across three groups of soccer players who differed in skill level. Implications for talent identification and development are considered.

Helgerud J, Engen L C, Wisloff U, & Hoof J\textsuperscript{33} study was conducted on Nineteen male elite soccer players age 18.1 +/- 0.8 yr, randomly assigned to the training group (N=9) and the control group (n=10) participated in the study. The specific aerobic training consisted of internal training, four times 4 min at 90-95\% of maximal heart rate, with a 3 min jog in between twice per week for 8 week. Players were monitored by video during two matches, one before and one after training. In the training group; (a) maximal oxygen uptake (VO\textsubscript{2} max) increase from 58.1 +/- 4.5 ml x kg (-1) to 64.3 +/- 3.9 ml x kg (-1) x Min (-1) (P<0.01); (b) Lactate threshold improved from 47.8 +/- 5.3 ml x kg (-1) x Min (-1) to 55.4 +/- 4.1 ml x kg (-1) x Min (-1) (P<0.01); (c)

Running economy was also improve by 0.7% (P<0.05) (d) Distance covered during a match increased by 20% in the training group (P<0.01); (e) Number of sprints increased by 100% (P<0.01) (f) Number of involvements with the ball increase by 24% (P<0.05); (g) the average work intensity during soccer match measured as percent of maximal heart rate, was enhanced from 82.7+/-3.4% to 85.6+/-3.1% (P<0.05) and (h) no charges were found in maximal vertical jumping height, strength speed, kicking velocity, kicking precision, or quality of passes after the training period. The control group showed no changes in any of the tested parameters. Enhanced aerobic endurance in soccer players improved soccer performance by increasing the distance covered enhancing work intensity, and increasing the number of sprints and involvements with the ball during a match.

Mohar M, Krstrup P & Bangsho J, study was to asses physical fitness, match performance and development of fatigue during competitive match at two high standards of professional soccer. Computerized time-motion analysis were performed 2-7 time during the competitive season on 18 top class and 24 moderate professional soccer players. In addition the players performed the Yo-Yo

intermittent recovery test. The top-class players performed 28 and 58% more (P<0.05) high intensity running and sprinting, respectively, than the moderate players (2.43+/-.14 Vs 1.90+/-.02 km and 0.65+/-.06 Vs 0.40+/-.06 km respectively). The top class players were better (11%; P<0.05) on the yo-yo intermittent recovery test than the moderate players (2.26+/-.08 Vs 2.04+/-.06 km respectively). The amount of high intensity running, independent of competitive standard and playing position, was lower (35-45%; P<0.05) in the last than in the first 15 minute of the game. After the 5 minute period during which the amount of high intensity running peaked, performance was reduced (P<0.05) by 12% in the following 5 min compared with the game average substitute players (n=13) covered 25% more (P<0.05) ground during the final 15 min of high-intensity running was 9.2% between successive match, whereas it was 24.8% between different stage of the season. Total distance covered and the distance covered in high-intensity running were higher (P<0.05) for modified players and full-back and attackers than for defenders. Attacker and full back covered greater (P<0.05) distance in sprinting than modifiers players and defenders. The midfielder players and full back covered a greater (P<0.05) distance than attackers and defenders in the YO-YO intermittent recovery test (2.23+/-.10 and 2.21+/-.04 Vs 1.99+/-.11
and 1.94+/−0.12 km respectively. The result show that top class soccer performed more high intensity running during a game and were better at the YO-YO test than moderate profession players; (2) fatigue occurred towards the end of matches as well as temporarily during the game, independently of competitive standard and of team position; (3) defender and attacker had a poorer Yo-Yo intermittent recovery test performance than midfielders and full back; and (5) large seasonal changes were observed in physical performance during matches.

Chow J Y, Davids K, Button C & Koh M55 was study. Four male participants practiced a soccer chipping task to seven different target positions over 12 sessions for 4 weeks. Data from each participant indicated changes in degrees of freedom involvement as a function of practice. Further, each participant showed a different progression of change in levels of joint involvement for hip, knee and ankle in the kicking limb. Cross correlations between joints in the kicking limb also showed different pathways of coupling and decoupling with practice performance outcomes scores improved and variability of intralimb coordination decreased as consequences of practice for all participants. Angle angle plots showed qualities

55 J Y Chow, K Davids, C Button & M K Oh, "Coordination Changes in a Distance Multi-Articular Action as a Function of Practice". Acta Psychologica (Amst) 2007 June 5: (Epub ahead of print)
changes in introlimb coordination between early and late practice sessions. Evidence suggested that foot velocity at ball contact was functionally manipulated by participants when kicking to target positions with varying height and distance constraints. Referencing data to a model of learning (Newell, KM 1985). Coordination, control and skill. In Goodman, D Franks, I & Wilberg, R B (EDS), differing perspectives in motor learning memory, and control. Amsterdam; North-itolland P. 295-317) determined that progression through different stages of learning may not be sequential and could alternate individual difference in acquisition of coordination and control of joint even under similar task constraints, showing how degeneraly in movement systems facilities learning.

Hawland E, Hoff J, experiment was to evaluate bilateral motor performance effects from training the non-dominant leg of competitive soccer players. The subjects were 39 soccer players 15-20 years of age, performance-matched and randomly divided into a training group (n=18) and a control group (n=21) both belonging to the same team. Both groups were tested by using two standardized foot-tapping tests and three soccer specific tests. The training intervention consisted of

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the experimental group participating in all parts of their soccer training except full play, using the non-dominant leg for 8 weeks, statistical analysis for the soccer specific tests revealed that the experimental group improved significantly as compared to the trained non-dominant leg. Somewhat unexpectedly, the experimental group also improved significantly in the tests, which made use of the dominant side. The standardized foot-tapping tests revealed similar results. The results might be explained by improved generalized motor programmers, or from a dynamic system approach, indicating that the actual training related to the handling of all the information available to the subjects in the situation, and that the body self-organized the motor performance.

Kotzamakis C, Chatzopoulos D, Michalidis C & Papaiakouvou, study was investigated the effect to combined heavy resistance and running speed training program performed in the same training session on strength, running velocity (RV), and vertical jump performance (VJ) of soccer players. Thirty five individual were divided in to 3 groups. The first group (n=12, com group) performed a combined resistance and speed training programme program at the same training session, and the second one (n=11, STR group)

performed the same resistance training without speed training. The third group was the control group (n=12, con group). The jump tests were used for the evaluation respectively. After training, both experimented groups. Significantly improved their IRM of all tested exercise. Furthermore, the COM group perform significantly better than the SIR and the CON groups the 3-m das squat jump and countermovement jump. It was concluded that the combined resistance and running speed programmed provides better results than the conventional resistance training regarding the power performance of soccer players.

Hoffman J R, Ratamess N A, Cooper J J, Kang J, Chilokes A & Faigenbaum A D,\(^{58}\) study was to explore the effects of 5 weeks of eccentrically loaded and un-loaded jump squat training in experienced resistance trained athlete during the straight/power phase of a 15 week periodized off season resistance training programme. Forty-seven male college football players were randomly assigned to 1 to 3 groups. One groups performed the jump squat exercise using both concentric and eccentric phase of contraction (CE; n=15). A second group performed the jump squat exercise using the concentric phase only (n=16) and a

third group did not performed the jump squat exercise and served as control (CT; n=16). No significant difference between the groups, were seen in power, vertical jump height, 40 yard srient speed and agility performance. In addition no differences between the groups were seen in integrated electromyography activity during the jump squat exercise. Significance difference between the CE and CT groups were seen in Delta IRM squat (65.8 and 27.5 kg, respectively) and Delta IRM power clean (25.9 and 3.8 kg, respectively). No other between group difference were observed. Results of this study provided evidence of the benefits of the jump squat exercise during a short-duration (5 week) training program for eliciting strength and power gains. In addition, the eccentric phase of this ballistic movement appears to have importantly implications for eliciting these strength gains in college football players during on off-season training programme. Thus coaches incorporating jump squats (Using both concentric and eccentric phase of contraction) in the off season training programmes of their athletes can see significant performance improvements during relatively short duration of training.

Diallo O, Dore E, Duchê P, & Van Praagh E\textsuperscript{59} study was to

examine the effectiveness of plyometric training and maintenance training on physical performance in prepubescent soccer players. Twenty body age 12-13 years was divided into two groups (10 in each) Jump Group (JG) and Control Group (CG), JG trained 3 days/week during 10 weeks, and performed various plyometric exercise including jumping, hurdling and skipping. The subsequent reduced training period lasted 8 weeks. However all subject continued their soccer training. Maximal cycling power (p max) was calculated using the following tests; Counter Movement Jump (CMJ), Squat Jump (SJ), Drop Jump (DJ), Multiple 5 bounds (MBS) and repeated rebound jump for 15 seconds (RRJ 15). Running velocities included: 20, 30 and 40 m (V20, V30, V 40 m). Body fat percentage (BF percent) and lean leg volume were estimated by anthropometry. Before training except for BF percent, all baseline anthropometric characteristics were similar between JG and CG. After training programme, P max (P<0.01), CMJ (P<0.01), SJ (P<0.05), MBs (P<0.01), RRJ 15 (P<0.01) and VO2m (P<0.05), performance increase in the JG. During this period no significant performance increase was obtained in the CG. After the 8 week of reduced training except Pmax (P<0.05) for CG any increase was observed in both group. These results demonstrate the short term polymetric training programmes increase athletic performance in
prepubescent boys. These implements were maintained after a period of reduced training.

Aziz AR, Chia M, & The K C⁶⁰ study was to examine the relationship between maximal oxygen uptake and repeated sprint performance in field hockey and soccer players. Experimental design a descriptive study on the aerobic – an aerobic performance of intermittent team game players. The study was conducted at the Sports Medicine Research Centre Participants; forty male national team game players (22.6 +/- 4.2 years; 1.73 +/- 0.07 m and 63.7 +/- 6.2 kg) were involved in the study. Measures: all subjects completed a tread mill run test to exhaustion to determine maximal oxygen uptake and 8x40 m sprint either on the field or running track to determine repeated sprint ability performance. Body mass normalized maximal oxygen uptake of 58.0 +/- 4.9 ml x kg (-1) x min (-1) of the group is comparable to values reported in the literature for team game players. No significant correlations were established between the fasts 40 m sprint time and maximal oxygen uptake (r=0.21 and -0.08, P>0.05). Moderate correlations are established between maximal oxygen uptake and total time for the eight sprints (r=-0.346 and -0.323; P<0.05). Maximal

oxygen uptake was not correlated with the faster 40 cm sprint time but was moderately correlated with total spring time. Since has shared variance between maximal oxygen uptake and total sprint time was only 12%, improving aerobic fitness further will only be expected to contribute marginally to improving repeated sprint performance of the team game players. It remains possible that a high level of aerobic fitness enhances other aspects of match play in game like soccer and hockey.

AL-Hazzaa HM, Almuzaini K, A Refaees SA, Sulaiman MA, Defterdar MY, AL-Ghamedi A, & AL-Khuraiji KN was examined with Twenty three outfield elite soccer players representing the Saudi national team participated fat percentage were: 25.2 +/- 2.3 years; 73.1 +/- 6.8 kg; 177.2 +/- 5.9 cm; and 12.3 +/- 2.7% respectively. Cardio respiratory parameters, including maximal oxygen uptake (VO2 max), were assessed by open circuit spirometry during grade treadmill running. Anaerobic power measuring were obtained using wingate anaerobic tests and included peak power (PP), and average power for 5 sec (AP5), 10 sec (AP10) 20 sec (AP20) and 30 sec (AP30). Mean (+/- SD) values for VO2 max in absolute and relative to body mass were

4.16+/−0.341 max×min−1 and 56.8+/−4.8 ml×kg−min−1 respectively. Such VO2 max value was 118% and 80% of those reported for Saudi college mates and distance runners, respectively. The ventilator anaerobic threshold (tevent) average 43.6 ml kg−1×min−1. There were no significant difference in VO2 max and tevent between players based on positions, although the midfielders and the center back had the highs and the lowest individual values for both measures, respectively, values (+/−SD) of PP and AP 30 were 873.6+/−141.8 (11.88+/−1.3 ws×kg−1), respectively. Only in absouled PP & AP 30 were the center back significantly superior to the other players. In addition, VO2 max was inversely reported to (r=−0.54; p<0.05) and positively related to AP 30 (r=−0.45; p<0.05). The aerobic power mass of Saudi elite soccer player was in the lower range of values normally reported in the literatures for elite soccer player. Both AP and AP 30 were somewhat lower than values previously reported for elite soccer player from other countries.