36. SKILL LEARNING

P-119 Backward cutting in soccer players

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OBJECTIVE The specific movements in soccer include not only forward movement, but also various movements to different directions such as backward running, side step, cutting and so on. Defenders specifically respond to attack from offensive players by backward cutting, which is rather difficult skill on soccer game. However, the intensive study about a backward cutting was not found in previous researches. The aims of this study were to analyze the important factors of the backward cutting with the ordinary two- dimensional motion analysis system and to analyze the backward cutting of the real game situation with a new model-based imaging matching technique.

METHODS Seventeen male in collegiate soccer players performed front-step cutting and back-step cutting. Time and cutting motion on each cutting trial was recorded. A defensive soccer player was recorded, especially the response with backward cutting to offensive attacks, by three DV cameras in game situation. The landmark of surroundings and the skeleton model were conformed to the video footage (Figure 1).

Figure 1. Matched skeleton model to the background video footage.

RESULTS The recorded time and the ground contact time of cutting phase in back-step cutting were much longer than those in front-step cutting. Also, a lack of stability of upper body was observed in back-step cutting compared with in font step cutting (Table 1). With the model-based image matching technique, joint angles trajectory of a backward cutting could be obtained even in the real game situation.

Table1. Amount of tilt change of upper body on frontal plane (°).

	impact absorption phase	**propulsion phase**
front-step cutting	1.8±1.1	8.5±5.9
back-step cutting	7.2±6.3 *	9.1±6.5

* Indicated significant ($p < 0.01$) from front-step cutting

DISCUSSION The ground contact time in back-step cutting had the tendency to depend not on the muscle power but on the core body balance. This result indicated that the stability and balance training of the body and upper extremity may improve the skill of the backward motion of the players. In addition, a model-based image matching technique would be useful to get in-depth data about sports performance in real sport scenes.

KEY WORDS Backward cutting, skill, motion analysis.

P-120 Microstructure of effective practice: nature of instruction process in soccer

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OBJECTIVE Effective instruction is crucial to the pursuit of optimal sporting performance. Researchers have shown that coaches use similar behaviours when dealing with elite performers (Potrac et al,, 2002). However, few studies have examined how coaches altered their behaviour due to the learner's age, skill level or form of the practice activity. This study examined the coaching behaviours employed on players of different age and skill levels during various forms of practice activities.

METHODS Instructional behaviours of coaches were assessed at three skill levels (elite, sub elite, recreational). Coaching sessions (n = 81) covering three age groups (9, 13, 16 years) were analysed. Behaviours were analysed using a validated observation instrument. Percentage and rate per minute were calculated and analysed using Group (elite, sub elite, recreational) x Age (9, 13, 16) ANOVAs.

RESULTS Coaches used praise more often with elite players and were less likely to be silent when working with sub-elite and recreational players. Elite players received less concurrent instruction compared to recreational players, $p < .05$.The use of management behaviours, pre instruction, and silence increased proportionally with player age, $p < .05$.

Table 1. Behaviour categories and definitions of the behavioural categories

Activity	Definition
1. Pre-Instruction	Initial information given to a player(s) preceding the desired action to be executed. It explains how to execute a skill, play, or strategy.
2. Concurrent Instruction	Cues or reminders given to a player (s) during the actual execution of the skill or play.
3. Post Instruction	Correct, re-explanation, or instructional feedback given after the execution of the skill or play.
4. Management	Verbal statements related to the organisational details of practice sessions, not referring to cognitive strategies or skill-based fundamentals.
5. Modelling	Provision of a demonstration of correct or incorrect performance of a skill or playing technique.
6. Questioning	Any question to player concerning strategies, techniques, assignments, and so forth associated with the sport.
7. Praise	Verbal or non-verbal compliments, statements, or signs of acceptance towards the players.
8. Scold	Verbal or non-verbal compliments, statements, or signs of displeasure towards the players.

DISCUSSION At the elite level, players were provided with a positive environment, where provision of constructive instruction was limited. Coaches used more pre-instruction and management with older age groups, although this may be due to increased task complexity. The amount of information presented was reduced with age, possibly implying a more 'hands off' (Williams and Hodges, 2005) approach, especially in game orientated practices.

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KEY WORDS Skill acquisition, elite performance, coaching behaviours, practice, soccer.

P-121 Effects of technical training on skill development in non-dominant legs of young soccer players

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OBJECTIVE In today's soccer with game systems that are changing, the movement fields of soccer players are quite narrowed; for soccer players to make safe ball control in these narrow fields, shoot passes that reach their aim and dribble safely without losing the ball to opponents, they have to learn the basic skills of soccer using both legs systematically (Haaland and Hoff 2003). The purpose of this study was to investigate the effect of special technical training on the skill development in non-dominant legs of young soccer players of two different age groups.

METHODS 65 volunteer soccer players from 4 young soccer teams participated in the study. Teams were separated randomly into the experimental and control groups of 12–14 years and 16–18 years. Basic ball drills to work only the non-dominant leg were carried out following the warm up for 10 weeks, 3 days/week. (maximal heart rate % 50-60) 7 skill test (Volley kick, Single Passing Hit, Short Passing Hit, Ball Counting, Short dribbling, Long dribbling, Johnson Test) proper to soccer were applied to both dominant and non-dominant legs of soccer players in pre-test and post-test during 10 weeks.

RESULTS This study revealed that the development of physical characteristics of experimental and control groups were parallel. There were no significant differences in the non-dominant legs of the both control groups but except the ball counting skill in 16-18 age groups there were significant differences in the non- dominant legs of experimental groups in the skill development of ($p<0,05$) $p<0,01$) levels.

Table 1. The comparison of the physical characteristics of subject and control groups.

	Variable	SubjectGroup	Control Group	Difference	t	P
12–14 Age Subject Group (N=17) Control Group (N=16)	Age (year)	13,00(0,70)	13,00(0,63)	0,00	0,00	1,00
	Sport Age(year)	1,73(0,39)	1,75(0,36)	0,02	0,11	,913
	Height (cm)	154,32(10.67)	156,06(8,60)	1,74	0,51	,610
	Weight (kg)	42,62(8,86)	44,93(7,53)	2,30	0,80	,428
16–18 Age Subject Group (N=16) Control Group (N=16)	Age (year)	17,00(0,73)	16,93(0,92)	0,07	0,21	,834
	Sport Age(year)	5,18(1,22)	5,31(0,94)	0,13	0,32	,749
	Height (cm)	172,33(6,06)	174,15(2,84)	1,81	1,09	,284
	Weight (kg)	61,98(7,71)	62,43(5,19)	0,44	0,19	,850

Table 2. The comparison of differences of first and pre-test and post-test result for dominant and non-dominant legs of experimental and control groups (12-14 age groups)

12-14 Age Variable	Subject-Control	Subject Group N: 17	Control Group N: 16	Difference	t	P
Voley kick	D.L	7,64(3,77)	8,00(4,16)	0,35	0,25	,800
(point)	N.D.L	8,94(3,13)	0,43(3,18)	8,50	7,73	,000**
Single Passing Hit	D.L	2,64(1,90)	2,81(1,72)	0,16	0,26	,795
(quantity)	N.D.L	3,23(1,09)	1,00(0,81)	2,23	6,62	,000**
Short Passing Hit	D.L	3,17(1,07)	3,25(0,93)	0,07	0,21	,835
(point)	N.D.L	3,00(0,79)	0,62(1,45)	2,37	5,87	,000**
Ball Count	D.L	0,70(1,35)	0,43(0,72)	0,26	0,70	,489
(quantity)	N.D.L	4,17(4,23)	1,12(3,15)	3,05	2,33	,026*
Short dripling	D.L	-0,24(0,39)	-0,37(0,40)	0,12	0,86	,396
(sn)	N.D.L	-0,92(0,56)	-0,01(0,33)	0,91	5,60	,000**
Long dripling	D.L	-0,96(0,89)	-0,59(0,42)	0,36	1,49	,145
(sn)	N.D.L	-2,23(1,22)	-0,10(0,63)	2,13	6,24	,000**
Johnson Test	D.L	7,47(3,44)	6,06(2,48)	1,40	1,33	,191
(quantity)	N.D.L	9,41(3,33)	1,00(1,89)	8,41	8,82	,000**

Tablo 3. The comparison of differences of first and pre-test and post-test result for dominant and non-dominant legs of experimental and control groups (16-18 age groups).

16-18 Age Variable	Subject-Control	SubjectGroup N: 17	Control Group N: 16	Difference	t	P
Voley kick	D.L	2,43(6,72)	4,12(2,70)	1,68	0,93	,359
(point)	N.D.L	7,93(3,60)	1,31(2,82)	6,62	5,78	,000**
Single Passing Hit	D.L	1,75(1,43)	2,37(0,88)	0,62	1,48	,149
(quantity)	N.D.L	2,93(0,77)	0,75(1,00)	2,18	6,92	,000**
Short Passing Hit	D.L	1,62(2,18)	1,68(1,77)	0,06	0,08	,930
(point)	N.D.L	2,68(1,62)	0,68(1,13)	2,00	4,03	,000**
Ball Count	D.L	0,87(2,52)	0,37(1,50)	0,50	0,68	,500
(quantity)	N.D.L	4,37(3,68)	2,31(2,52)	2,06	1,84	,075
Short dripling	D.L	-0,24(0,19)	-0,38(0,17)	0,14	2,16	,038*
(sn)	N.D.L	-0,74(0,37)	-0,03(0,18)	0,71	6,81	,000**
Long dripling	D.L	-0,43(0,28)	-0,42(0,38)	0,01	0,02	,984
(sn)	N.D.L	-1,23(0,45)	-0,17(0,36)	1,06	7,25	,000**
Johnson Test	D.L	2,12(2,91)	3,37(1,36)	1,25	1,55	,131
(quantity)	N.D.L	6,43(2,09)	1,62(1,25)	4,81	7,87	,000**

DISCUSSION It was witnessed that there was much more skill development in the experimental group of 12–14 years than the experimental group of 16-18 years.

REFERENCE
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KEY WORDS Soccer, training, skill, non-dominant leg.

P-122 Effect of memory recall on perceptual-cognitive skill in elite soccer: Development of long term working memory

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OBJECTIVE According to Ericsson and Kintsch (1995), Long Term Working Memory (LTWM) can be used to circumvent limitations in short-term memory, enabling skilled performers to acquire better encoding/retrieval methods, promoting rapid access to information and improved memory recall. These skills are thought to contribute to superior recall ability in skilled players when compared to less skilled players. In this study the ability of two groups of elite soccer players of varying levels of perceptual-cognitive expertise and a group of novice players to recall aspects of matches in which they had participated were examined.

METHODS The perceptual-cognitive skills of elite (n-24) and novice (n-12) soccer players were assessed. The elite groups were stratified based on performance (perceptually excellent, perceptually average). Retrospective memory recall was examined for individual, team and opposition events using a recall questionnaire. Sportscode Pro software® was used to obtain match statistics.

RESULTS Elite players had superior perceptual-cognitive skills compared with their novice counterparts, $p>0.01$. Players were more accurate in recalling individual events rather than those involving team mates and the opposition, $p>0.05$. There were no difference in the accuracy of memory recall between the two groups of elite players, $p<0.05$.

DISCUSSION Memory recall was not shown to be a determinate of anticipation and decision-making skill in elite soccer players. These finding suggested that other factors may have led to the development of perceptual excellence in elite players rather than memory recall. In future, researchers could collect verbal reports after matches to elicit more detailed information in relation to memory retrieval and encoding.

REFERENCES
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KEY WORDS Energy perceptual expertise, memory recall, long-term working memory.

P-123 Educational approaches in coaching applications in youth professional soccer

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OBJECTIVE Educational approaches are important to determine how to teach new skill to youth teams players. There are different ideas between educational approaches training applications of trainers who work with youth players of professional soccer teams. The purpose of this study was to analyse the educational approaches training applications of trainers who work with youth players of professional soccer teams.

METHODS The participants of this study were 50 coaches, who worked in youth teams of the professional league, second league A and second league B and third league teams. A Sample (Martens, 1987) with the 5 scale Likert type 21 questions, composed of two sections was used. The first section was consisted of demographics and the latter analysed the training of the football coach's training applications. The plausibility coefficient of the survey of the study is determined with α: .80. T-test and one way ANOVA, ($p<0.05$) were used for the analyses.

RESULTS According to the results of the study, 59,2 % of the trainers had their coach license from Turkish football federation (TFF) and 40.8 % from the universities. The training experience of the coaches was 25.7 % 1-5 years, 29.8 % 6-10 years, 44.6 % 11 years and more. The coaches shared the view of the analyses of the educational approaches A (X=3.69).According to the foundation of the trainer license of the trainer (TFF or university), "succeeding of the group and submitting feedback of the positive or negative of the correcting, preventing of the enjoying of the sportsmen and a positive communication with them" and comparing in these subjects, there are expressive differences $p<0.05$. The result is for the trainer, which gained their license from the university. Coaches depended on the time of training occupation have also differences between ""theoretical information submitting and often feedback of the coaches, the division of the movement into parts and variance analyze; $P<0.05$. Result is for the coaches, which are training since 1–5 and 6–10 years. Coaches depended on the time of training occupation have also differences between ""theoretical information submitting and often feedback of the coaches, the division of the movement into parts and variance analyze $P<0.05$. Result is for the coaches, which are training since 1–5 and 6–10 years.

Table 1. The number of the participant soccer clubs and the coach

The participant clubs	League	Number of trainer
Ankara Spor	1	7
Gençlerbirliği	1	11
MKE Ankaragücü	1	8
Türk Telekom	2.league A	7
Ankara Demirspor	2.league B	5
Gencler Birligi Asasspor	2.league B	4
A.B. Kızılcahamam Belediyespor	3 league	2
Bugsas Spor	3 league	2
Çubukspor	3 league	2
Etimesgut Sekerspor	3 league	2
	10 teams	50

DISCUSSION The study showed that the coach with license from the university was better in correction and submitting of the information and obtaining of the enjoyment of the sportsmen of the training and in the positive better communication as the trainer with license of the TFF.

REFERENCES
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KEY WORDS Coaches of youth teams, educational approaches, feedback.

P-124 Motor coordination abilities and technical actions of junior football players

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OBJECTIVE Success gained in team games including football depend on definite links (players) in a team as well as their cohesion (good team work in a formation and among particular formations). Effective actions in one-on-one play

require from the players great technical skills, making use of physical conditions as well as of motor and coordination abilities. The aim of this paper was to define, what influence has motor coordination abilities on the fundamental element of the game, namely one-on-one play, where the complexity of movement with a ball, that is: dummy runs and passes, body play, dribbling, constitute the most difficult technical element.

METHODS The research material constitutes the results of measurements conducted among 20 football players, who trained regularly ca. 3- 4 times, with average 5 years training experience? For the evaluation of motor coordination abilities particular tests were used (Ljach, 1998). One-on-one play was conducted with everybody separately according to the original scenario.

RESULTS The level of tests' results evaluating motor coordination abilities indicated great diversity within a group which is shown by relatively high values of variable indices. The results of analysis determining correlation between the level of MCA and effective 1x1 plays prove their significant interdependence. Out of 11 correlation 9 turned out to be statistically significant (level P<0,05).

DISCUSSION The results indicated that young players who possessed high level of motor coordination abilities were able to act effectively in 1x1 situations. On this basis it can be concluded that there was close correlation between the indices of MCA and effective 1x1 play. The most significant interdependence was observed between 1x1 play and motor adjustment.

KEY WORDS Football, tests, motor coordination abilities, one-on-one play, young football players.

P-125 Differences in Muscularity of Psoas Major and Thigh Muscles in Relation to Sprint and Vertical Jump Performances in Elite Young and Professional Soccer Players

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INTRODUCTION Sprinting and jumping are the most essential abilities in attaining high-level soccer playing standards. Many efforts were made in identifying biomechanical and physiological factors requisite for establishing a more specific and efficient approach for the development of young players. In particular influence of muscular strength has been extensively studied, but remains controversial.

OBJECTIVES Muscular strength was basically determined by muscle cross-sectional area (CSA). Recently we reported CSA of psoas major and thigh muscles correlated with the best 100-m record in junior sprinters2). The purpose of the study was to compare high-level youth and professional soccer players in sprint and vertical jump performances with regard to muscularity of the muscle groups.

METHODS 30 professional (PRO) and 24 youth (YNG) players from the same club in Japan participated. The CSA of quadriceps femoris (QF), hamstrings (HAM) and adductors (ADD) and psoas major (PM) were determined from the MRI. 20-m sprint time was measured using infrared photocell sensors at every 5-m. Vertical height of squat jump (SJ) and counter jump (CJ) were measured by filming with height calibration.

RESULTS Table 1 shows the differences and effect size (ES) between PRO and YNG. Stepwise multiple regression analyses produced prediction equations in the sprint times with independent variables of the CSA of PM and ADD at mid-thigh and ratio of QF at the upper and mid-thigh. In SJ and CJ, only QF at the upper thigh was selected as a significant explanatory variable in the regression models.

Table 1. Differences between PRO and YNG.

	Sprint (sec)				VJump (cm)		Body Comp		Muscle CSA (cm^2)			
	5m	10m	15m	20m	SJ	CJ	Fat(%)	FFM(kg)	Qf_{mid}	HAM_{lo}	ADD_{up}	PM
PRO	.99	1.72	2.36	2.96	42.8	57.1	7.7	66.5	83.4	42.8	66.2	19.9
	(.02)	(.04)	(.05)	(.06)	(3.8)	(4)	(2.3)	(5.5)	(6.9)	(5.3)	(5.9)	(1.8)
YNG	1.02	1.78	2.45	3.08	38.4	50.6	8.8	58.0	74.5	36.5	57.8	16.5
	(.04)	(.04)	(.05)	(.07)	(3.7)	(4.1)	(2.5)	(4.6)	(7.3)	(4.5)	(4.3)	(1.7)
Diff.	-.03	-.06	-.09	-.12	4.4	6.5	-1.1	8.5	8.9	6.3	8.4	3.4
ES	-1.1	-1.6	-1.7	-1.8	1.1	1.6	-0.5	1.6	1.2	1.2	1.6	1.9

VJump: Vertical jump, Comp: Composition, CSA: Cross-sectional area, SJ:squat jump, CJ:counter jump, FFM:fat-free mass, QF_{mid}:quadriceps femoris at middle of thigh, Ham_{lo}: hamstrings at lower thigh, ADD_{up}:adductors at upper thigh.

DISCUSSION & CONCLUSION The CSA of PM, showing the largest ES between PRO and YNG, was selected as the first significant contributor to predict the sprint time at 10, 15, 20-m. This was a similar result for junior sprinter2), indicating the predominant development of specific muscle groups influence, in part, sprint and vertical jump performances, and the training of these muscles is essential for younger players.

KEYWORDS MRI, cross-sectional area, sprint,jump, multiple regression analysis.

P-126 Effect of different approach velocities in soccer kick

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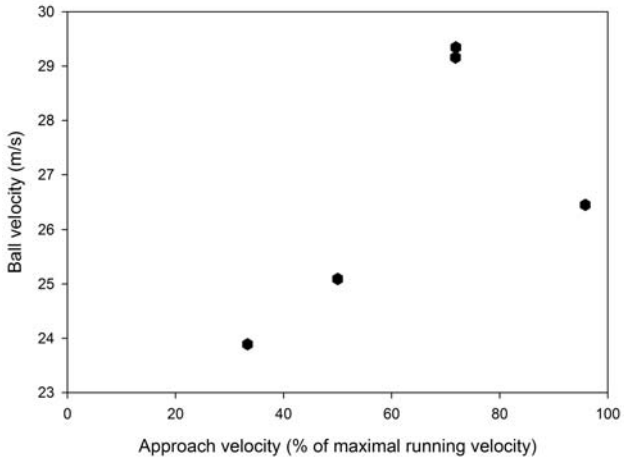
OBJECTIVE The soccer kick is a proximal-to-distal movement pattern, in which the aim is for the most distal segment to achieve the highest possible speed at impact. Usually, this movement pattern is only analysed for two segments (thigh and shank-foot). However, the pelvic movement influences the movement of the whole leg. Accordingly, acceleration of the hip will influence the movement of the whole leg. This case study investigated the effect of different approach velocities on ball velocity in maximal instep soccer kicks. Furthermore, the parameters that were important for this effect were described.

METHODS One male elite-subject performed the experiments; maximal soccer kicks with approach velocities of 1/3, 1/2 and over 90% of the maximal running velocity. Furthermore, kicks at a self selected approach velocity were performed before and after. The trial with the highest ball velocity in each group was selected for further analysis. 240Hz video was recorded and inverse dynamics calculated.

RESULTS The results showed that the maximal ball velocity was reached at the self selected approach velocity. The maximal ball velocity was 29.16 m/s and the self selected approach velocity was 71.88% of the maximal running velocity. Table 1 presents the work performed on the shank from the different movement dependant moments.

Table 1. The work performed on the shank from the different movement dependant moment

	$V_{approach}$ (%)	V_{ball} (m/s)	W_{muscle} (%)	W_{omega_thigh} (%)	W_{alfa_thigh}(%)	$W_{hip\_acceleration}$(%)	$W_{gravity}$(%)
Trial:							
Self selected 1	71.8	29.16	53.71	20.70	2.48	17.30	5.77
Low	33.2	23.89	47.69	21.12	1.68	23.59	5.89
Medium	52.1	25.09	45.58	21.75	0.15	25.40	7.09
High	95.8	26.44	50.04	19.92	1.92	22.19	5.91
Self selected 2	71.9	29.34	53.69	20.12	1.44	19.05	5.67



DISCUSSION The study revealed that the approach velocity influences the ball velocity. An approach velocity below or above the self selected approach velocity would contribute to a lower ball velocity. The present results indicated that this was mainly caused by less work produced by the knee extensor muscles and not by factors related to the hip acceleration. For future studies more subjects are needed to verify the results.

KEY WORDS Soccer kicking, biomechanics, approach velocity