INDIVIDUAL KICKING TECHNIQUES ASSOCIATED WITH IMPROVED KICKING DISTANCE IN ELITE YOUTH SOCCER GOAL KEEPERS

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Goalkeepers (GK) in soccer

Goal kicking of soccer?
The goal kicking of professional GK ≈ 60 m

A long goal kicking technique is a very useful means of attacking strategy because sending the ball closer to their attacking goal can increase the chance of scoring the goal.

Previous study

Reviews in soccer kicking
Long kicking in Australian Rules football
Punt kicking of goalkeeper in soccer

No studies have reported the goal kicking distance for goalkeepers. Thus, the goal kicking techniques have not yet been documented.
The purpose of the present study was to evaluate kicking techniques that maximise the kicking ball distance of goalkeepers.
**Experiment**

Subject
4 elite youth GK, age 19.37 ± 1.07 years,
Height 1.89 ± 0.03 m, Weight 88.82 ± 3.81 kg
All ball rotations, left knee (20° and 30° rotation) were attached to the body

Ball
Ordem 3, Nike (800 hPa)
4 retro-reflective markers (14 and 25 mm diameter) were attached to the body

Equipment
Qualisys Track Manager motion capture (500 Hz)
(Kistler Instruments, Hook, UK) (1000 Hz)

**Methods**

**Definition of lab and joint co-ordinate systems**

At each joint, Z = internal/external rotation, Y = abduction/adduction and X = flexion/extension.

**Lean angle of kicking and support leg**

Lean angle of kicking leg
Outward lean (+), Inward lean (-)
Lean angle of support leg

**Deformation of ankle joint during ball contact**

Deformation of plantar flexion

**Definition of phases during kicking**

- Maximum hip extension (MHE)
- Support foot touch down (SFTD)
Definition of phases during kicking

- Maximum hip extension (MHE)
- Support foot touch down (SFTD)
- Maximum knee flexion (MNF)
- Ball contact (BC)
- Follow through (FT)

Methods

An entered linear multiple regression analysis was conducted with ball distance as the dependent variable and with two variables (combination) as independent variables for all six players at different phases of the kick in swinging motion data model. These combination parameters chosen to represent the best regression were based on R-squared and p values. The significant level for statistical analysis was set at p < 0.05.

Multiple regression analysis

Ball kicking distance Variable 1 Variable 2

Methods

Variables at MHE, SFTD, MNF, and FT phase

- Angle of hip and knee (flexion/extension; abduction/adduction)
- Angular velocity of hip and knee (flexion/extension; abduction/adduction)
- Lean angle of kicking and support leg
Multiple regression
Variables at BC phase

BC phase
• Angle of hip and knee (flexion/extension; abduction/adduction)
• Angular velocity of hip and knee (flexion/extension; abduction/adduction)
• Lean angle of kicking and support leg
• Angle of foot before ball contact before BC
• Peak of ankle angle during BC
• Deformation of ankle joint angle
• Centre of mass of foot velocity at BC

Methods

Significant variables of all player

Goalskeepers
Max. hip extension
Support foot touch down
Max. knee flexion
Before ball contact
After ball contact

Follow throw phase

Increased outward lean of kicking leg from MHE to MKF

Increased knee angular velocity at BC

Results and discussion

Increased outward lean of kicking leg from MHE to MKF

Follow throw phase

Results and discussion

Follow throw phase

Results and discussion

Keeping generated knee extension and hip abduction angular velocity until the end of kicking might be a key point to enhanced kicking ball distance.

Though the players cannot involve the ball behaviour after ball contact, it might be useful as success performance of kicking for coaching.
Significant variables of each player

Results and discussion

Increased inward lean of support leg

Results and discussion

Decreased plantar flexion during ball contact

Results and discussion

Significant variables of each player in regression analysis

Results and discussion

Deformation of plantar flexion of ankle
Results and discussion

Enhanced ball contact techniques that was caused by keeping plantar flexion of the ankle at a minimum is considered to have improved the ball velocity.

Summery

The present study examined the technical contributors of individual ball distance in kicking. Two variables at different phases of the kick was observed for each player ($p < 0.05$). These key variables have potential to be used as rapid feedback to the player to aid improved kicking performance.