mechanisms of stress demands that can lead to typical kicking

Implications:

moments in the transverse plane.

kicks are related both to greater hip

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0.01, respectively).

lower thoracolumbar

knee extension moment is greater in those individuals who produce

power . There seems to be a compensatory relationship in which the

trunk moment, the magnitudes of hip and knee moments and kick

0.05). Peak ipsilateral thoracolumbar and lumbopelvic rotator

(c142)

moments, and peak knee extensor and hip

extension of the right hip, peak moment of extension of the right knee,

and peak velocity of the foot pre-impact with the ball. Pearson’s
correlation analyzes were performed to investigate the relationship
between trunk moment and lower limb moment and pre-

impact foot velocity.

Results: Peak thoracolumbar flexor moment had a moderate to
good significant negative correlation with knee extensor peak
moment (r = -.519, p < 0.05). Peak ipsilateral thoracolumbar and
lumbopelvic rotator moments, and peak knee extensor and hip
flexor moments had significant positive correlations, from moderate
to good, with pre-impact foot velocity peak (r = 0.481 \leq r \geq 0.677 p <

0.05). Peak ipsilateral thoracolumbar and lumbopelvic rotator
toments had significant positive correlations, from moderate to
good, with peak hip flexor moment (r = 0.671, p < 0.01; r = 0.659, p <

0.01, respectively).

Conclusion: There are relationships between the magnitudes of
trunk moment, the magnitudes of hip and knee moments and kick
power. There seems to be a compensatory relationship in which the
toen extension moment is greater in those individuals who produce
lower thoracolumbar flexion moment. In addition, more powerful
kicks are related both to greater hip flexion and knee extension
moments and to greater thoracolumbar and lumbopelvic rotation
moments in the transverse plane.

Implications: The findings make it possible to explain possible
mechanisms of stress demands that can lead to typical kicking

injuries, providing the planning of prevention and rehabilitation
strategies.

Keywords: Soccer, Kick, Trunk

Conflict of interest: The authors declare no conflict of interest.

Acknowledgment: To the development agencies National Council
for Scientific and Technological Development (CNPq), Research Sup-
port Foundation of the State of Minas Gerais (FAPEMIG) and CAPES

Ethics committee approval: Federal University of Minas Gerais
(UFMG) CAAE – 42162915.9.0000.5149

https://doi.org/10.1016/j.bjpt.2024.100865

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RELATIONSHIP BETWEEN TRUNK AND LOWER KICKING LIMB MOMENT AND MAXIMUM KICK POWER IN SOCCER

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Background: Kicking is a sporting gesture that generates high
stress demands on the musculoskeletal system. The participation
of the trunk in the kick has been studied since the flexion-
extension and rotation moments of the trunk and pelvis can
favor the energy transmission mechanism for the kicking lower
limb. This allows the performance of the maximum kick with
sharing of demands between the trunk and the lower limb. Thus,
the magnitude of the joint moment produced in the trunk
during the kick can influence the magnitude of the moment pro-
duced in the lower limb and the power of the kick. However,
there are no reports on the existence of these possible
relationships.

Objectives: To investigate the relationship between bisegmented
trunk moments (thoracolumbar and lumbopelvic) and kicking lower
limb moments, as well as kick power (foot velocity pre-impact with
the ball) in a maximum instep soccer kick.

Methods: Cross-sectional study carried out with eighteen male vol-
unteers who practiced soccer as a recreational activity (1x/week,
for at least 1 year and without musculoskeletal injuries in the last 6
months), between 18 and 35 years old, with a body mass index \leq 25
kg/m². Data collection was carried out at the Movement Analysis
Laboratory (LAM), at the Federal University of Minas Gerais (UFMG).
The variables collected were the peak moment of ipsilateral thora-
columbar and lumbopelvic flexion and rotation, peak moment of
flexion of the right hip, peak moment of extension of the right knee,
and peak velocity of the foot pre-impact with the ball. Pearson’s
correlation analyzes were performed to investigate the relationship
between trunk moment and lower limb moment and pre-

impact foot velocity.

Results: Peak thoracolumbar flexor moment had a moderate to
good significant negative correlation with knee extensor peak
moment (r = -.519, p < 0.05). Peak ipsilateral thoracolumbar and
lumbopelvic rotator moments, and peak knee extensor and hip
flexor moments had significant positive correlations, from moderate
to good, with pre-impact foot velocity peak (r = 0.481 \leq r \geq 0.677 p <

0.05). Peak ipsilateral thoracolumbar and lumbopelvic rotator
toments had significant positive correlations, from moderate to
good, with peak hip flexor moment (r = 0.671, p < 0.01; r = 0.659, p <

0.01, respectively).

Conclusion: There are relationships between the magnitudes of
trunk moment, the magnitudes of hip and knee moments and kick
power. There seems to be a compensatory relationship in which the
toen extension moment is greater in those individuals who produce
lower thoracolumbar flexion moment. In addition, more powerful
kicks are related both to greater hip flexion and knee extension
moments and to greater thoracolumbar and lumbopelvic rotation
moments in the transverse plane.

Implications: The findings make it possible to explain possible
mechanisms of stress demands that can lead to typical kicking

injuries, providing the planning of prevention and rehabilitation
strategies.

Keywords: Soccer, Kick, Trunk

Conflict of interest: The authors declare no conflict of interest.

Acknowledgment: Coordenação de Aperfeiçoamento de Pessoal de
Nível Superior. Fundação de Amparo à Pesquisa do Estado de Minas

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ASSOCIATION BETWEEN TRUNK AND LEVEL OF PHYSICAL ACTIVITY IN PATIENTS ON HEMODIALYSIS

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Background: Patients on hemodialysis have lower level of physical
activity due cardiovascular and musculoskeletal changes caused by
chronic kidney disease and the hemodialysis process. The lower
level of physical activity can contribute to the impairment of physi-
cal function, however, the relationship between postural balance
and level of physical activity needs further investigation.

Objectives: To evaluate the association between postural balance
and level of physical activity in patients on hemodialysis.

Methods: A cross-sectional study was carried out with patients who
were 18 years of age or older and who were on regular hemodialysis
for at least three months. Patients unable to perform the proposed
assessments, with psychiatric impairments and severe and/or unsta-
cible comorbidity were excluded. Postural balance was assessed by
the Mini Balance Evaluation Systems Test (Mini-BESTest) and the
level of physical activity was investigated by the daily steps count
recorded by the accelerometer Actigraph wGT3X-BT. Data normality
was verified using the Shapiro-Wilk test. The correlation between
the Mini-BESTest score and the daily steps was calculated using
the Spearman correlation coefficient (\rho) and the association between
these variables was investigated using a multivariate linear regres-
sion model. The significance level was p < 0.05.

Results: Ninety-six patients (59.2 \pm 12.3 years; 57.3% male) were
evaluated. The median of the Mini-BESTest score was 22.0 (4.0) and
the median of daily step count was 3750 (3009). The Mini-BESTest
score was positively correlated with the daily step count (\rho = 0.449;

p < 0.001). This association remained statistically signifi-
cant after adjusting for age, gender, time on hemodialysis, hemodialysis
efficacy index, and presence of neurological disease (R = 0.540;

R² = 0.292; adjusted R² = 0.243; p < 0.001).

Conclusion: This study showed that a better performance in pos-
tural balance was associated with a higher level of physical activity
in hemodialysis patients.

Keywords: Renal Dialysis, Postural Balance, Exercise

Conflict of interest: The authors declare no conflict of interest.

Acknowledgment: Coordenação de Aperfeiçoamento de Pessoal de
Nível Superior. Fundação de Amparo à Pesquisa do Estado de Minas