

Soccer causes degenerative changes in the cervical spine

European Spine Journal, February 2004, 13(1):76-82

Alparslan Kartal, Brahim Yldran, Alparslan Enköylü and Feza Korkusuz

FROM ABSTRACT:

Background

Radiological changes and degeneration of the cervical spine have been previously described in soccer players.

The onset of such changes was 10–20 years earlier than that of the normal population.

The aim of this study was to assess these early degenerative changes in amateur active and veteran soccer players in a cross-sectional descriptive study using biomechanical, radiological, and magnetic resonance measures.

Methods

The subjects were active (<30 years; n=15) and veteran (>30 years; n=15) male amateur soccer players, and their age-matched controls (n=13 and n=15). Biomechanical measurements were made on a cervical dynamometer. Dynamic radiological and magnetic resonance findings were also obtained and evaluated.

Results

The normalized mean extension moment was higher in the active soccer players, but the mean range of motion was lower.

Degenerative changes were prominent in veteran players, and the sagittal diameter of their spinal canal at C2 to C6 was lower when compared to active players and controls.

Magnetic resonance findings of degeneration were more prominent in soccer players when compared to their age-matched controls.

Conclusion

A tendency towards early degenerative changes exists in soccer players most probably due to high- and/or low-impact recurrent trauma to the cervical spine caused by heading the ball.

THESE AUTHORS ALSO NOTE:

“Soccer is one of the most popular sports around the globe with a high incidence of trauma.”

“Brain injuries in soccer are well defined, but those of the cervical spine are rarely determined.”

“Severe muscle spasms, spinal cord injuries, disc herniation and fracture dislocations are documented among the acute injuries to the cervical spine in soccer.”

In soccer, “scoring, defending and passing the ball with the head is an integral part of this game; so chronic degenerative changes should be common in the cervical spine.”

“High- and/or low-impact recurrent trauma mainly due to heading the ball may initiate degenerative changes at the cervical spine.”

Soccer initiated degeneration of the cervical spine will narrow the cervical canal, produce pressure on the spinal cord and make soccer players more susceptible to neurological complications.

The spondylotic anteroposterior diameter was significantly lower in the soccer group when compared to controls. **[Central Canal Spinal Stenosis]**

The pathologies found in the cervical spines of the soccer players included cervical disc bulging, osteophytes in the cervical canal, disc protrusion, loss of cervical lordosis, spinal cord compression, and spinal cord compression in hyperflexion.

DISCUSSION

“The head of a soccer player should be rigid at impact to absorb the force of the ball and prevent jarring at the neck.” This “decreases the risk of rotational acceleration of the head relative to the trunk and also the risk of damaging the brain and the cervical spine.”

“The maximum force applied to the athletes head can be calculated as approximately 2,000 N [Newton] [450 pounds] for each heading of the ball from the above given data, and the cervical spine is indirectly influenced by this trauma.”

“The cervical spine absorbs a significant amount of the force generated due to heading the ball. This type of repetitive force during competition or training may increase the risk of degeneration at the intervertebral joints, intervertebral discs or the spinal cord.”

“Playing soccer decreased the ROM of the cervical spine over time.”

“The saggital diameter of the cervical canal decreased in veteran soccer players when compared to active players and their age-matched controls.”
[This means central canal spinal stenosis].

“Continuous micro- and macro-trauma to the cervical spine due to heading the ball in soccer may cause early degenerative changes.”

The MR findings of the spinal column and cord were more severe in soccer players than in their age-matched controls.

“Cervical disc bulging, osteophytes in the cervical canal, disc protrusion, loss of cervical lordosis, spinal cord compression, and cord compression in hyperflexion were the most common MR findings.”

The “degenerative changes of the cervical spine in soccer are not only limited to the skeletal tissues but may also extend to the soft tissues, including the intervertebral disc and the spinal cord.”

“In conclusion, biomechanical, radiological, and MR findings present a tendency towards early degenerative changes of the cervical spine most probably due to heading the ball in soccer.”

Soccer player degenerative cervical spine problems “tend to increase with age and seem to be irreversible.”

Soccer player degenerative cervical spine problems “are not limited to the skeletal tissue but extend to the intervertebral disc and spinal cord.”

[IMPORTANT]

“We propose that extensor muscles be strengthened to prevent early degenerative changes to the cervical spine in soccer players.”

KEY POINTS FROM DAN MURPHY

- 1) Previous studies have shown that heading the soccer ball potentially damages the brain.
- 2) The cervical spine absorbs a significant amount of force during heading the ball.
- 3) Degeneration of the cervical spine in soccer players is 10–20 years earlier than that of the normal population.
- 4) These degenerative changes are caused by the high- and/or low-impact recurrent trauma to the cervical spine caused by heading the ball.
- 5) The pathologies found in the cervical spines of the soccer players include cervical disc bulging, osteophytes in the cervical canal, disc protrusion, loss of cervical lordosis, and spinal cord compression.

- 6) These soccer-initiated degeneration of the cervical spine make soccer players more susceptible to neurological complications.
- 7) The amount of force generated in heading the ball is 450 pounds.
- 8) The degenerative cervical spine problems in soccer players caused by heading the ball increase with age and are irreversible.