

Does Lumbo-Pelvic Position During Full Golf Swings Change Over A Round Of Golf? A Pilot Study Of Elite Amateur Golfers

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Purpose:

It has been suggested that during a round of golf, factors such as cognitive or physical fatigue may affect a golfer's ability to produce consistent swing kinematics. Alterations in swing kinematics that may result from fatigue, particularly of the lumbar spine, have not been evaluated in a context-specific environment. Recent advances in portable motion analysis systems afford the opportunity to measure some aspects of golf swing kinematics outdoors while playing golf. This pilot study was conducted to determine what changes occur over a round when using a driver and when putting.

Methods:

Six amateur golfers (mean age of 21.8 ± 5.4 years, body mass index of 22.8 ± 3 kg/m² and a mean Australian handicap of 6.5 ± 3.1 strokes) without a recent history of low back pain each played nineteen holes - the first hole being repeated to enable the two repetitions at the same hole to be compared. A wireless 3D motion system (Dorsa Vi Pty Ltd) continuously recorded data from two sensors, one on the sacrum and the other on the upper lumbar spine. In addition to providing the locations of each landmark in relation to that person's normal standing posture, the difference between the sensors was used to indicate the position of the lumbar spine in flexion/extension and lateral flexion.

Analysis:

The positions of each marker at address position and the range of lumbo-pelvic movement (the difference between the two markers) during swings at tee-off (when a driver was used) and the first putt for each hole were used for analysis. Paired t-tests were calculated to determine whether there were any significant differences between the first and nineteenth (when hole one was repeated) holes.

Results:

No significant differences were detected in address positions or range of movement for putting and tee-off between the first and last holes. For tee-off the upper sensor was inclined forward by 32 and 35 degrees, whereas the flexion in the lumbar spine was 12 and 14 degrees.

For putting the upper sensor was flexed 44 and 52 degrees and lumbar flexion 25 and 31 degrees. For the swing at tee-off, there were a few significant differences that fit with the general trend for the range of flexion/extension to increase and the range of lateral flexion to shift towards the right. For the swing while putting, no differences were significant, but the trends were towards less flexion and an increase in lateral flexion to both sides.

Discussion:

The findings from this study suggest small but potentially important changes occur in lumbo-pelvic kinematics both in the address position and during the swing after playing 18 holes. The Dorsa Vi system appears to be suitable for monitoring lumbar kinematics during a round of golf as participants in this study reported nil adverse effects on their golf performance from the instrumentation.

Practical Application/Clinical Relevance:

The present study is one of the few to measure lumbo-pelvic kinematics over a round of golf. While studies involving larger sample sizes are required, the instrumentation employed was simple, unobtrusive and relatively inexpensive. Findings from future studies conducted in an ecologically valid environment using the Dorsa Vi may provide different insights into mechanisms underpinning the relationship between swing kinematics, golf performance and risk of injury.