Mechanics of Professional Polo Players Exhibiting Pain vs. Players Without Pain

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As one of the oldest sports still played today, it is somewhat surprising that very little data have been collected on the sport of equestrian polo. Of the available data, the focus has been either on the kinematics and kinetics of the offside forehand swing1,2 or injury statistics3,4 of polo athletes. No study has yet to link the two areas of focus: mechanics and injury. The purpose of this study to identify significant differences in swing mechanics between female polo athletes with and without pain.

Ten female professional polo athletes (33.0 ± 10.4 yrs.; 1.69 ± 0.06 m; 66.9 ± 9.3 kg) participated. After signing an informed consent and completing a health history questionnaire, participants were attached to an electromagnetic tracking system (trakSTAR™, Ascension Technologies, Inc., Burlington, VT, USA) synced with The MotionMonitor® (Innovative Sports Training, Chicago, IL., USA). Each participant then warmed-up and executed three match effort offside forehand shots from a wooden horse. Warm-up time as well as equipment (mallet and helmet) were not standardized in effort to minimize testing environment adjustments. Testing procedures were approved by the university's Institutional Review Board prior to all testing.

Five of the ten participants indicated they were currently experiencing pain and five indicated having no pain, allowing for participants to be divided into two equal groups, those with pain and those without pain. Kinematic data were analyzed at three swing events: take away (TA), top of backswing (TOB), and ball contact (BC) (Figure 1). An independent samples t-test was conducted to determine significant correlations between trunk and swing-side shoulder kinematics and reports of current pain. Significant differences were calculated using IBM SPSS Statistics 21 software (IBM Corp., Armonk, NY) for normally distributed data with an alpha level set a priori at $\alpha = 0.05$. Significant differences were found between pain and shoulder elevation at TA ($t(7.54) = 2.999$, $p = 0.18$); shoulder horizontal abduction at TOB ($t(7.061) = -2.868$, $p = 0.24$); and shoulder elevation at TOB ($t(7.322) = 3.030$, $p = 0.18$).

Based on this study, polo players exhibiting pain display different kinematics of the offside forehand swing, compared to those with no pain. The findings of this study suggest that athletes who display higher shoulder elevation at TA and TOB, as well as greater shoulder horizontal abduction at TOB, may be more likely to also experience pain. This means that bringing the mallet excessively high and farther from the midline of the body may be related to incidence of pain susceptibility in polo athletes. The study supports previous work that reported higher forces at the elbow when shoulder horizontal abduction is greater.1 Based on these results, more research regarding pain location, kinematics, and kinetics is warranted.

References:

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Statement of Research Advisor:

Abigail's work documents some of the first data published regarding polo swing mechanics. Abigail was able to utilize her research experiences carry out a solid study regarding polo swing mechanics that will not only further the sport of polo but also world of sports medicine and biomechanics.
—Gretchen Oliver, Kinesiology

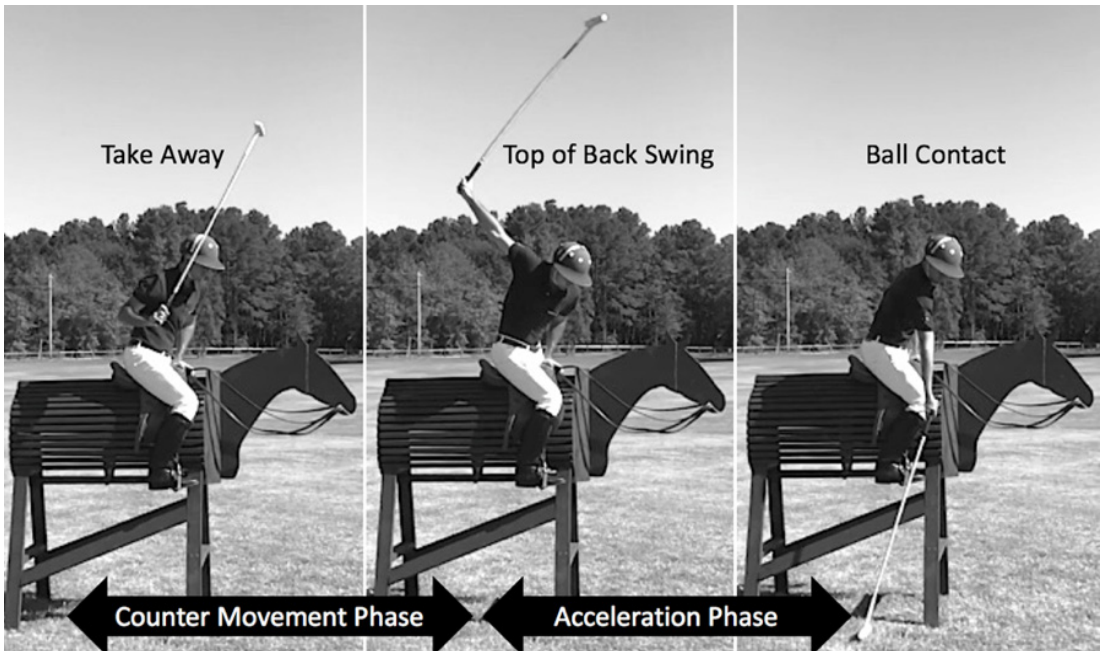

Figure 1: Events of Offside Forehand Polo Swing