



Golfer-club Interaction during Swing and Its Influences on Motor Control Strategies Employed by Elite, Advanced and Novice Golfers

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Introduction

Previous studies dealing with qualitative descriptions and simulations of golf swings have either focused on specific body segments (e.g. arms, feet) or had limitations on kinematic data collection (results were not reliably three dimensional and whole body). Hence, there is a need to gain knowledge of full body kinematics of golf swing. On the other hand, current ground force measurements exam only weight transfer patterns determined by both golfer and the golf club. To our best knowledge, there is no study dealing with the dynamic influence of the club on golfers' weight transfer during swing. Studies on body-equipment interactions will certainly supply valuable information on training (motor learning) and equipment optimization.

Objective

The goals of this research were to:

1. supply 3D characterization of golfers.
2. quantify the golfer-club interaction and to determine the influences of the interaction on motor control strategies employed by golfers
3. explore ways and parameters for a quantitative evaluation of golf swings

Setting

Biomechanics lab at the UofL

Subjects

This study involved 13 male participants from Lethbridge area (age 20 – 51 years old).

Intervention/Main Outcome Measures

From motion capture, we can obtain anatomical positions that allow the modeling of the skeletal structure, which enables the reconstruction of human body and the calculation of dynamic COG (center of gravity). From the ground reaction force measurement, we obtain the total weight transfer of club-golfer system. By contrast the differences of these 2 synchronized measurements, the interaction of club-body and its influence on motor control during a swing can be determined.

Main Results

Proper joint control will reduce the dynamic interaction between club and golfer in the medial-lateral direction. The Driver has more significant influence on such an interaction than Irons. The whip-like sequential joint control of the trunk-arm system is a key for increasing ball release speed. Both characteristics can be identified by comparing ground reaction force measurements to COG which supplies an objective way for diagnosing a swing.

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