

Golf Grip Force Evaluation in Individuals with and without Hand Arthritis Using a New Wearable Sensor Technology

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BACKGROUND

Hand osteoarthritis (H-OA) is the most common type of osteoarthritis largely affecting individuals over 45. H-OA involves pain, loss of grip strength and limiting participation in recreational activities such as golf. Currently, a number of 'arthritic' grips are designed using joint protection principles to 'reduce hand forces and tight gripping'. However, no comprehensive examinations in their effectiveness have been conducted.

HYPOTHESIS

The purpose of this study is to systematically analyse the hand forces produced from various golf grips and arthritis grips at the distal-phalanges of the hand-grip interface in individuals with and without hand arthritis using new wearable sensor technology.

METHODS

The finger forces in the hand were measured using Pressure Profiles FingerTPS system for participant's bottom gripping hand thumb, index, middle and ring fingers. The participants performed 3 golf shots using a real ball on artificial turf with 12, mid-iron clubs fitted with various types of standard and arthritis grips.

RESULTS

Preliminary results of 4 healthy participants demonstrated that serrated style golf grips designed for players with arthritis produced some of the highest forces. Also, players with larger hand length measures produce higher forces in smaller diameter grips and small hand length measures in larger diameter grips.

DISCUSSION

These preliminary results demonstrate the possibility that 'arthritic' golf grips are not appropriately designed for the given user along with the potential relationship between grip geometry and hand size to finger forces. In better understanding the mechanics of arthritis and its relation to sports, the design of more advanced sporting equipment can be developed.