

Morphological Features of Pistol Grip Deformity

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Abstract

Purpose: The purpose of this study was to elucidate the morphological features of the pistol grip deformity (PGD) using radial computed tomography (CT) images.

Materials and Methods: Using multiplanar reformation, radial CT images of a total of 51 hips were reconstructed. The femoral neck was used as the axis of rotation and the images were generated at 10° intervals from anterior to posterior. The alpha angles of each plane were measured, and compared between the PGD and control (normal morphology) groups. We also compared the mean alpha angles between each plane within the PGD group.

Results: The mean maximum alpha angles were 61° in the 60° vector in the PGD group and 50° in the 40° and 50° vectors in the control group. The mean alpha angles in the PGD group was significantly greater than those in the control group in the 30° to 100° vectors ($P < 0.05$). In the PGD group, the mean alpha angles at the anterosuperior position were significantly greater than those at the superior position ($P < 0.05$).

Discussion: In this study, we found that PGD is a particular morphological abnormality from the anterosuperior to superior femoral head-neck junction. This finding contradicts the results that have previously been reported. We need to differentiate between PGD and pure cam-type deformity to understand the morphology for preoperative and intraoperative decision-making for femoroacetabular impingement by use of radial imaging.

Key words: Femoroacetabular impingement, Cam-type deformity, Pistol grip deformity, Radial imaging