Influence of tibial rotation on tibial tunnel position measurements using lateral fluoroscopy in anterior cruciate ligament reconstruction.

The purpose of the current study was to evaluate the influence of internal and external knee rotation on tibial tunnel position measurements in anterior cruciate ligament reconstruction using the Amis and Jakob line. Anatomic double bundle ACL reconstruction was performed in seven cadaveric knees. Afterwards, the knees were CT scanned, and 3D CT models were established. Utilizing these models, strict lateral and radiographs with the knees in 5°, 10°, and 20° of internal as well as external rotation were established. Using these radiographs, the positions of the anteromedial (AM) and posterolateral (PL) tibial tunnels were measured using the Amis and Jacob line. The tunnel positions of the strict lateral were compared to the rotated radiographs. To assess the inter- and intraobserver reliability, two independent observers measured the tunnel positions, and one observer measured twice. Significant differences for the AM tunnel position were observed if more than 10° of external or 20° of internal rotation were applied. For the PL tunnel position, no significant differences were found between the strict lateral and the rotated radiographs. Inter- and intraobserver reliability was good. The accuracy of the Amis and Jakob line is dependent on the degree of knee rotation and the position of the measured tunnel. Therefore, when
using the Amis and Jakob line to determine the tibial tunnel position during surgery, attention should be paid to rotational alignment of lateral radiographs. However, the maximum rotation tested in the present study (20°) showed only a difference in tunnel position of 3.3 % compared to optimal rotational alignment. Thus, in most cases, the effects of minor malrotation on tunnel position measurement should be of minimal clinical significance. Diagnostic study.

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