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The proximal posterior cartilage of the lateral femoral condyle can be used as a reference for positioning the femoral tunnel in ACL Reconstruction

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Faculty Disclosure Information

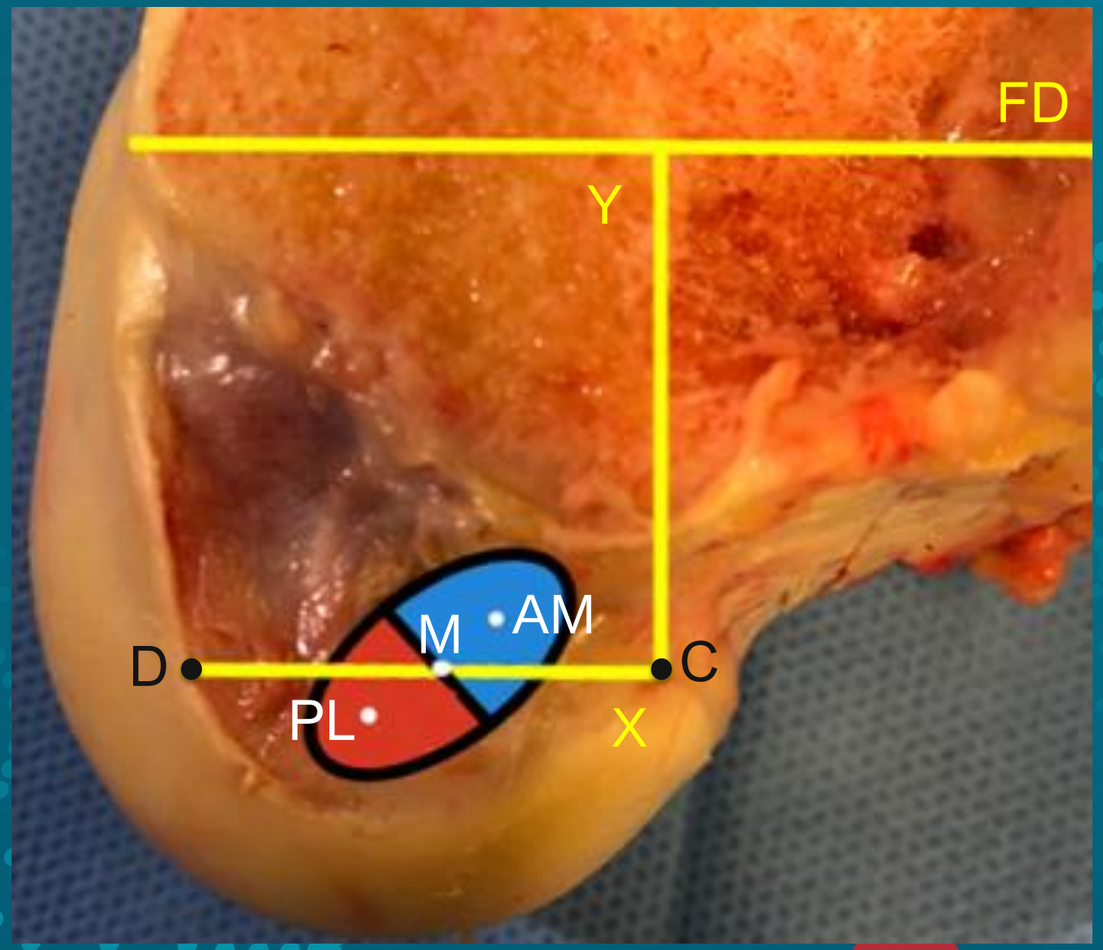
- Nothing to disclosure

Purpose

- The aim of this study was to evaluate the relationship of the proximal and posterior limits of the lateral femoral condyle cartilage (point C) with the femoral origin of the ACL in cadaveric specimens to determine the possibility of using this relationship as an intraoperative anatomical parameter to guide the positioning of the femoral tunnel

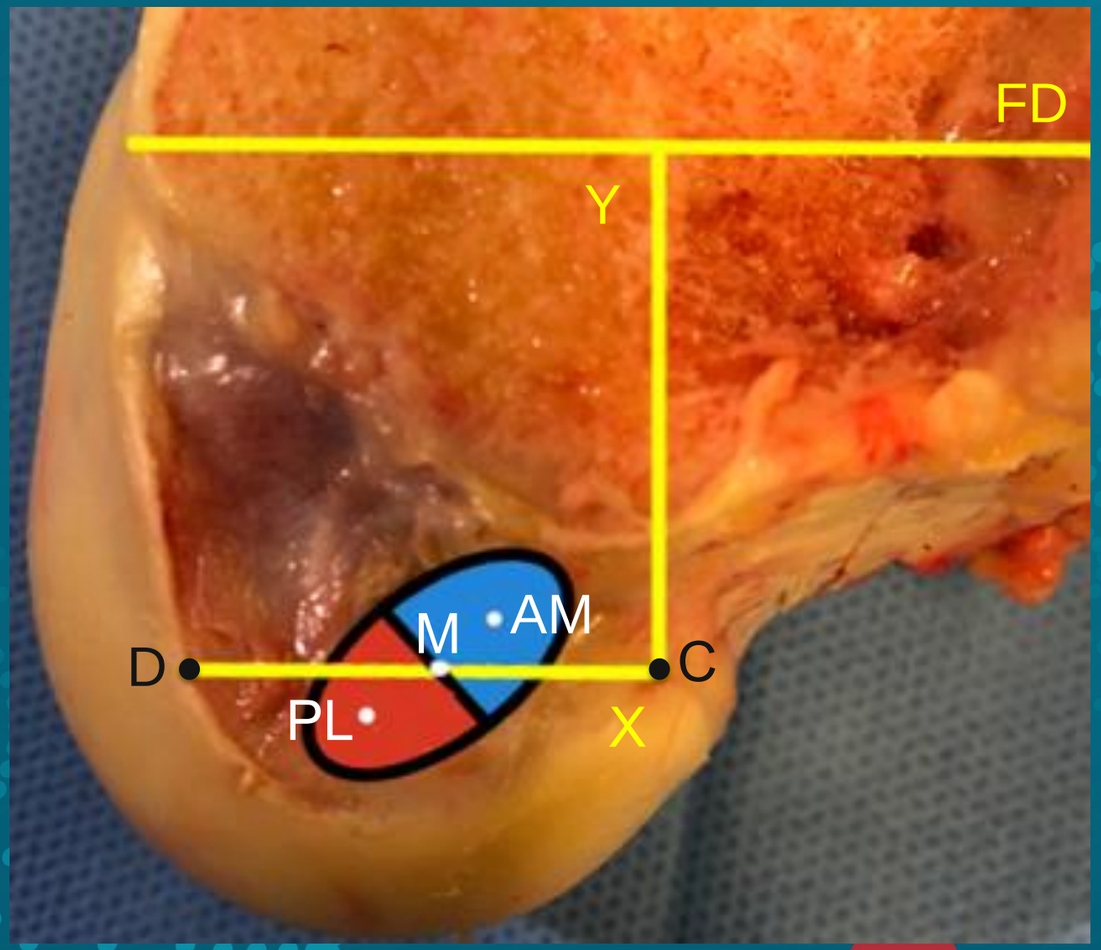
Methods

- Twenty knees were studied.
- The axis of the femoral diaphysis (FD) was first determined, and a parallel line was drawn passing through the most proximal portion of the cartilage of the lateral femoral condyle (point C), generating the X-axis (deep-shallow).
- A line was plotted perpendicular to this X-axis that passed through point C, creating the Y-axis (low/high).
- The centers of the anteromedial bundle (AM), posterolateral bundle (PL) and ACL (M) were identified.



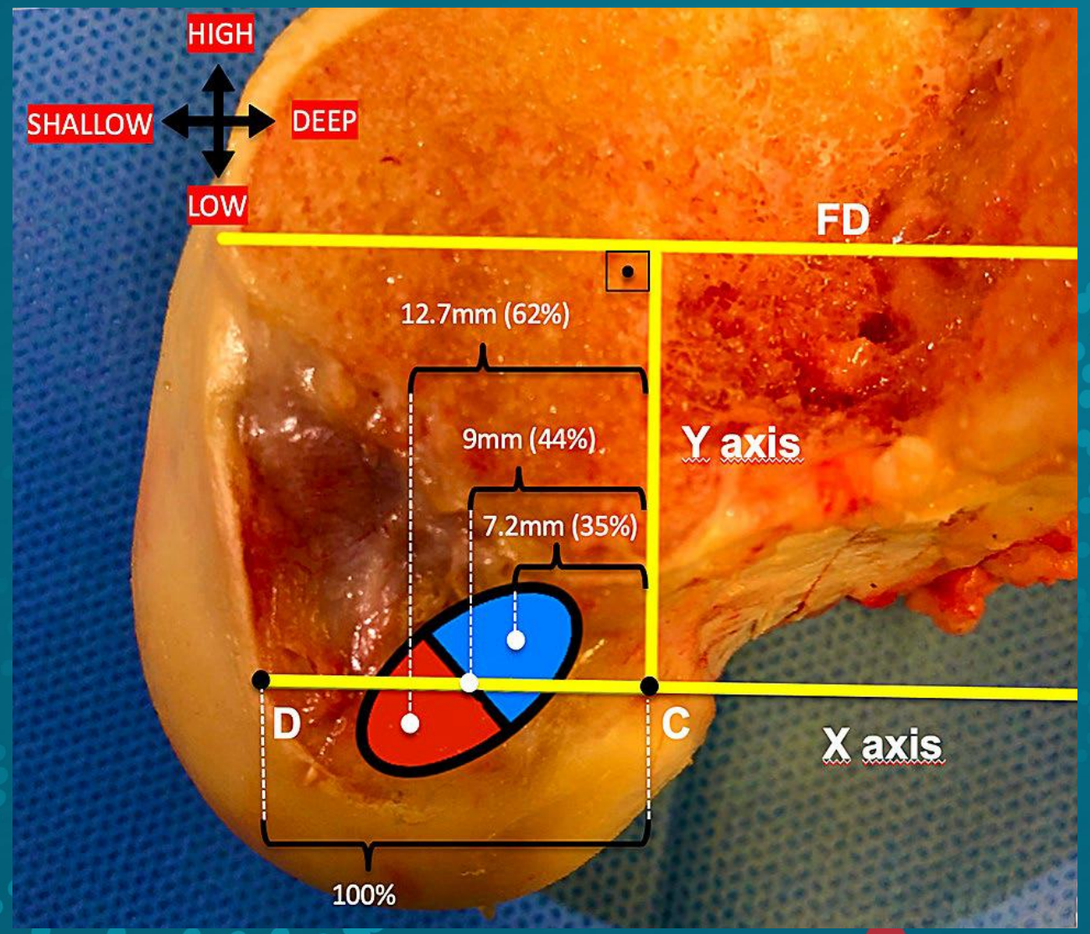
Methods

- The following distances were then measured: AM-X, PL-X, M-X, AM-Y, PL-Y and M-Y. Negative values indicate that the center of the AM, PL, or M was below point C on the Y-axis.
- The distances from the center of the anteromedial and posterolateral bundles and center of the ACL to the Y-axis (AM-Y, PL-Y and M-Y) were also evaluated as a percent- age of the CD distance, the distance from point C to the distal cartilage (point D) through the X-axis, to determine the percentages referred to as %AM/ CD, %PL/CD and %M/CD.



Results

- Twenty knees were dissected.
- The distance between the Y-axis and the center of the anteromedial bundle (AM-Y) had a mean value of 7.2 mm and ranged between 6.1 mm and 8.6 mm; the distance between the Y-axis and the center of the PL bundle (PL-Y) had a mean value of 12.7 mm and ranged between 10.5 mm and 14.6 mm; and the distance between the Y-axis and the center of the ACL (M-Y) had a mean value of 9 mm and varied between 7.3 mm and 11 mm.
- The center of the AM was an average of 35% of the CD distance, with a range of 29 to 48%; the center of the PL was an average of 62%, with a range of 54 to 67%; and the center of the ACL (M) was an average of 44%, with a range of 34 to 57%.



Results

- The distance between the X-axis and the center of the anteromedial bundle (AM-X) had a mean value of 2.1 mm (3.2 mm and 0.9 mm); the distance between the X-axis and the center of the posterolateral bundle (PL-X) had a mean value of -1.2 mm(0 mm and -3 mm); and the distance between the X-axis and the center of the ACL (M-X) was 0.3 mm (0 mm and 1.2 mm).
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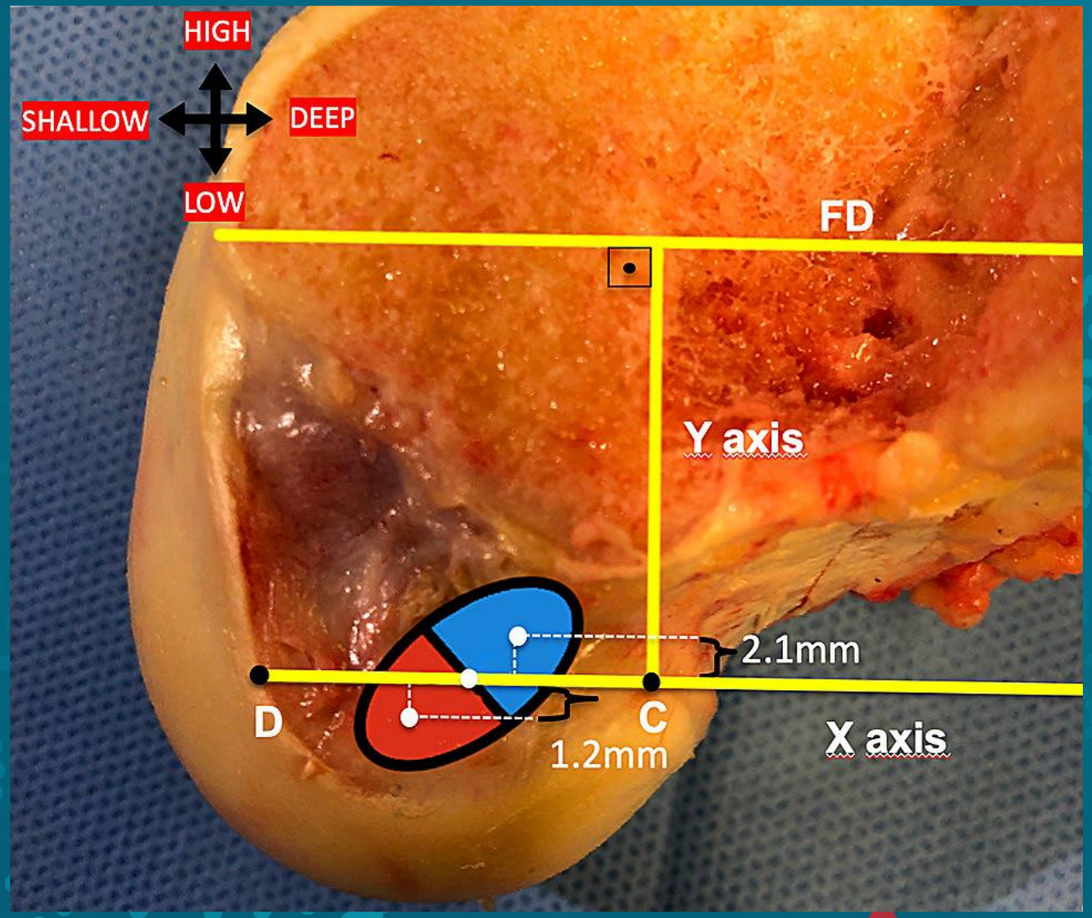
- Therefore, the AM bundle was above point C, the PL bundle was at or below point C, and the center of the ACL (M) was at or slightly above the level of point C in all cases and was at the same level as point C in 11 of the 20 cases (55%).



Results

Table 1 Descriptive statistics and variability measures (*N* 20)

	Mean (SD)	CV	Min	Max	CI
AM-Y	7.17 (0.66)	9%	6.10	8.60	0.29
PL-Y	12.65 (0.94)	7%	10.50	14.60	0.41
M-Y	9.03 (1.11)	12%	7.30	10.98	0.48
AM/CD%	35.2% (4.9%)	14,0%	29.5%	47.8%	2.2%
PL/CD%	61.7% (3.7%)	6,0%	54.1%	67.4%	1.6%
M/CD%	44.2% (7.0%)	15,8%	33.8%	57.2%	3.1%
AM-X	2.14 (0.53)	25%	0.90	3.15	0.23
PL-X	(–) 1.25 (0.81)	65%	– 3.00	0.00	0.35
M-X	0.32 (0.45)	140%	0.00	1.20	0.20
CD	20.56 (1.65)	8%	17.30	23.80	0.72

AM-Y distance from the anteromedial bundle to the low/high axis, *%AM/CD* percentage of the anteromedial bundle distance relative to the CD distance, *PL-Y* distance from the posterolateral bundle to the low/high axis, *%PL/CD* percentage of the distance from the posterolateral bundle relative to the CD distance, *M-Y* distance from the center of the anterior cruciate ligament to the low/high axis, *%M/DC* percentage of distance from the center of the anterior cruciate ligament relative to the CD distance, *AM-X* distance from the anteromedial bundle to the deep/shallow axis, *PL-X* distance from the posterolateral bundle to the deep/shallow axis, *M-X* distance from the center of the cruciate ligament anterior to the deep/shallow axis, *SD* standard deviation, *CV* coefficient of variation, *CI* confidence interval

Conclusion

- Due to the similarity among specimens in the height of the ACL on the Y-axis in relation to the proximal posterior cartilage of the femoral lateral condyle (point C), this point can be used as an arthroscopic intraoperative parameter to define the position of the femoral tunnel in ACL reconstruction for single- or double-bundle techniques.

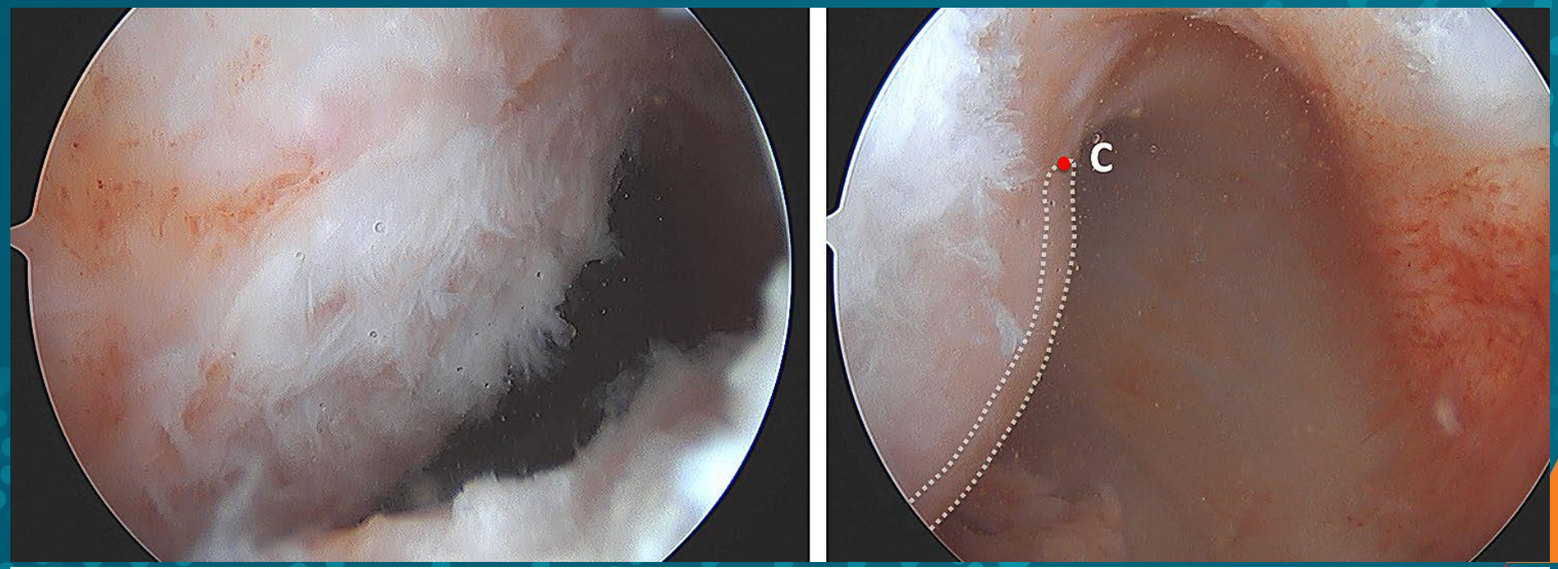


Fig. 3 Left image: arthroscopic view of the ACL footprint seen through the anteromedial portal [note that the limit of the posterior and proximal cartilage of the lateral femoral condyle is not observed (point C)]. Right image: Point C (shown in red) can also be observed through the anteromedial portal, with the arthroscope positioned more posteriorly. The white dotted line represents the limits of the cartilage of the lateral femoral condyle

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