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# Can the posterior femoral cartilage be used as an anatomical reference for the creation of the femoral tunnel in anterior cruciate ligament reconstruction?

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# Faculty Disclosure Information

- Nothing to disclosure



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# Purpose

- The objective of the study is to evaluate the accuracy of femoral tunnel positioning in the anatomical reconstruction of the anteromedial bundle of the ACL using the most proximal and posterior portion of the lateral femoral condyle cartilage (Point C), as described by Cury et al.



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# Methods

- From december 2022 to december 2023, 47 patients underwent ACL reconstruction using Point C as an anatomical landmark for anteromedial bundle reconstruction.
- To create the femoral tunnel, a femoral guide, using the outside-in technique, through the anterolateral portal measuring from Point C to the anterior edge of the femoral condyle, generating the XY distance. From the posterior limit of the XY distance, a value equivalent to 35% of XY is measured, from posterior to anterior, which represents the sagittal coordinate. From this coordinate, a point 2 mm proximal is marked, the femoral guide in outside in manner is positioned and the femoral tunnel is drilled.

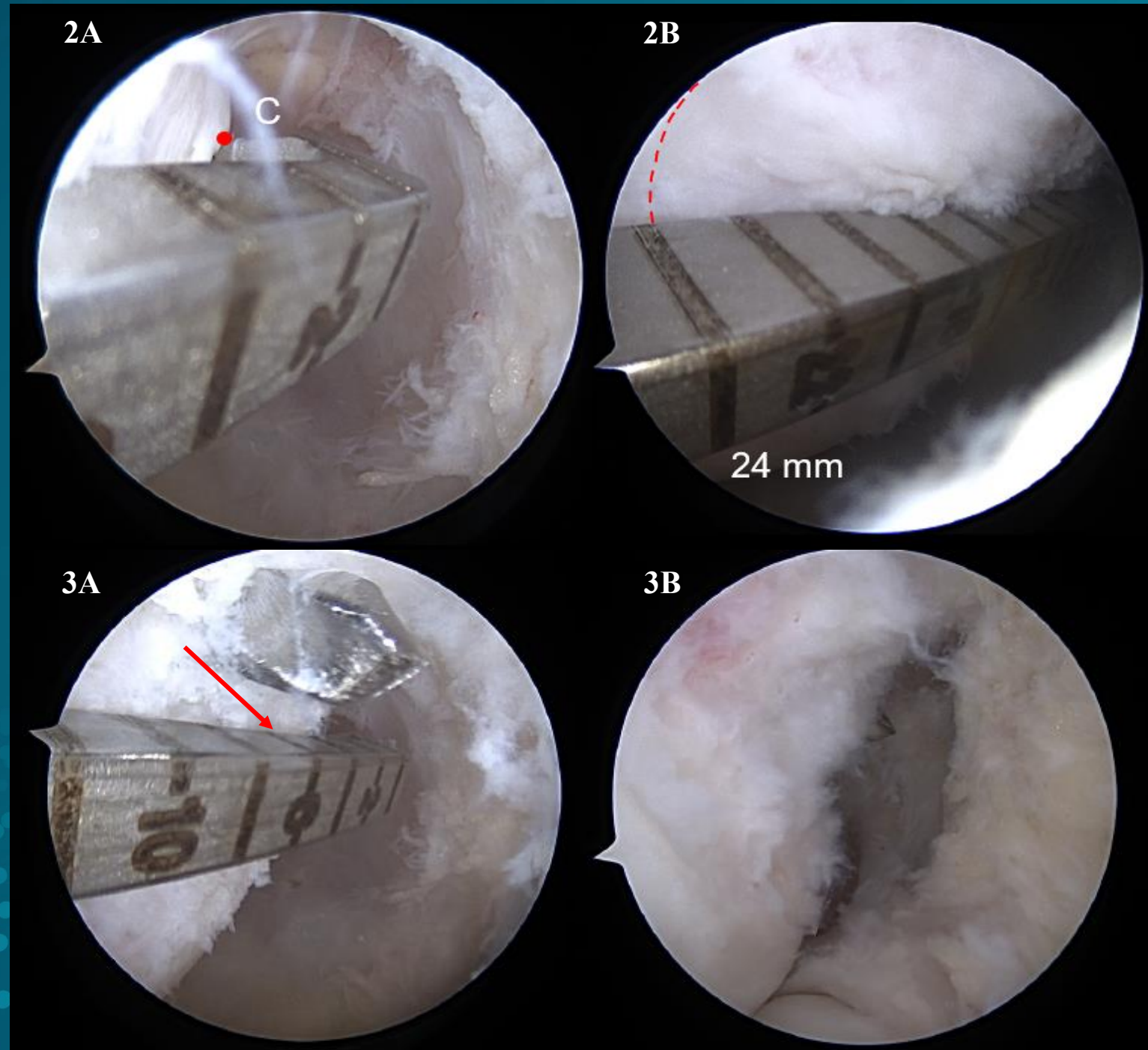


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# Methods



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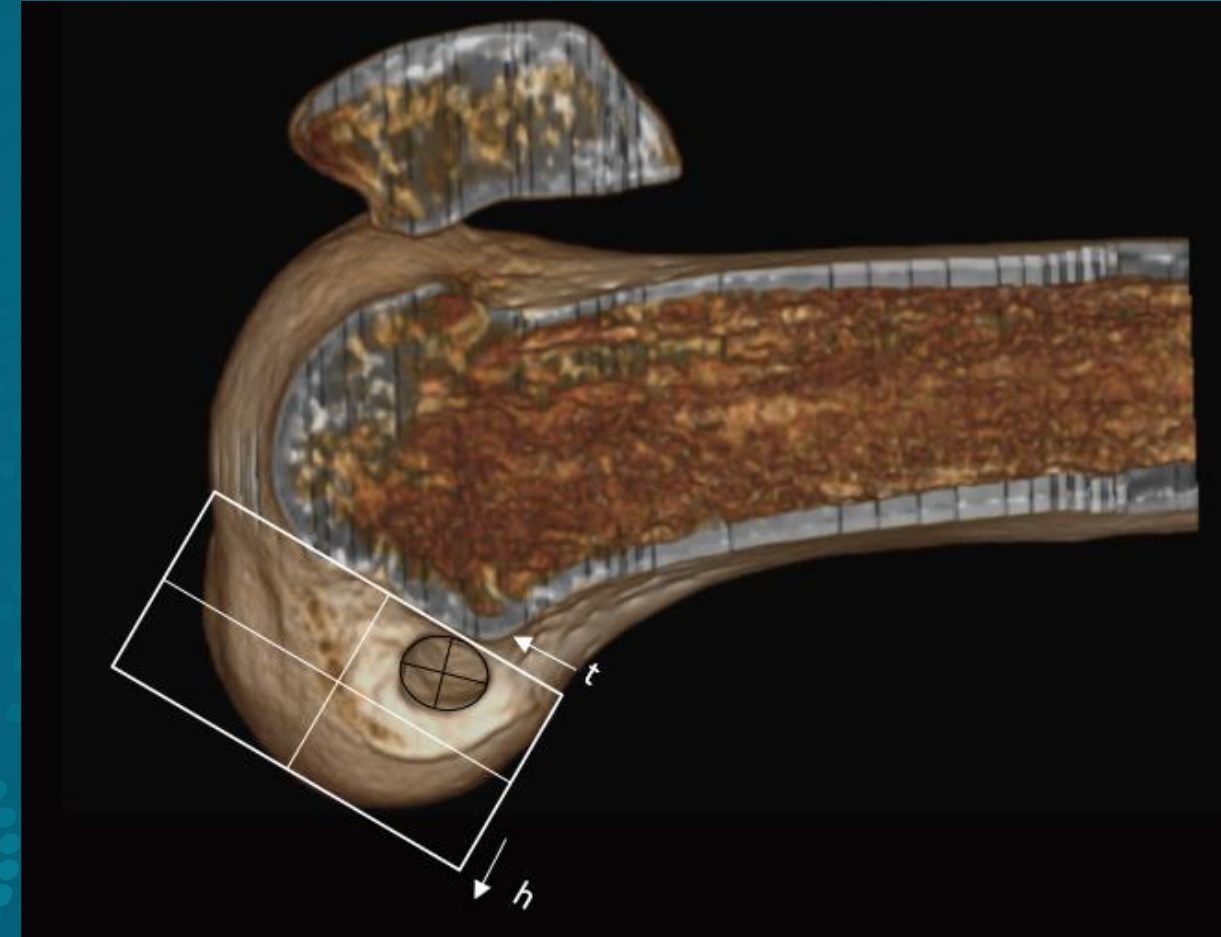


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# Methods

- After the procedure, the patient underwent tomographic evaluation, to obtain a true side view of the knee after tridimensional reconstruction. To assess the accuracy of the positioning, we used Bernard's quadrants. Two evaluators at three different time measured the percentages for each case, and the results were compared to the values described in the literature for the anteromedial bundle (horizontal coordinate/depth =  $24.2 \pm 4\%$  and vertical/height coordinate =  $21.6 \pm 5.2\%$ ).



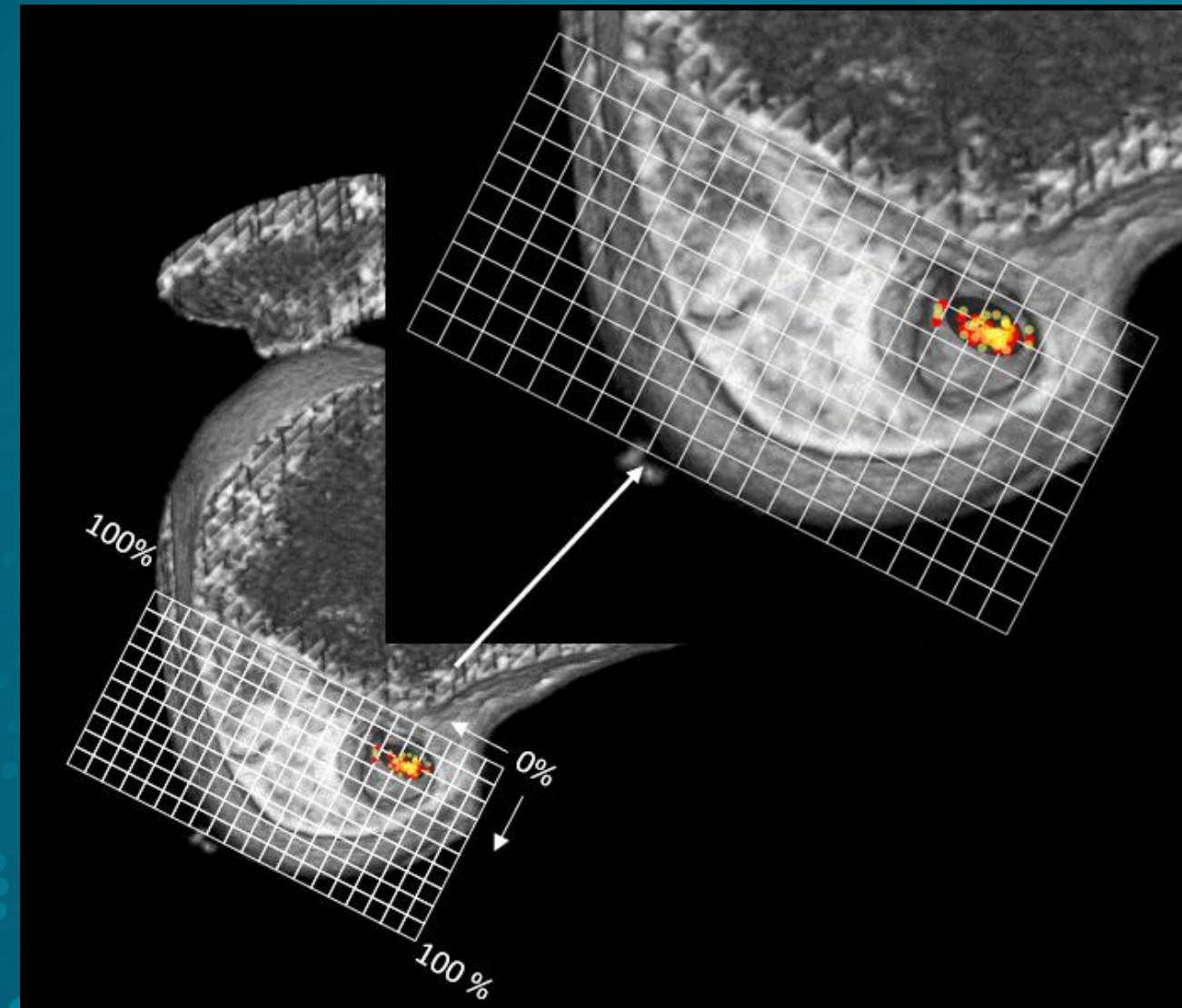
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# Results

- The average distance from Point C to the anterior portion of the lateral femoral condyle was 23.3 mm
- The average correlation value of Point C with the center of the anteromedial bundle in the horizontal coordinate intraoperatively was 7.68 mm.
- The average depth values (X coordinate), in the Bernard quadrants, for evaluator 1 at time 1 were 23.63%, and at time 2 were 23.62%. The average height values (Y coordinate) at time 1 were 22.7%, and at time 2 were 22.07%. The analysis by the second evaluator at the third time point had an average X coordinate of 23.56% and Y coordinate of 22.34%.



Highlighted in the upper image, the black circle represents the values of the coordinates of the anteromedial bundle in the literature (t: 24.2  $\pm$  4% and h: 21.6  $\pm$  5.2%). The 47 cases evaluated by evaluator 1 in the first stage are represented in red. The 47 cases evaluated by evaluator 2 are represented in yellow.



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# Results

**Table 2** Complete Descriptive of Quantitative Factors

	Mean	Median	Standard Deviation	N	CI	SEE	ICC	SEM
Age (Years)	32.3	33	10.1	47	2.9	1.5		
Distance CD (mm)	23.3	24	1.3	47	0.4	0.2		
Distance from Point C (mm)	7.68	8	0.7	47	0.2	0.10		
Depth 1st Time Evaluator 1	23,6%	23,6 %	2,3%	47	0,7%	0,3%	0,942	0,56%
Depth 2nd Time Evaluator 1	23,6%	23,0%	2,6%	47	0,7%	0,4%		
Height 1st Time Evaluator 1	22,7%	22,4%	2,0%	47	0,6%	0,3%	0,791	0,90%
Height 2nd Time Evaluator 1	22,1%	22,1%	2,1%	47	0,6%	0,3%		
Depth 2nd Evaluator	23,6%	23,0%	2,5%	47	0,7%	0,4%		
Height 2nd Evaluator	22,3%	22,1%	1,8%	47	0,5%	0,3%		

N = number of patients / CI = confidence interval / SEE = Standard Error of the Estimate / ICC = Intraclass Correlation Coefficient / SEM = Standard Error of Measurement / CD= intraoperative evaluation of the distance from point C to the anterior portion of the lateral femoral condyle / mm = millimeters

**Table 3** Accuracy of Point C

	Height		Depth	
	Accuracy	CI	Depth	CI
T1 - Evaluator 1	100%	0,0%	93,6%	7,0%
T1 - Evaluator 2	100%	0,0%	91,5%	8,0%
T2 - Evaluator 1	100%	0,0%	93,6%	7,0%

T1 = time 1 / T2 = time 2 / CI = confidence interval



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# Conclusion

- The technique showed good accuracy in mimicking the anteromedial bundle in the femoral tunnel in outside in drilling during ACL reconstruction and can be used as an anatomical parameter to guide the surgeon while performing the surgery.



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# References

1. Abebe ES, Utturkar GM, Taylor DC, Spritzer CE, Kim JP, Moorman CT, Garrett WE, DeFrate LE (2011) The effects of femoral graft placement on in vivo knee kinematics after anterior cruciate ligament reconstruction. J Biomech 44(5):924–929
2. de Paula Leite Cury R, Simabukuro AM, de Marques Oliveira V, Escudeiro D, Jorge PB, Severino FR, Guglielmetti LGB (2020) Anteromedial positioning of the femoral tunnel in anterior cruciate ligament reconstruction is the best option to avoid revision: a single surgeon registry. J Exp Orthop 7 (11): 1-7
3. Byrne KJ, Hughes JD, Gibbs C, Vaswani R, Meredith SJ, Popchak A, Lesniak BP, Karlsson J, Irrgang JJ, Musahl V (2022) Non-anatomic tunnel position increases the risk of revision anterior cruciate ligament reconstruction. Knee Surgery, Sports Traumatology, Arthroscopy 30(4):1388–139
4. Guglielmetti LGB, de Oliveira VM, Mestriner MB, Netto A dos S, Rabelo ND dos A, Correa VNM, Aihara LJ, Cury R de PL (2023) Posterior Proximal Cartilage of the Lateral Femoral Condyle as a Reference for Positioning the Femoral Tunnel in ACL Reconstruction. Video Journal of Sports 3(6):1-3
5. Kim SJ, Song SY, Kim TS, Kim YS, Jang SW, Seo YJ (2021) Creating a Femoral Tunnel Aperture at the Anteromedial Footprint Versus the Central Footprint in ACL Reconstruction: Comparison of Contact Stress Patterns. Orthop J Sports Med 9 (4): 1-8
6. de Mees TTCR, Reijman M, Waarsing JH, Meuffels DE (2022) Posteriorly positioned femoral grafts decrease long-term failure in anterior cruciate ligament reconstruction, femoral and tibial graft positions did not affect long-term reported outcome. Knee Surgery, Sports Traumatology, Arthroscopy 30(6):2003–2013
7. Xu H, Zhang C, Zhang Q, Du T, Ding M, Wang Y, Fu SC, Hopkins C, Yung SH (2016, August 1) A Systematic Review of Anterior Cruciate Ligament Femoral Footprint Location Evaluated by Quadrant Method for Single-Bundle and Double-Bundle Anatomic Reconstruction. Arthroscopy - Journal of Arthroscopic and Related Surgery 32(8): 1724-1734



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