STROBE Statement—Checklist of items that should be included in reports of ***observational studies***

	Item No	Recommendation
Title and abstract	1	(*a*) Computed tomography and preoperative X-ray studies in posterior malleolar fractures: retrospective observational study
		(*b*) Approximately 40% of ankle fractures affect the posterior malleolus (PM) .PM osteosynthesis was recommended when size in X-ray images was greater than 25% of the joint. Currently, tomography has been gaining traction in the preoperative evaluation of ankle fractures. We compared PM size in X-ray images with sagittal computed tomography slices (SAGCT) to elucidate similarity in dimensions and correlate PM size in X-ray images with the articular surface of the affected tibial plafond in the axial view (AXCT) of different tomographic categories of PM fracture. Eighty-one patients (mean age, 39.4 ± 13.5 years) were evaluated. Two independent examiners measured PM size in profile X-ray images (PMXR) and SAGCT and AXCT. The correlation rates between the examiners were 0.93 and 0.94 for PMXR and SAGCT, respectively ($p < 0.001$). Fragments were 2.12% larger in SAGCT than in PMXR ($p = 0.018$). When PMXR < 25%, AXCT corresponded to 10.13% of the tibial plafond, and when PMXR ≥ 25%, AXCT was 24.52% ($p < 0.001$). According to the Haraguchi classification , when analyzing AXCT, difference was found between the three types, with II > I > III ($p < 0.001$).
Introduction		
Background/rationale	2	Approximately 40% of ankle fractures are trimalleolar fractures, Fractures involving the Posterior Malleolous (PM) cause more incongruity, joint instability, and worse results.
Objectives	3	Analyze PM size in X-ray and CT studies, and relate the size of the fragment obtained from X-ray images with articular area of the tibial plafond.
Methods		
Study design	4	Posterior Malleolous fixation is currently controversial[11-14], and variable clinical results have been obtained in the treatment of trimalleolar fractures[15]. The classic recommendation to fixate PM fractures with a radiological size ≥25% theoretically improves articular congruence and reduces the risk of post-traumatic arthritis[16,17]. On the other hand, some authors report fixating PM fractures of various sizes, including small fragments (<25%), under the justification of providing more stability to the ankle joint and better functional results[18,19].
Setting	5	Over a five-year period, from 2016 to 2021, 370 patients diagnosed with an ankle fracture were treated at our hospital (level-1 Trauma Center).
Participants	6	(*a*) The study included patients aged 18 years or older with an ankle fracture or fracture-dislocation involving the PM (AO Foundation/Orthopedic Trauma Association [AO/OTA] classification 44-A3, 44-B3, and 44-C1/2). Cases of tibial plafond fractures, cases of ankle fractures associated with other hindfoot fractures, and cases with incomplete data in the medical records, such as absence of appropriate X-ray and CT images, were excluded. A total of 81 patients met the study's inclusion criteria.
		(*b*) Not applicable
Variables	7	The PMXR sizes measured by two examiners (X and Y) were 21.15% and

		20.46%, respectively, with a mean of 20.81% and Pearson's correlation index of 0.93 ($p < 0.001$). With regard to SAGCT, the values obtained were 23.45% and 22.39%, with a mean of 22.92% and Pearson's index of 0.94 ($p < 0.001$). This inter-observer correlation was excellent both for PMXR and SAGCT. When the sample was divided into two groups according to PMXR size, groups A (<25%) and B (≥25%) had 56 and 25 patients, or 69.13% and 30.86% of the sample, respectively. When analyzing the AXCT of all fractures, the PM affected a mean 14.57% of the tibial plafond, but there was a difference between the groups, with 10.13% and 24.52% of the tibial plafond affected in group A (<25%) and in group B (≥25%), respectively, ($p < 0.001$). The subdivision into the <15%, 15%–19.9%, 20%–24.9%, 25%–29.9%, and ≥30% intervals and their respective AXCTs was performed to evaluate the gradual increase in the affected articular surface according to PMXR size.
Data sources/ measurement	8*	For AXCT, the size of the affected articular surface was measured in both groups (A and B) and the size of the PM and the involvement of the articular surface were compared in the respective morphological categories using the classification proposed by Haraguchi[26]. The statistical analysis was performed using the SPSS Statistics software for Mac (IBM Corporation, Armonk, NY, USA), version 23, considering the mean of the values obtained by the examiners in PMXR and SAGCT. Data normality was tested for the quantitative variables using the Kolmogorov–Smirnov test. Inter-observer reliability was assessed using the Kappa method for the qualitative variables and Pearson's correlation for the quantitative variables. For direct comparison between X-ray and CT, the paired-sample *t*-test or the Wilcoxon, Mann–Whitney, and Kruskal–Wallis tests were used, depending on data normality, type of variable, and number of groups. The significance level was $p < 0.05$, with a 95% confidence interval (CI).
Bias	9	Not Applicable
Study size	10	Of these fractures, 144 involved the PM. The study included patients aged 18 years or older with an ankle fracture or fracture-dislocation involving the PM (AO Foundation/Orthopedic Trauma Association [AO/OTA] classification 44-A3, 44-B3, and 44-C1/2). Cases of tibial plafond fractures, cases of ankle fractures associated with other hindfoot fractures, and cases with incomplete data in the medical records, such as absence of appropriate X-ray and CT images, were excluded. A total of 81 patients met the study's inclusion criteria.
Quantitative variables	11	Posterior malleolus size in X-ray(PMXR) and CT Scans (SAGCT), PM articular surface (AXCT)
Statistical methods	12	(*a*) The statistical analysis was performed using the SPSS Statistics software for Mac (IBM Corporation, Armonk, NY, USA), version 23
		(*b*) A total of 81 patients were included in the study, of whom 44 were men (54.3%) and 37 were women (45.6%), with a mean age of 39.4 years (±13.5). One ankle fracture (1.2%) was type A in the AO/OTA classification, 51 (62.9%) were type B, and 29 (35.8%) were type C. It was observed that the PM presented more than one fracture line in 22 cases (27.2%). Those PMs had what is described in the literature as a chondral or intercalary fragment at the center of the fracture, between the metaphysis and the posterior tibial cortex[29,30]. The PMXR sizes measured by examiners X and Y were 21.15% and 20.46%, respectively, with a mean of 20.81% and Pearson's correlation index of 0.93

		(p < 0.001). With regard to SAGCT, the values obtained were 23.45% and 22.39%, with a mean of 22.92% and Pearson's index of 0.94 (p < 0.001). This inter-observer correlation was excellent both for PMXR and SAGCT (Table 2). Thus, regardless of the measured image, a good inter-observer evaluation was obtained with the proposed measurement method. A significant difference was found in mean size between the images, with PM size in SAGCT being 2.12% (CI 0.3–3.8) greater than in X-ray images (p = 0.018).
		(*c*) Explain how missing data were addressed
		(*d*) If applicable, explain how loss to follow-up was addressed
		(*e*) Describe any sensitivity analyses
Results		
Participants	13*	(a) Participants: 370 potentially eligible, 144 examined for eligibility, 81 confirmed. Eligible.
		(b) Cases of: tibial plafond fractures, ankle fractures associated with other hindfoot fractures, and with incomplete data in the medical records, such as absence of appropriate X-ray and CT images.
		(c) Not Applicable
Descriptive data	14*	(a) A total of 81 patients were included in the study, of whom 44 were men (54.3%) and 37 were women (45.6%), with a mean age of 39.4 years (±13.5).
		(b) Not Applicable
		(c) Not Applicable
Outcome data	15*	Report numbers of outcome events or summary measures over time
Main results	16	(*a*) The correlation rates between the examiners were 0.93 and 0.94 for PMXR and SAGCT, respectively (p < 0.001). Fragments were 2.12% larger in SAGCT than in PMXR (p = 0.018). In PMXR there were 56 cases < 25% and 25 cases ≥ 25%. When PMXR < 25%, AXCT corresponded to 10.13% of the tibial plafond, and when PMXR ≥ 25%, AXCT was 24.52% (p < 0.001). According to the Haraguchi classification, fractures types I and II had similar PMXR measurements that were greater than those of type III. When analyzing AXCT, a significant difference was found between the three types, with II > I > III (p < 0.001).
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		
Key results	18	The present study achieved a relevant sample, considering other studies on the same subject[26-28], and the study variables showed excellent correlation and inter-observer agreement according to Landis[37], which demonstrates the applicability of the measuring method. The present findings add new information to the topic of articular involvement in PM fractures, which will hopefully aid the analysis of the clinical results of patients with PM fractures in future studies.
Limitations	19	The fact that there are different forms of measuring PM size should be considered. Several X-ray parameters have been studied to interpret ankle fractures, and PM size has good inter-examiner reproducibility[21]. There is controversy regarding the best way of measuring PM size in lateral X-ray

		images; moreover, inter-observer agreement shows variable results[22]. Currently, many authors consider CT essential for an adequate understanding of PM fractures, due to the limitations of X-ray images and because CT aids in surgical planning by providing information on PM size and morphology and on its relationship with other malleoli and with the syndesmosis[20-22,32,33].
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21	Discuss the generalisability (external validity) of the study results
Other information		
Funding	22	Not Applicable

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at http://www.strobe-statement.org.