

Traction radiographs improve evaluation of complex intertrochanteric fractures: Surgeon experience-independent effects in a nationwide simulation-based study

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ABSTRACT

BACKGROUND: The role of traction radiographs in the preoperative evaluation of intertrochanteric femur fractures remains controversial, with inconsistent evidence regarding their impact on fracture classification, stability assessment, and surgical decision-making. This nationwide simulation-based study aimed to investigate how orthopedic trauma surgeons use and interpret traction radiographs and to determine their influence on surgical planning across different levels of clinical experience.

METHODS: A nationwide, cross-sectional simulation-based study was conducted among actively practicing orthopedic and trauma surgeons between October 14 and November 15, 2025, using a structured questionnaire containing simulated cases. The questionnaire included demographic characteristics, clinical experience, perceptions of traction radiographs, and case-based assessments of 15 AO Foundation/Orthopaedic Trauma Association (AO/OTA)-classified intertrochanteric fractures (31-A1, 31-A2, 31-A3). A total of 133 surgeons participated, yielding 1,995 individual case evaluations. Changes in surgical decisions before and after traction radiographs were analyzed using McNemar tests, while independent predictors were identified using generalized estimating equations (GEE).

RESULTS: Traction radiographs were requested in 59.5% of all assessments, with significantly higher request rates in unstable patterns (31-A2: 75%; 31-A3: 68.2%) compared with 31-A1 fractures (30%). Overall, traction imaging resulted in a 12.4% change in surgical planning, increasing to 21% among cases in which traction radiographs were obtained. Decision changes were most common in 31-A2.3 (14.9%) and 31-A3.3 (16.9%) patterns. The most frequent implant transition was from short to long proximal femoral nail (PFN) (40.8%), followed by conversion to arthroplasty (18.8%). GEE analysis demonstrated that both fracture type and requesting traction radiographs were independent predictors of surgical plan modification (odds ratio [OR]=1.55–2.40 for unstable fracture types; OR=1.60 for traction radiograph request; $p<0.05$ for all). Surgeon title, institutional setting, years of experience, and case volume were not associated with decision changes.

CONCLUSION: Traction radiographs provide clearer visualization of fragment configuration and medial and lateral wall integrity, leading to improved recognition of fracture instability and a measurable shift toward more durable fixation strategies. Their impact on surgical planning is most pronounced in complex or borderline-unstable fracture patterns and remains consistent across experience levels. As a low-cost and readily accessible adjunct, traction radiography represents a valuable tool in the preoperative assessment of intertrochanteric fractures. Routine use is recommended, particularly when instability is suspected or when standard radiographs provide insufficient clarity.

Keywords: AO/OTA classification; fracture stability; intertrochanteric femur fracture; traction radiograph; surgical decision-making.

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INTRODUCTION

Intertrochanteric fractures (ITFs) are common injuries in older adults and are largely driven by underlying osteoporosis. Both treatment choice and postoperative prognosis depend heavily on fracture stability; therefore, accurate identification of fracture patterns and stability markers remains essential for appropriate surgical planning.^[1] Management is predominantly operative, with proximal femoral nailing (PFN), dynamic hip screw (DHS) fixation, and—when indicated—arthroplasty representing the main treatment options.^[2–4] The overarching objective is to achieve stable reduction and reliable fixation that allow early mobilization.

Routine evaluation of ITFs typically includes anteroposterior (AP) pelvis and hip radiographs, along with a cross-table lateral view.^[5] However, femoral neck anteversion and deformity caused by the fracture can make these standard projections less clear. In displaced or comminuted fractures, conventional radiographs may not fully depict fragment orientation or the true reducibility of the fracture. Consequently, intraoperative challenges may arise, occasionally leading to suboptimal implant selection or inadequate reduction. Traction radiographs—performed with axial traction and internal rotation of the injured limb during image acquisition—have been described as an adjunct modality to overcome these limitations.^[6] In parallel, the use of computed tomography (CT) at initial presentation has also increased in many emergency settings.

Some clinicians have adopted traction radiographs to refine preoperative decision-making.^[7] By separating fracture fragments, traction radiographs can provide clearer visualization of the fracture line, comminution pattern, and the integrity of the posteromedial cortex. They have also been shown to significantly improve both interobserver and intraobserver agreement when applying the AO Foundation/Orthopaedic Trauma Association (AO/OTA) classification system for intertrochanteric fractures.^[7,8] Particularly in teaching hospitals, these images have been reported as a low-cost, low-morbidity tool that enhances classification accuracy.^[9] Conversely, other studies have suggested that traction radiographs do not improve the reliability of AO/OTA classification in pertrochanteric fractures, leaving their true clinical utility somewhat uncertain.^[10]

These conflicting findings create uncertainty regarding the true value of traction radiographs in clinical practice and their role in surgical decision-making. To date, no nationwide study has evaluated the impact of traction radiographs on surgical decision-making across varying levels of surgeon experience. In this study, we hypothesized that traction radiographs have a meaningful effect on surgical planning and that this influence increases with fracture complexity, regardless of surgeon experience. Our aim was to investigate how orthopedic trauma surgeons perceive and utilize traction radiographs in the preoperative evaluation of intertrochanteric fractures and to assess their perceived impact on surgical decision-making using

a radiology-based, simulation-driven clinical decision-making design.

MATERIALS AND METHODS

Ethical approval for the study was obtained from the Clinical Research Ethics Committee of Koşuyolu Yüksek İhtisas Training and Research Hospital (Date: 14.10.2025, Decision no: KYIEAH-KAEK 2025/17/1274). This study was designed as a nationwide, cross-sectional, case-based online study conducted among actively practicing orthopedic and trauma surgeons. All participants were informed that their responses would be analyzed solely for scientific purposes and reported in an aggregated manner.

A pilot study was conducted with 10 orthopedic surgeons working at Fatih Sultan Mehmet Training and Research Hospital, who independently evaluated 30 fracture cases. Feedback from this phase indicated that an online completion time exceeding 15 minutes reduced response completion rates. Based on the pilot data, a minimum of 15 cases was calculated to provide adequate statistical power, and the final number of questions was adjusted accordingly.

Case Selection and Criteria

Fifteen intertrochanteric fracture cases were selected a priori to represent the AO/OTA 31-A1, 31-A2, and 31-A3 spectrum and common clinical scenarios. Case selection was based on predefined radiographic criteria and image quality rather than clinical outcomes, aiming to minimize selection bias. Two senior orthopedic trauma surgeons independently assigned the reference AO/OTA classification for each case and resolved discrepancies by consensus.

Inclusion Criteria

- Adults aged ≥ 18 years
- Fracture types AO/OTA 31-A1, 31-A2, and 31-A3
- Radiographs of adequate image quality that clearly demonstrated fracture morphology.

Exclusion Criteria

- Patients aged < 18 years
- Fractures of the femoral shaft or distal femur
- Intracapsular fractures (femoral head or femoral neck fractures).

The study population consisted of actively practicing orthopedic and trauma surgeons. Participants were recruited through TOTBİD (Turkish Society of Orthopedics and Traumatology) specialist groups and completed an online questionnaire hosted on Google Forms between October 14, 2025 and November 14, 2025. Data collection was closed on November 15, 2025. Participation was voluntary and anonymous; no directly identifying personal data were collected. The number of surgeons who participated in and completed the case-based online assessment was recorded.

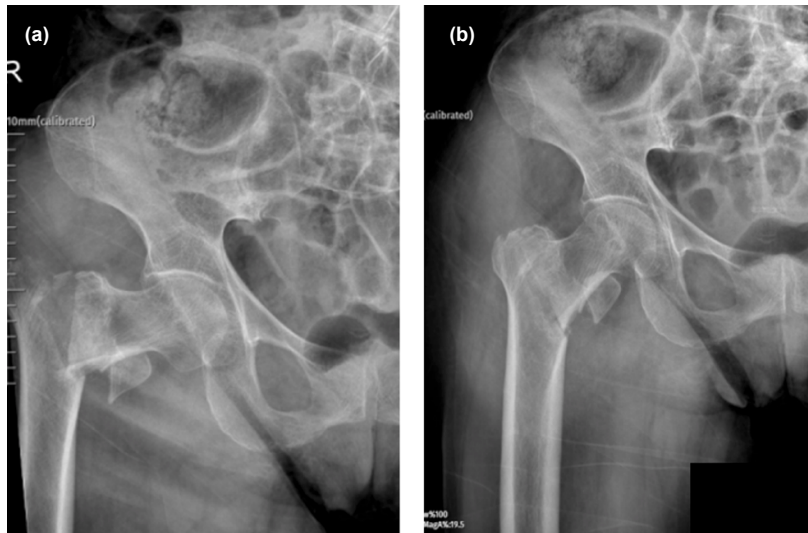


Figure 1. Representative hip radiographs used in the study instrument. (a) Standard anteroposterior hip radiograph without traction. (b) Traction-internal rotation radiographic view obtained under axial traction.

For each case, participants first reviewed standard preoperative radiographs and recorded (i) whether they would request a traction radiograph and (ii) their initial surgical plan or implant preference. If a traction radiograph was requested (i.e., traction images were viewed), participants then recorded their revised surgical plan (Fig. 1). The primary endpoint was surgical plan change after traction radiography among traction-viewed evaluations, defined as any change in the planned treatment category or implant choice between the pre-traction and post-traction responses. Secondary endpoints included the probability of requesting traction radiography and the direction of decision change (e.g., escalation from extramedullary fixation to cephalomedullary nailing or arthroplasty).

Simulation-Based Clinical Decision-Making Study

All participants evaluated the same standardized radiographic cases via the online platform, ensuring uniform image input across all institutions. The study instrument was structured into three main sections to examine the role of traction radiographs in clinical decision-making from different perspectives:

Demographic Characteristics: This section included participants' job title, type of institution, years of clinical experience, and the frequency with which they treated patients with hip fractures.

1. Questions addressing perceived effectiveness, benefits and drawbacks, associated risk factors, previous training, and the availability of relevant imaging equipment were used to assess participants' perspectives on traction radiographs.

2. Case-Based Surgical Decision-Making: This section analyzed participants' inclination to request traction radiographs,

their initial surgical choices, changes in those choices after reviewing traction images, and their preferred surgical approaches.

Item-level missingness was assessed for each variable, and the proportion of missing data was reported for all covariates and outcomes. Because overall missingness was low (133/137 responses; <1% missing data), a complete-case analysis was performed as the primary approach.

Statistical analyses were performed using SPSS (version 24.0, Chicago, Illinois, USA) and Python 3.11. An a priori power analysis indicated that ≥ 64 respondents were required (two-sided $\alpha=0.05$, 80% power) to detect a clinically meaningful paired change. Clustering arising from repeated case ratings was accounted for using a design effect, and the final sample (133 participants; 1,995 case evaluations) provided adequate precision for population-averaged estimates. Continuous variables were reported as mean \pm standard deviation (SD), while categorical variables were expressed as percentages. Missing data accounted for less than 1%; therefore, no data completion procedures were necessary. The stability of surgical planning before and after traction radiograph evaluation was assessed using Cohen's kappa coefficient (κ), interpreted according to the Landis and Koch classification as 0.00–0.20 (slight), 0.21–0.40 (fair), 0.41–0.60 (moderate), 0.61–0.80 (substantial), and 0.81–1.00 (almost perfect agreement). In this context, kappa was used to measure intra-rater decision stability, assessing the degree of agreement between initial and revised surgical preferences beyond that expected by chance. Factors influencing surgical decision change were analyzed using a generalized estimating equations (GEE) model with a logit link and an exchangeable correlation structure. A significance level of $p<0.05$ was adopted.

RESULTS

Participant Demographics

A total of 133 orthopedic and trauma surgeons participated in the study. The professional distribution included specialists (64%), assistant or associate professors (12%), associate professors (15%), and full professors (9%). Regarding institutional affiliation, 53% were working in university or tertiary-care hospitals, 23% in private hospitals or clinics, 21% in Ministry of Health state hospitals, and 3% in private offices. Clinical experience was broadly distributed as follows: more than 15 years (34%), 11–15 years (19%), 6–10 years (23%), and 0–5 years (24%) (Table 1).

Clinical Profile and Experience

Most respondents (59%) reported routinely managing hip fracture cases. While 21% encountered more than five cases per week, 30% reported monthly exposure, and 11% indicated that they rarely managed such injuries.

Perceptions and Experience with Traction Radiographs

Overall, 72% of participants believed that traction radiographs were useful for assessing fracture stability and fragment alignment (Fig. 2).

When asked about perceived advantages, the most common responses were easier surgical planning (85%) and improved visualization of fracture fragments (65%). Furthermore, 35% agreed that traction radiography reduced the likelihood of fracture characteristics being misclassified or misinterpreted. Reported disadvantages included additional cost and increased time burden (23%), whereas 5% felt that traction imaging offered no meaningful improvement over standard radiographs (Fig. 3).

Variable	n	%
Academic title		
Specialist	85	64.0
Assistant professor	16	12.0
Associate professor	20	15.0
Professor	12	9.0
Institution type		
University/tertiary hospital	71	53.4
Private hospital	30	22.6
State hospital	28	21.1
Private office	4	3.0
Clinical experience		
0–5 years	32	24.1
6–10 years	30	22.6
11–15 years	25	18.8
>15 years	46	34.6

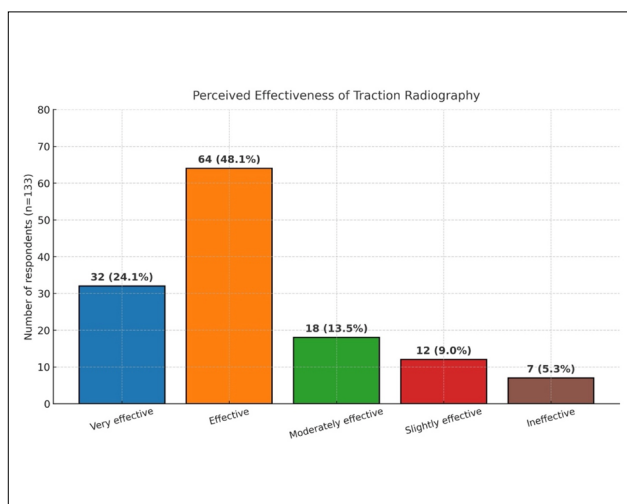


Figure 2. Perceived effectiveness of traction radiographs in assessing intertrochanteric fractures.

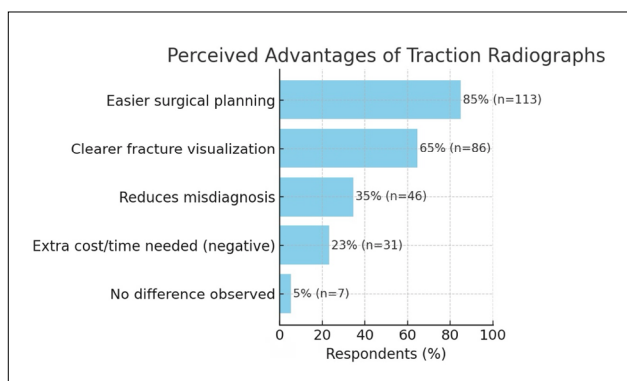


Figure 3. Reported advantages of traction radiographs, including improved surgical planning and enhanced visualization of fracture fragments.

Difficulties Encountered with Traction Radiographs

Patient-related factors were identified as the most common challenge during traction radiography; 80% of participants reported patient discomfort or poor patient cooperation as the primary obstacle. Other barriers included time constraints (42%), lack of adequately trained staff (40%), and limited equipment availability (32%). Only 5% reported experiencing no substantial difficulties (Fig. 4).

Training and Equipment Availability

Formal training in traction radiography was uncommon. More than half of the surgeons (52%) reported learning through on-the-job experience, 20% stated that they had received no training at all, 8% had received only theoretical instruction, and just 19% had undergone comprehensive theoretical and practical training. Equipment accessibility showed a similar pattern: only 13% reported adequate availability, whereas 54% considered their institutional resources inadequate, 24% described them as partially available, and 9% were unsure.

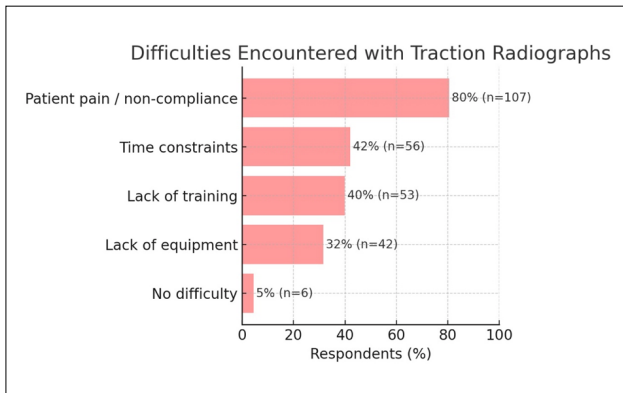


Figure 4. Most commonly encountered challenges during traction radiograph acquisition.

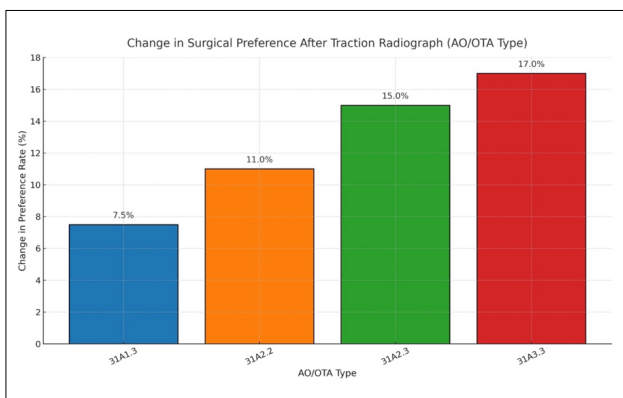


Figure 5. Distribution of surgical plan modifications following review of traction radiographs across AO Foundation/Orthopaedic Trauma Association (AO/OTA) fracture types.

Case-Based Surgical Decision-Making

A total of 1,995 individual observations were obtained from 15 fracture cases. The distribution across the AO/OTA classification system was roughly balanced, with one-third classified as 31-A1, one-third as 31-A2, and the remaining one-third as 31-A3.

Table 2. Distribution of surgical plan changes (n=249) and agreement analysis

Initial preference → Revised preference	Frequency (n)	%
Short PFN → Long PFN	102	40.8
Short PFN → Arthroplasty	47	18.8
Long PFN → Arthroplasty	18	7.2
PFN ↔ DHS	15	6.0
Other transitions	67	27.2
Total changes (out of 1,995 evaluations)	249	100
Cohen's kappa (κ)	0.68	<0.001*

Note: “→” indicates a unidirectional change; “↔” indicates bidirectional changes. PFN: Proximal femoral nail; DHS: Dynamic hip screw. *Statistically significant at p<0.05.

The overall request rate for traction radiography was 59.5%. Fracture type was significantly associated with the probability of obtaining traction imaging (p<0.001). The request rate was 30% for 31-A1 fractures, increasing markedly to 75% for 31-A2 and 68.2% for 31-A3 fractures.

Changes in Surgical Planning

The overall rate of surgical plan modification after reviewing traction radiographs was 12.4%. Among the 1,186 cases for which traction imaging was requested, surgical decisions changed in 249 instances (21%).

Decision changes were most frequent in 31-A2.3 (14.9%) and 31-A3.3 (16.9%) fractures, whereas the rate was lower for 31-A1.3 injuries (7.5%) (Fig. 5). The association between AO/OTA fracture type and decision change was statistically significant ($\chi^2(3)=22.47$, p=0.00035).

Changes in Implant Selection

The most prevalent change among the 249 cases with surgi-

Table 3. Results of generalized estimating equations (GEE) analysis

Variable	OR	95% CI	p-value
31-A2.2 vs. 31-A1.3	1.55	1.10–2.17	0.023
31-A2.3 vs. 31-A1.3	2.10	1.49–2.95	<0.001*
31-A3.3 vs. 31-A1.3	2.40	1.65–3.48	<0.001*
Traction radiograph requested (Yes)	1.60	1.25–2.05	<0.001*
Academic title	–	NS	>0.05
Institution type	–	NS	>0.05
Clinical experience	–	NS	>0.05
Frequency of hip fracture cases	–	NS	>0.05

*Statistically significant at p<0.05. NS: Not significant.

cal plan revision was the transition from a short to a long PFN (40.8%). Other major transitions included switching from short PFN to arthroplasty (18.8%) and from long PFN to arthroplasty (7.2%). Transitions between PFN and DHS fixation occurred in 6% of cases. Overall, 67.1% of decision changes reflected a shift toward a more stable intramedullary construct or arthroplasty (Table 2). The total number of changes (n=249) was consistent with the overall change rate of 12.4% observed across the 1,995 evaluations. To assess the reliability of surgical planning before and after traction radiographs, Cohen's kappa coefficient (κ) was calculated, revealing substantial agreement ($\kappa=0.68$, $p<0.001$). This finding confirms that the observed shifts in surgical preference were statistically significant and not attributable to chance.

Multivariable Analysis

The generalized estimating equations model demonstrated that requesting a traction radiograph and fracture type were independent predictors of surgical plan change. Compared with 31-A1.3 fractures, the likelihood of decision change was significantly higher in 31-A2.2 (odds ratio [OR]=1.55; 95% confidence interval [CI]: 1.10–2.17; $p=0.023$), 31-A2.3 (OR=2.10; 95% CI: 1.49–2.95; $p<0.001$), and 31-A3.3 fractures (OR=2.40; 95% CI: 1.65–3.48; $p<0.001$) (Table 3).

Requesting traction radiographs increased the odds of a decision change by approximately 60% (OR=1.60; 95% CI: 1.25–2.05; $p<0.001$). Professional title, institution type, years of experience, and weekly case volume were not statistically significant predictors.

DISCUSSION

The principal finding of this study is that the use of traction radiographs significantly increases the likelihood of revising the surgical plan in intertrochanteric fractures, particularly in cases with unstable fracture patterns. Our results confirm that traction imaging plays an important role in the evaluation of intertrochanteric fractures. During case evaluation, nearly 60% of participants requested traction radiographs, and a substantial proportion subsequently revised their treatment plans, illustrating the role of this imaging modality in clinical decision-making. These results suggest that focused training programs centered on the acquisition and interpretation of traction pictures may enhance surgeon confidence, particularly among those with less experience. This study also provides evidence that traction radiographs influence surgical planning in complex intertrochanteric fractures, independent of surgeon experience.

The rate of traction radiograph requests increased in parallel with the AO/OTA instability grade, and this variable showed a strong association with changes in surgical planning. The rate of decision change was nearly 2.5 times higher in 31-A2.3 and 31-A3.3 fractures than in stable 31-A1.3 fractures. This pattern suggests that surgical plan modifications are concentrated in unstable fracture types and that traction imaging is an important tool for improving treatment strategies in these

situations. Our findings support the notion that traction radiographs may elucidate the true stability characteristics of fractures within the AO/OTA 31-A2 subgroup, thereby significantly influencing treatment decisions. The data also suggest that surgeons generally only use traction imaging when they are not sure what to do during the early planning stage. This shows that traction imaging has a selective but important role.

The literature has long documented moderate interobserver agreement for intertrochanteric fracture classification using systems such as Evans/Jensen and AO/OTA, particularly in comminuted patterns.^[11–13] Previous reports indicate that adding a traction–internal rotation view improves interobserver reliability.^[7] It has also been reported that the addition of an internal rotation traction radiographic view significantly improves radiologist accuracy, diagnostic confidence, and interreader agreement.^[14] In one study, 19% of observers revised their assessment of fracture stability—most notably in 31-A2.1 patterns, where 34% of initially “stable” fractures were reclassified as unstable following traction imaging. Our findings contribute to this debate by shifting the focus from classification reliability alone to clinical decision impact. In a standardized national sample of surgeons, traction radiographs were associated with measurable changes in planned treatment, particularly in more complex fracture patterns.

Traction–internal rotation radiographs have been reported to enhance the evaluation of the lateral femoral wall and, in turn, influence implant selection and preoperative planning.^[15–17] Consistent with these observations, our cohort demonstrated a 12.4% overall change in implant choice after traction imaging, accompanied by convergence in treatment preferences that suggests improved interobserver agreement. Clinically, this shift in decision-making appears to be driven by the additional information traction views provide regarding case-specific reducibility. In many instances, surgeons revised their initial plans when traction imaging revealed poorer-than-anticipated reduction potential, greater fragment separation, or more pronounced deformity. Importantly, the GEE model supported this interpretation by identifying fracture type and the request for traction radiographs as independent predictors of surgical plan modification, whereas surgeon-related characteristics (professional title and experience) and institution type were not associated with decision change. Collectively, these findings indicate that traction radiographs function less as a “surgeon-dependent” adjunct and more as a standardized decision-support tool that enhances recognition of key fracture determinants across different practice environments. This is particularly relevant when considering the lateral femoral wall, where a thin preoperative wall has been linked to fixation failure and inferior functional outcomes with a dynamic hip screw, underscoring the need for meticulous radiographic assessment.^[17] In this study, our results suggest that the perceived value of traction imaging—by facilitating a more confident appraisal of lateral wall adequacy and other instability cues that steer treatment away from DHS when appropriate—reflects a broadly shared awareness

that is largely independent of surgical seniority. Consequently, traction imaging may help harmonize implant selection toward mechanically more stable constructs.

Notably, surgeons were more likely to shift from extramedullary fixation to intramedullary nailing after traction radiographs revealed greater instability. Conversely, transitions from an intramedullary device to a less stable implant following traction imaging were rare. The most frequent change was from a short to a long PFN, followed by conversion to arthroplasty. These trends indicate that the net effect of traction imaging is a shift toward more stable fixation strategies.

In the present study, measured surgeon characteristics (title, years of experience, institution type, and hip fracture volume) were not statistically associated with decision change after adjustment for fracture-related factors. This finding should be interpreted cautiously. Prior work has shown that experience can influence classification reliability and perceived difficulty, and even when p-values are non-significant, clinically meaningful effect sizes may still exist.^[9] Therefore, we interpret “experience-independent” to mean that—within the precision of this study—case morphology and traction visualization dominated decision revisions, rather than concluding that experience plays no role in real-world decision-making. Larger or longitudinal study designs, incorporation of confidence ratings, and linkage to operative outcomes are needed to determine whether traction imaging truly standardizes decision-making across different levels of surgeon experience.

When assessing perceived advantages, participants frequently cited several benefits of traction imaging. However, approximately 5% reported practical limitations, primarily related to cost and workflow. Patient-related obstacles, most notably discomfort and limited cooperation, emerged as the most significant challenges during imaging, surpassing institutional or technological constraints.

Training-related findings also deserve attention. Many residents and early-career surgeons report improved confidence in fracture classification and treatment planning when traction imaging is incorporated into their training.^[6,9,18] In our study, systematic training was uncommon, with more than half of respondents reporting that they had learned traction radiography informally during clinical practice. Limited access to appropriate equipment was also evident. These findings highlight the need to incorporate traction radiograph acquisition and interpretation into residency training programs and to standardize equipment availability, which may ultimately improve decision-making skills among younger surgeons.

Overall, traction radiograph utilization reached 60% in this cohort and was associated with meaningful changes in surgical planning. These findings suggest that traction imaging may serve as an important complementary tool in the stability assessment of intertrochanteric fractures.

This study has several limitations that should be considered when interpreting the findings. First, the study relies on a

case-based, standardized radiograph assessment that captures self-reported diagnostic and treatment preferences rather than real-time bedside decision-making. Therefore, the findings may differ from actual clinical practice, where patient comorbidities, bone quality, functional status, anesthesia risk, and institutional constraints can materially influence implant selection. Second, because the cross-sectional decision-making study was disseminated through professional communication channels and participation was voluntary, the sample represents a convenience cohort. If the total number of eligible surgeons reached is unknown or the response rate is low, nonresponse bias may limit representativeness despite the nationwide scope. Third, traction radiographs were not randomly assigned. Requesting traction imaging likely reflects baseline uncertainty and perceived instability; therefore, associations between traction imaging and decision change should be interpreted as decision-impact associations rather than causal effects. Fourth, only 15 cases were included and were purposefully selected to represent the fracture spectrum. Although this approach supports standardized comparisons, it may not reflect the full national distribution of fracture morphologies, image quality, or borderline patterns, and the results may therefore be sensitive to case selection. Fifth, correlated-data methods reduce—rather than eliminate—analytic concerns in cross-classified study data. Although we modeled within-respondent dependence and performed case-level sensitivity analyses, residual clustering and unmeasured heterogeneity may persist. Finally, the present study does not evaluate whether traction-driven changes in surgical plans translate into improved patient-centered outcomes. Prospective clinical studies linking imaging strategy to intraoperative reducibility, complication rates, and functional recovery are needed.

CONCLUSION

In conclusion, traction radiographs improve visualization of fracture configuration and instability markers, leading to changes in surgical planning, particularly in complex or borderline unstable intertrochanteric fractures. This effect is consistent across different levels of surgical experience. Traction radiography may therefore serve as a useful adjunct in preoperative assessment when standard radiographs provide limited information.

Ethics Committee Approval: This study was approved by the Koşuyolu Yüksek İhtisas Training and Research Hospital Ethics Committee (Date: 14.10.2025, Decision No: KYİEAH-KAEK 2025/17/1274).

Peer-review: Externally peer-reviewed.

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Materials: O.Y.; Data collection and/or processing: H.F.E., O.Y.; Analysis and/or interpretation: H.Ç.K., O.G.; Literature review: H.Ç.K., B.E.K.; Writing: H.Ç.K., O.G.; Critical review: B.E.K., B.Y.

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ORJİNAL ÇALIŞMA - ÖZ

Traksiyon grafileri kompleks intertrokanterik kırıkların değerlendirilmesini iyileştirir: Cerrah deneyiminden bağımsız etkiler gösteren ulusal ölçekli simülasyon temelli çalışma

AMAÇ: Traksiyon grafilerinin intertrokanterik femur kırıklarının preoperatif değerlendirilmesindeki yeri halen tartışmalıdır. Literatürde kırık sınıflandırması, stabilite değerlendirmesi ve cerrahi planlama üzerindeki etkisine ilişkin bulgular kesinleşmemiştir. Bu ulusal ölçekli çalışma, ortopedi ve travmatoloji uzmanlarının traksiyon grafisi kullanımına yönelik yaklaşımlarını ve bu görüntülemenin cerrahi karar verme sürecine etkisini, klinik deneyimden bağımsız olarak değerlendirmeyi amaçlamıştır.

GEREÇ VE YÖNTEM: 14 Ekim–15 Kasım 2025 tarihleri arasında aktif olarak çalışan ortopedi ve travmatoloji hekimlerine çevrimiçi vaka temelli bir değerlendirme uygulanmıştır. Bu değerlendirme; demografik bilgiler, klinik deneyim, traksiyon grafisine yönelik algı ve 15 AO/OTA sınıflandırılmış intertrokanterik kırık vakasına (31-A1, A2, A3) ilişkin vaka temelli soruları içermiştir. Toplam 133 katılımcıdan 1995 gözlem elde edilmiştir. Cerrahi karar değişiklikleri McNemar testi ile analiz edilmiş, bağımsız belirleyiciler Genelleştirilmiş Tahmin Denklemi (GEE) ile değerlendirilmiştir.

BULGULAR: Traksiyon grafisi istem oranı tüm değerlendirmelerin %59.5'ini oluşturmuş olup, bu oran instabil kırık tiplerinde anlamlı biçimde yükselmiştir (31-A2: %75; 31-A3: %68.2; 31-A1: %30). Traksiyon grafisi sonrası genel cerrahi plan değişikliği oranı %12.4, traksiyon grafisi istenen olgularda ise %21 olarak bulunmuştur. Karar değişikliği özellikle 31-A2.3 (%14.9) ve 31-A3.3 (%16.9) kırıklarında belirginleşmiştir. En sık implant geçişi kısa PFN'den uzun PFN'ye (%40.8), ardından artroplastieye geçiş (%18.8) şeklinde olmuştur. GEE analizinde kırık tipi ve traksiyon grafisi istemi cerrahi karar değişikliğinin bağımsız belirleyicileri olarak saptanmıştır (OR=1.55–2.40 ve OR=1.60; p<0.05). Katılımcının unvanı, kurum tipi, deneyim yılı ve vaka hacminin karar değişikliği üzerinde anlamlı etkisi bulunmamıştır.

SONUÇ: Traksiyon grafileri fragman konfigürasyonunun ve medial/lateral duvar bütünlüğünün daha net değerlendirilmesine olanak sağlayarak kırık instabilitesinin daha doğru tanınmasına ve daha dayanıklı implant tercihlerine yönelimde artışa neden olmaktadır. Bu etkinin özellikle kompleks veya sınırda instabil kırıklarda belirgin olduğu ve cerrah deneyiminden bağımsız olarak korunduğu gösterilmiştir. Traksiyon grafisinin düşük maliyetli, uygulanabilir ve klinik karar sürecine anlamlı katkı sağlayan bir yöntem olarak intertrokanterik kırıkların preoperatif değerlendirilmesinde rutin kullanımının, özellikle instabiliteden şüphelenilen durumlarda, faydalı olabileceği düşünülmektedir.

Anahtar sözcükler: AO/OTA sınıflandırması; cerrahi karar verme; intertrokanterik femur kırığı; kırık stabilitesi; traksiyon grafisi.

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