

Extended Bayram Holidays and Surgical Timing in Orthopaedic Fracture Patients: A Matched-Control Study, 2016–2025

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Abstract

Aims: To assess whether admission during Ramadan Bayram or Eid al-Adha was associated with surgical timing in orthopaedic fracture patients. Hospital stay, surgery within 48 hours, and one-year reoperation were secondary outcomes. **Methods:** This single-centre retrospective matched-period cohort study included patients admitted between June 2016 and June 2025. Twenty Bayram holiday periods were matched with control periods of identical duration from the preceding two weeks. Patients requiring immediate surgery, those with open injuries, and those admitted directly to intensive care were excluded. Mixed-effects models adjusted for age, sex, ASA grade, femoral fracture status, and multiple fractures. **Results:** The cohort included 192 patients: 100 admitted during holiday periods and 92 during control periods. Median time to surgery was 4.5 days during holidays and 4.0 days during control periods ($p=0.169$). After adjustment, holiday admission was not associated with time to surgery (adjusted geometric mean ratio 1.03, 95% confidence interval 0.85–1.24; $p=0.781$). Surgery within 48 hours was similar between groups (36.0% vs 31.5%; $p=0.512$). Hospital stay was longer during holidays in the unadjusted analysis (median 9 vs 7 days; $p=0.004$), but not after adjustment ($p=0.702$). Older age was associated with longer time to surgery and hospital stay, while multiple fractures were associated with longer hospital stay. One-year reoperation rates were similar (6.0% vs 4.3%; $p=0.750$). **Conclusion:** Bayram holiday admission was not independently associated with delayed surgery, prolonged hospital stay, or one-year reoperation.

Keywords: Fractures, bone; time-to-treatment; length of stay; reoperation; holidays

1. Introduction

For patients admitted with an orthopaedic fracture, treatment is not limited to the operation itself. Preoperative assessment, anaesthetic preparation, operating-room scheduling, postoperative care, and discharge planning may all influence the course of hospitalisation. Coordinating these processes may be more difficult when routine hospital services are reduced.^{1,2}

Previous studies have examined whether weekend and holiday admissions affect fracture care, most often in hip fracture populations.^{3,4} Some have reported longer waits for surgery during public holidays, whereas others found no clear difference in mortality or other major outcomes.^{5,6} Similar concerns have been raised during longer holiday periods in other medical systems, including the Christmas and summer vacation periods in Europe and North America and the Chinese New Year/Spring Festival holiday in East Asia.^{7,8} However, studies examining the effect of extended holiday periods on hospital care remain limited, and their findings are inconsistent.⁹ Differences in trauma theatre availability, inpatient staffing, and postoperative services may explain some of this variation.¹⁰

Ramadan Bayram and Eid al-Adha are the two major religious public holidays in Türkiye. Their official durations are 3.5 and 4.5 days, respectively. When these holidays fall adjacent to a weekend, they commonly result in a 4-5-day interruption of routine services. In some years, additional administrative leave extends this period to 9-10 days. Emergency care continues during these periods, but outpatient clinics are generally suspended and the usual pattern of operating-room and ward activity may change.

Whether these holiday periods affect the care of orthopaedic fracture patients has not been studied in Türkiye. We therefore compared patients admitted during Ramadan Bayram and Eid al-Adha with patients admitted during matched control periods before each holiday. The primary aim was to determine whether holiday admission was associated with a longer time to surgery. Hospital stay and one-year reoperation were also assessed. We additionally compared short holidays lasting 4-5 days with extended holidays lasting 9-10 days.

2. Methods

This single-centre retrospective matched cohort study was carried out at Trakya University Faculty of Medicine. It included patients admitted between June 1, 2016, and June 30, 2025.

Ethical approval was acquired from the Trakya University Faculty of Medicine Non-Interventional Clinical Research Ethics Committee (Trakya GOBAEK; protocol no. 225/248; June 23, 2025). Written informed consent was received from hospitalized patients.

2.1. Study Periods and Matching Strategy

Holiday periods comprised the official Ramadan Bayram and Eid al-Adha holiday periods occurring during the study period. A holiday period was defined operationally as a period in which outpatient services were not provided and operating room activity differed from the routine schedule.

For each holiday period, a control period of identical duration was selected from the two weeks immediately preceding the corresponding holiday. This approach was used to reduce seasonal variation while limiting the influence of Bayram-related changes in patient volume, referral patterns, and health-care delivery. The study included 20 holiday periods, consisting of 10 Ramadan Bayram and 10 Eid al-Adha periods, each paired with a corresponding pre-holiday control period. Control periods were selected using a predefined calendar-based approach to provide periods of identical duration as close as possible to each corresponding holiday, thereby minimizing seasonal variation. The matched calendar period was retained as a clustering variable in adjusted analyses.

2.2. Participants

Patients admitted during the holiday or matched control periods with a fracture requiring surgery were assessed for inclusion. Patients were excluded if they required emergency surgery, open fracture or wound, tendon injury, laceration, femoral neck fracture, physeal injury, infection requiring surgery, amputation, or intensive care at admission.

Femoral neck fractures were excluded because, as intracapsular fractures, they have distinct risks such as avascular necrosis and nonunion and are managed within fracture-specific treatment pathways with different surgical timing considerations. Elective cases and patients who refused treatment were also excluded.

Of 559 initially screened patients, 233 undergoing elective procedures and 9 who declined treatment were excluded. Of the remaining 317 patients, 27 who required direct intensive care unit admission, 22 with amputations, 17 undergoing surgery for infection, and 59 with open fractures, open wounds, tendon injuries, or lacerations were excluded. The final analytic cohort comprised 192 patients: 100 admitted during holiday periods and 92 admitted during matched control periods.

As the primary aim was to evaluate the overall delivery of operative orthopedic trauma care during extended public holidays rather than fracture-specific surgical timing, all eligible operative fracture cases were analyzed within a single cohort. Potential differences related to fracture type were addressed in the adjusted models where feasible.

2.3. Data Collection and Variables

Records were gathered retrospectively from the data system and picture archiving and communication system (PACS). Clinical variables included age, sex, American Society of Anesthesiologists (ASA) physical status classification, fracture site, femoral fracture status, and multiple-fracture status. ASA classification was obtained from the hospital records and dichotomized as ASA I-II or ASA III-IV. Femoral fractures included proximal, shaft, and distal femoral fractures. Multiple fractures were defined as fractures involving two or more anatomical regions.

2.4. Outcomes

The primary outcome was time to surgery, calculated in days from emergency room presentation to the index operation. Secondary outcomes were length of hospital stay, surgery within 48 hours of hospital presentation, and reoperation within one year of admission. Surgery within 48 hours was evaluated as a secondary, pragmatic service-level outcome and was not intended to represent a universal clinical timing standard across all fracture types.

Length of hospital stay was calculated in days from hospital admission to discharge. Surgery within 48 hours was defined as an index operation performed within 48 hours of presentation. Reoperations occurring within one year after the index admission were identified from hospital records and classified according to their indication.

2.5. Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics version 31. All tests were two-sided, and a p value <0.05 was considered statistically significant. Continuous variables were summarized as median and interquartile range (IQR), and categorical variables as number and percentage. Baseline characteristics and unadjusted clinical outcomes were compared between holiday and control groups using the Mann-Whitney U test for continuous variables and the chi-square test or Fisher's exact test for categorical variables, as appropriate. Hodges-Lehmann estimates with 95% confidence intervals (CIs) were calculated for between-group differences in time to surgery and hospital stay.

Because time to surgery and hospital stay showed right-skewed distributions, both variables were log-transformed before multivariable modelling. Linear mixed-effects models were fitted to estimate adjusted associations between study period and time to surgery or hospital stay. Each model included study period, age, sex, ASA group, femoral fracture status, and multiple-fracture status as fixed effects. Matched calendar period was included as a random intercept to account for clustering within the matched holiday-control sets. Regression coefficients were exponentiated and reported as adjusted geometric

mean ratios (aGMRs) with 95% CIs. Age was modelled continuously and effect estimates were presented per 10-year increase.

A generalized linear mixed-effects model, including the same covariates and matched calendar period as a random intercept, was used to assess factors associated with delayed surgery (>48 hours). Delayed surgery (>48 hours) was coded as the event in the generalized linear mixed-effects model. Given the small number of reoperations, the comparison of one-year reoperation rates between study periods was reported using unadjusted analyses.

In exploratory analyses, holiday periods were further categorized as short holidays lasting 4–5 days, extended holidays lasting 9–10 days, and matched control periods. Over the 10-year study period, a total of 20 Bayram holiday periods were evaluated; nine were classified as short holidays lasting approximately 4–5 days, while the remaining 11 were classified as extended holidays lasting approximately 9–10 days.

Overall differences between the three groups were assessed using the independent-samples median test, followed by Bonferroni-adjusted pairwise comparisons. Duration-stratified linear mixed-effects models used the same covariates and random-intercept structure as the primary models. Exploratory subgroup analyses examined time to surgery according to age group (<65 vs. ≥65 years), femoral fracture status, and ASA group. The correlation between age and time to surgery was assessed using Spearman's rank correlation coefficient.

3. Results

The study included 192 patients. Of these, 100 (52.1%) were admitted during holiday periods and 92 (47.9%) during the corresponding matched control periods. Holiday-period admissions covered both Ramadan Bayram and Eid al-Adha throughout the study years. The median age was 61 years (IQR, 33–89), with ages ranging from 2 to 98 years. Overall, 97 patients (50.5%) were male and 95 (49.5%) were female.

Table 1 summarizes the baseline demographic and clinical characteristics of the study groups. Patients admitted during holiday periods were older, and women accounted for a greater proportion of this group. Femoral fractures were also more frequent during holiday periods. In contrast, the groups did not differ significantly with respect to ASA classification, multiple-fracture status, and the overall distribution of fracture sites.

Median time to surgery was 4.5 days (IQR, 2–9) during holiday periods and 4.0 days (IQR, 2–5) during matched control periods. The estimated Hodges–Lehmann difference was 1.0 day (95% CI, 0.0–2.0), with no statistically significant difference between the groups ($p = 0.169$). Similarly, the proportion of patients undergoing surgery within 48 hours did not show a significant difference between holiday and control periods (36.0% vs 31.5%; OR, 1.22; 95% CI, 0.67–2.23; $p = 0.512$).

In contrast, the unadjusted median length of hospital stay was longer during holiday periods than during control periods [9.0 days (IQR, 5.25–13.0) vs 7.0 days (IQR, 5.0–9.75)]. The estimated Hodges–Lehmann difference was 2.0 days (95% CI, 1.0–3.0), and this difference was statistically significant ($p = 0.004$).

Table 1. Baseline demographic and clinical characteristics of the study groups

Variable	Holiday group, n = 100	Control group, n = 92	p-value
Age, years, median (IQR)	68.5 (36.0–82.0)	56.0 (31.5–76.5)	0.035
Sex, n (%)			0.030
Male	43 (43.0)	54 (58.7)	
Female	57 (57.0)	38 (41.3)	
ASA grade, n (%)			0.154
ASA I–II	54 (54.0)	59 (64.1)	
ASA III–IV	46 (46.0)	33 (35.9)	
Femoral fracture, n (%)	57 (57.0)	34 (37.0)	0.005
Multiple fractures, n (%)	9 (9.0)	13 (14.1)	0.265
Fracture site, n (%)			0.187
Humerus	7 (7.0)	6 (6.5)	
Forearm	10 (10.0)	7 (7.6)	
Femoral fracture	57 (57.0)	34 (37.0)	
Tibia	10 (10.0)	18 (19.6)	
Spine	1 (1.0)	2 (2.2)	
Pelvis	2 (2.0)	3 (3.3)	
Hand	3 (3.0)	5 (5.4)	
Foot	1 (1.0)	2 (2.2)	
Multiple fractures	9 (9.0)	13 (14.1)	
Clavicle	0 (0.0)	2 (2.2)	

Note: Data are presented as median (IQR) or n (%). Group comparisons were performed using the Mann–Whitney U test for continuous variables and the chi-square or Fisher's exact test for categorical variables, as appropriate. ASA, American Society of Anesthesiologists; IQR, interquartile range

Table 2. Adjusted linear mixed-effects model for time to surgery accounting for matched calendar periods

Variable	Comparison	B	SE	Adjusted geometric mean ratio	95% CI	p-value
Study period	Holiday vs control	0.027	0.097	1.03	0.85–1.24	0.781
Femoral fracture	Absent vs present	0.112	0.136	1.12	0.86–1.46	0.410
Multiple fracture	Absent vs present	0.103	0.160	1.11	0.81–1.52	0.520
Sex	Male vs female	−0.017	0.101	0.98	0.80–1.20	0.863
ASA group	ASA I–II vs ASA III–IV	−0.058	0.134	0.94	0.73–1.23	0.666
Age	Per 10-year increase	0.143	0.029	1.15	1.09–1.22	<0.001

Note: The dependent variable was log-transformed time to surgery. Adjusted geometric mean ratios were obtained by exponentiating the B coefficients. Matched calendar period was included as a random intercept.

The adjusted linear mixed-effects model results are presented in Table 2. After adjustment for age, sex, ASA group, femoral fracture status, and multiple-fracture status, with matched calendar period included as a random intercept, holiday-period admission was not associated with time to surgery ($F(1, 176.737) = 0.078$, $p = 0.781$). The adjusted geometric mean time to surgery was 3% longer during holiday periods than during

control periods (adjusted geometric mean ratio, 1.03; 95% CI, 0.85–1.24; $p = 0.781$). Each 10-year increase in age was independently associated with a 15% longer adjusted geometric mean time to surgery ($p < 0.001$).

In the adjusted generalized linear mixed-effects model, holiday-period admission was not associated with surgery within 48 hours ($p = 0.109$). Age was the only significant predictor, with each 10-year increase associated with 65% higher odds of delayed surgery ($p < 0.001$).

The adjusted linear mixed-effects model results are shown in Table 3. Holiday-period admission was not significantly associated with length of hospital stay ($p = 0.702$). Patients without multiple fractures had a 37% shorter adjusted geometric mean hospital stay than those with multiple fractures ($p = 0.002$). Each 10-year increase in age was associated with a 12% increase in the adjusted geometric mean length of stay ($p < 0.001$).⁷

Table 3. Adjusted linear mixed-effects model for length of hospital stay accounting for matched calendar periods

Variable	Comparison	B	SE	Adjusted geometric mean ratio	95% CI	p-value
Study period	Holiday vs control	0.046	0.118	1.05	0.81–1.35	0.702
Femoral fracture	Absent vs present	−0.120	0.124	0.89	0.69–1.13	0.338
Multiple fracture	Absent vs present	−0.465	0.148	0.63	0.47–0.84	0.002
Sex	Male vs female	−0.035	0.092	0.97	0.81–1.16	0.709
ASA group	ASA I–II vs ASA III–IV	−0.032	0.123	0.97	0.76–1.23	0.793
Age	Per 10-year increase	0.115	0.026	1.12	1.07–1.18	<0.001

Note: The dependent variable was log-transformed length of hospital stay. Adjusted geometric mean ratios were obtained by exponentiating the B coefficients. Matched calendar period was included as a random intercept.

Reoperation within one year was required in 10 patients (5.2%). The most common indication was infection ($n = 6$), followed by mechanical failure ($n = 3$) and skin-related problems or implant removal ($n = 1$). There was no evidence of a difference in one-year reoperation between the holiday and control groups (6.0% vs 4.3%; OR, 1.40; 95% CI, 0.38–5.14; $p = 0.750$).

Table 4. Indications for reoperation within one year by study period

Reason for reoperation	Holiday, n	Control, n
Infection	3	3
Mechanical failure	2	1
Skin-related problem and implant removal	1	0
Total	6	4

3.1. Analysis of Short and Extended Holiday Periods

The cohort included short-holiday periods of 4–5 days ($n = 41$), extended-holiday periods of 9–10 days ($n = 59$), and matched control periods ($n = 92$). Median time to surgery was 3 days (IQR, 1–8), 6 days (IQR, 2–9), and 4 days (IQR, 2–5), respectively. Although the overall difference was significant (independent-samples median test, $\chi^2 = 6.17$, $p = 0.046$), none of the pairwise comparisons remained statistically significant after Bonferroni correction. Adjusted p values were 1.000 for short holidays versus control periods, 0.202 for short versus extended holidays, and 0.055 for extended holidays versus control periods.

Median hospital stay was 7 days (IQR, 4.5–12.5) during short holidays, 10 days (IQR, 8–13) in extended holidays, and 7 days (IQR, 5–9.75) during control periods. The overall difference was significant ($p = 0.004$), with a longer stay in extended holidays than during control periods after Bonferroni correction (adjusted $p = 0.003$).

Table 5 presents the adjusted linear mixed-effects model for time to surgery. In this duration-stratified analysis, holiday status was not significantly associated with time to surgery after adjustment for age, sex, ASA group, femoral fracture status, and multiple-fracture status, with matched holiday–control period included as a random intercept ($F(2, 142.85) = 0.865$, $p = 0.423$). None of the pairwise comparisons between short holidays, extended holidays, and control periods was statistically significant after Bonferroni adjustment (all adjusted $p > 0.05$). Each 10-year increase in age was independently associated with a 16% longer adjusted geometric mean time to surgery (adjusted ratio, 1.16; 95% CI, 1.09–1.23; $p < 0.001$). Femoral fracture status, multiple-fracture status, sex, and ASA group were not significantly associated with time to surgery.

Table 5. Adjusted linear mixed-effects model of factors associated with time to surgery

Variable	Comparison	B (log scale)	SE	Adjusted geometric mean ratio	95% CI for B	95% CI for ratio	p-value
Holiday status	Short holiday (4–5 days) vs extended holiday (9– 10 days)	−0.20 7	0.160	0.81	−0.526 to 0.112	0.59–1.12	0.201*
Holiday status	Short holiday (4–5 days) vs control	−0.09 9	0.137	0.91	−0.369 to 0.172	0.69–1.19	0.471*
Holiday status	Extended holiday (9–10 days) vs control	0.108	0.116	1.11	−0.121 to 0.336	0.89–1.40	0.354*
Femoral fracture	Absent vs present	0.113	0.136	1.12	−0.156 to 0.381	0.86–1.46	0.410
Multiple fracture	Absent vs present	0.097	0.160	1.10	−0.220 to 0.413	0.80–1.51	0.547
Sex	Male vs female	−0.00 9	0.102	0.99	−0.209 to 0.192	0.81–1.21	0.930
ASA group	ASA I–II vs ASA III–IV	−0.02 1	0.137	0.98	−0.291 to 0.249	0.75–1.28	0.878
Age	Per 10-year increase	0.150	0.030	1.16	0.090 to 0.210	1.09–1.23	<0.001

Note: Time to surgery was log-transformed. The matched period was included as a random intercept. $\exp(B)$ represents the adjusted ratio of geometric means. ASA, American Society of Anesthesiologists; CI, confidence interval; SE, standard error. *: raw value

Table 6 presents the adjusted linear mixed-effects model for hospital length of stay. Raw p-values are presented. Bonferroni-adjusted p-values for pairwise comparisons are provided in the table footnote. In this exploratory duration-stratified analysis, holiday status was not significantly associated with hospital stay after adjustment for age, sex, ASA group, femoral fracture status, and multiple-fracture status, with matched holiday–control period included as a random intercept ($F(2, 95.863) = 2.376$, $p = 0.098$).

Table 6. Adjusted linear mixed-effects model of factors associated with hospital length of stay

Variable	Comparison	B (log scale)	SE	Adjusted ge- ometric mean ratio	95% CI for B	95% CI for ratio	p-value
Holiday status	Short holiday (4–5 days) vs extended holiday (9–10 days)	−0.238	0.138	0.79	−0.515 to 0.038	0.60–1.04	0.090*

Holiday status	Short holiday (4–5 days) vs control	–0.024	0.121	0.98	–0.263 to 0.215	0.77–1.24	0.845*
Holiday status	Extended holiday (9–10 days) vs control	0.215	0.105	1.24	0.008 to 0.421	1.01–1.52	0.042*
Femoral fracture	Absent vs present	–0.098	0.125	0.91	–0.344 to 0.148	0.71–1.16	0.432
Multiple fracture	Absent vs present	–0.467	0.146	0.63	–0.756 to –0.178	0.47–0.84	0.002
Sex	Male vs female	–0.003	0.093	1.00	–0.186 to 0.180	0.83–1.20	0.973
ASA group	ASA I–II vs ASA III–IV	0.005	0.125	1.01	–0.240 to 0.251	0.79–1.29	0.965
Age	Per 10-year increase	0.120	0.030	1.13	0.070 to 0.170	1.07–1.19	<0.001

Note: Hospital stay was log-transformed. Matched period was included as a random intercept. exp(B) represents the adjusted ratio of geometric means. ASA, American Society of Anesthesiologists; CI, confidence interval; SE, standard error. *: Raw p-values are presented. Bonferroni-adjusted p-values for pairwise comparisons were 0.270 for short vs extended holiday, 1.000 for short holiday vs control, and 0.126 for extended holiday vs control.

None of the pairwise comparisons between short holidays, extended holidays, and control periods was statistically significant after Bonferroni adjustment. The adjusted geometric mean hospital stay was estimated to be 24% longer in extended holidays than during control periods (adjusted geometric mean ratio, 1.24; 95% CI, 0.96–1.60; adjusted $p = 0.126$). Patients without multiple fractures had a 37% shorter adjusted geometric mean hospital stay than those with multiple fractures ($p = 0.002$). Each 10-year increase in age was associated with a 13% longer adjusted geometric mean hospital stay ($p < 0.001$). Femoral fracture status, sex, and ASA group were not significantly associated with hospital stay.

In exploratory analyses of the overall cohort, age was moderately correlated with time to surgery (Spearman's $\rho = 0.500$; $p < 0.001$). Patients aged ≥ 65 years had a longer median time to surgery than those aged < 65 years [7.0 days (IQR, 4.0–9.0) vs 2.0 days (IQR, 1.0–5.0); $p < 0.001$]. Similarly, patients with femoral fractures had a longer median time to surgery than those without femoral fractures [5.0 days (IQR, 3.0–9.0) vs 3.0 days (IQR, 1.0–5.0); $p < 0.001$].

Exploratory subgroup analyses comparing holiday and control periods showed no statistically significant difference in time to surgery among patients aged ≥ 65 years ($p = 0.149$), patients with femoral fractures ($p = 0.907$), or patients with ASA grade III–IV ($p = 0.174$).

4. Discussion

In this 10-year matched-period cohort study, admission during Ramadan Bayram or Eid al-Adha was not associated with delayed fracture surgery. After adjustment for patient and fracture characteristics, time to surgery and hospital length of stay were comparable between holiday and control periods. These findings suggest that holiday-period admission was not independently associated with the measured outcomes of surgical timing and hospital stay.

A possible explanation lies in the organisation of emergency operating-room activity at our institution. During these holiday periods, one fracture case was generally operated on each day unless theatre capacity was required for a life-threatening emergency from another specialty. Maintaining this level of operative activity may have limited the accumulation of fracture cases and contributed to the similar waiting times observed during holiday and control periods. However, because daily theatre use and competing emergency cases were not recorded, this explanation remains tentative.

The study population was heterogeneous with respect to age, fracture location, and clinical priority. This reflects the real-world orthopedic trauma workload during holiday periods; however, expected surgical timing may differ substantially between fracture types. Accordingly, the findings should be interpreted as service-level rather than fracture-specific effects.

Previous studies have reported conflicting results. Hagino et al. found that weekend or public-holiday admission was associated with delayed hip fracture surgery.⁴ In contrast, Daugaard et al. found no increase in mortality following weekend or public-holiday admission, while Wong et al. observed only small holiday-related increases in time to surgery without higher mortality.^{3,11} Foss and Kehlet reported increased mortality during longer holiday periods despite similar surgical timing.¹ Differences in case mix, staffing, trauma theatre availability, and definitions of holiday exposure may explain these different findings.¹⁰ Unlike most previous studies, our cohort included fractures at different anatomical sites rather than only hip fractures.

Surgery within 48 hours and one-year reoperation rates also did not differ between groups. These outcomes suggest that holiday-period admission was not associated with worse outcomes among the measures evaluated in this study. This is consistent with studies of weekend hip-fracture care reporting no clear difference in the risk of reoperation or other major short-term outcomes according to the timing of admission or surgery.^{12,13}

Hospital stay was two days longer during holiday periods in the unadjusted analysis. However, patients in the holiday group were older and more frequently had femoral fractures. After adjustment, holiday admission was no longer associated with length of stay. Age was independently associated with both longer surgical waiting time and longer hospital stay, while multiple fractures were associated with longer hospital stay. Patient and fracture characteristics therefore appear to explain much of the crude difference between the groups.

These findings suggest that the crude difference in length of stay was mainly related to differences in patient age and injury characteristics rather than to the holiday period itself. This is in keeping with previous trauma studies showing that older age and greater injury burden are associated with longer hospital stays.^{14,15} Albayrak et al. similarly reported that older patients with proximal femoral fractures had more comorbidities, higher ASA grades, longer preoperative preparation, and longer hospital stays.¹⁶ In hip fracture populations, longer preoperative waiting times have also been associated with prolonged hospitalisation, although this relationship may partly reflect medical complexity and the need for preoperative optimisation.¹⁷ Treatment-related factors may also contribute to variation in hospital stay. In geriatric patients with hip fractures, Sürücü et al. reported shorter hospital stays in patients operated with proximal femoral nailing than in those operated with hemiarthroplasty.¹⁸

Extended holidays lasting 9–10 days showed a possible signal toward longer hospital stay. Although the adjusted estimate was 24% higher than that of control periods, the pairwise comparison did not remain statistically significant after correction for multiple comparisons. Given the limited subgroup size, this finding should be considered exploratory and may represent a clinically relevant trend that warrants confirmation in larger studies.

More broadly, disruptions in healthcare delivery may affect aspects of fracture care beyond surgical timing. A recent Turkish study of older adults with femoral neck fractures following COVID-19 mobility restrictions highlighted the importance of continuity in postoperative rehabilitation, osteoporosis treatment, and follow-up care.¹⁹

The study has some limitations. Its retrospective, single-centre design limits inference and generalisability. Holiday and control groups differed in several baseline characteristics, and residual confounding may remain despite adjustment. Staffing levels,

theatre capacity, reasons for surgical delay, and discharge-related factors were not available. Despite multivariable adjustment for relevant baseline differences, residual confounding related to fracture urgency, comorbidities, and preoperative preparation cannot be excluded.

The small number of reoperations also produced an imprecise estimate for this outcome. However, the use of duration-matched control periods close to each holiday reduced seasonal variation and allowed repeated comparisons across ten years.

Although femoral fracture and other relevant baseline variables were included in the multivariable models, residual confounding related to fracture-specific urgency, anatomical location, preoperative preparation, and other unmeasured clinical factors cannot be excluded. The limited number of patients within individual fracture categories also precluded reliable fracture-specific subgroup analyses. The clinical relevance of the 48-hour threshold may vary across fracture types and should therefore be interpreted as a service-level indicator rather than a fracture-specific standard of timely surgery. Pre-holiday changes in elective or semi-urgent surgical scheduling may have influenced the control periods and could not be fully accounted for.

5. Conclusion

In conclusion, extended Bayram holidays were not independently associated with delayed surgery, prolonged hospital stay, or increased one-year reoperation in orthopaedic fracture patients without an immediate surgical indication. The results show that age and fracture complexity had a greater influence on the treatment course than the holiday period itself.

Informed Consent: Written informed consent was obtained from all hospitalized patients.

Ethics Committee Approval: The study protocol was approved by the Trakya University Faculty of Medicine Scientific Research Ethics Committee (protocol no. 225/248; June 23, 2025). The study was conducted in accordance with the principles of the Declaration of Helsinki.

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Use of Artificial Intelligence: No generative artificial intelligence tools or technologies were used in the preparation of this study. The entire content of the manuscript was originally prepared, reviewed, and approved by both authors. Grammarly was used solely to check English grammar and word choice.

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