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Original Article

Penile fractures: the price of a merry Christmas

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Objectives

To explore whether Christmas might be a risk factor for penile fractures due to the Christmas spirit related to the intimacy and euphoria of these holly jolly days.

Patients and methods

We evaluated the incidence of penile fractures during Christmas and New Year's Eve through the GeRmAn Nationwide inpatient Data (GRAND) from the Research Data Center of the Federal Bureau of Statistics (Wiesbaden, Germany). Furthermore, we assessed the impact of COVID-19 on penile fractures and their seasonality.

Results

A total of 3,421 patients with a median, interquartile range (IQR) age of 42 (32–51) years had a penile fracture requiring a hospital stay from 2005 to 2021. In all, 40 (1.2%) penile fractures occurred in 51 days of Christmas (from 24/12 to 26/12 in each year). The daily incidence of penile fractures during Christmas was 0.78 with an incidence rate ratio (IRR) of 1.43 (95% confidence interval [CI] 1.05–1.95, $P = 0.02$). If every day was like Christmas, 43% more penile fractures would have occurred in Germany from 2005 on. Interestingly, only 28 (0.82%) penile fractures occurred during the New Year's Eve period (31/12 to 02/01 from 2005 to 2021). This resulted in an IRR of 0.98 (95% CI 0.69–1.5, $P = 0.98$) in the New Year's Eve period. Most patients with penile fractures were admitted to hospital at the weekend ($n = 1{,}322$; IRR 1.58, 95% CI 1.48–1.69; $P < 0.001$). Summer was also associated with more penile fractures ($n = 929$; IRR 1.11, 95% CI 1.03–1.19; $P = 0.008$). Both the COVID-19 pandemic ($n = 385$; IRR 1.06, 95% CI 0.95–1.18, $P = 0.29$) and its lockdown period ($n = 93$; IRR 1, 95% CI 0.82–1.23; $P = 0.96$) did not affect the incidence of penile fractures.

Conclusion

The incidence of penile fractures displays a seasonality. Last Christmas penile fractures occurred more often. This year to save us from tears, we will NOT do something special (the new Christmas hit of the year).

Keywords

penile fracture, perioperative outcomes, COVID-19, Christmas, retrospective cohort study

Introduction

Penile fractures are defined as the rupture of the tunica albuginea surrounding the corpora cavernosa [1]. Penile fractures are often heralded by an audible crack followed by severe pain, rapid detumescence, swelling, and formation of a haematoma [2]. They are considered a urological emergency requiring a hospital stay and, in ~25% of the cases, they are accompanied by urethral injury [3]. Most patients are managed with direct surgical exploration and repair of the tunical rupture (and the urethral injury) to minimise fibrosis formation and reduce the risk of secondary erectile dysfunction and penile curvature [4].

Penile fractures are classically caused by a forceful bending of the erect penis during aggressive sexual intercourse featuring unusual sexual positions (e.g., 'reverse cowgirl') [5]. It seems that penile fractures occur most likely during sex in unconventional scenarios (extramarital affairs, unusual locations) [6]. Therefore, penile fractures are considered a surrogate of couples' sexual activity and attitudes [7].

In Germany, Christmas is widely celebrated. 'It's the most wonderful time of the year, there is always much mistletoeing, and hearts are glowing, when loved ones are near'. In other words, Christmas might be a risk factor for penile fractures due to the 'Christmas spirit' related to the

intimacy and euphoria of these holly jolly days. Besides, how can you celebrate Christmas without children?

Within this spirit, we aimed to evaluate the incidence of penile fractures during Christmas through the GeRmAn Nationwide inpatient Data (GRAND). As secondary outcomes, the impact of COVID-19 and seasonality were assessed.

Patients and Methods

Data Source

We included all patients from the GRAND study diagnosed with penile fracture (International Classification of Diseases, 10th Revision [ICD-10] code: S39.80) from 2005 to 2021. The GRAND study contains all reimbursed inpatient cases in Germany apart from psychiatric, forensic, and military cases. Data of each case are first transferred to the Institute for the Hospital Remuneration System and, subsequently, to the Research Data Center of the Federal Bureau of Statistics (Wiesbaden, Germany), from which they can be provided upon request (agreement: LMU – 4710-2022). For each inpatient case, information on patient and hospital characteristics, comorbidities, as well as inpatient procedures, outcomes, and complications are available and stored anonymised at the Federal Bureau of Statistics.

The primary outcome of the present study was to assess the incidence of penile fractures during the Christmas period (in-hospital admission from 24/12 to 26/12 in each year). Secondary outcomes included: (i) whether penile fracture diagnosis was also accompanied by more penile fracture operations during Christmas, (ii) the incidence of penile fractures during the New Year's Eve period (in-hospital admission from 31/12 to 02/01 in each year), (iii) the incidence of penile fractures during the COVID-19 pandemic in Germany (in-hospital admission from 08/03/2020 to 31/12/2021) and COVID-19 lockdown in Germany (in-hospital admission from 22/03/2020 to 06/05/2020 and from 02/11/2020 to 03/03/2021), (iv) the seasonality and risk factors of penile fractures.

Statistical Analysis

All continuous variables were calculated as medians with interquartile ranges (IQRs) and all categorical variables as frequencies with proportions. The corresponding comparisons were performed with the Mann–Whitney test and the chi-squared test. For each outcome, we estimated the daily incidence of penile fractures. To quantify the possible change during the specific period compared to the reference period, we computed incidence rate ratios (IRRs) with their 95% CIs. For all analyses, a two-sided $P \leq 0.05$ was considered statistically significant. All analyses were undertaken from the Research Data Center of the Federal Bureau of Statistics based on an R script developed by our research team (source: RDC of the Federal Statistical Office and the Statistical Offices of the Federal States, DRG Statistics 2005–2021, own calculations).

Results

Baseline Characteristics

A total of 3,421 patients with a median (IQR) age of 42 (32–51) years had a penile fracture requiring a hospital stay from 2005 to 2021. The median (IQR) length of hospital stay was 3 (2–5) days, and the median (IQR) in-hospital costs were 2,358 (1,914–2,629) Euros/patient. Most patients did not display any comorbidities. Overall, 253 (7.4%) patients had hypertension, 58 (1.7%) diabetes, and 51 (1.5%) were obese. Most of the patients (2,605 [76%]) underwent surgical correction of their penile fracture (Table 1).

Effect of Christmas and New Year's eve on Penile Fractures

Overall, 40 (1.2%) penile fractures requiring a hospital stay occurred in 51 days of Christmas (24/12 to 26/12 from 2005 to 2021). The percentage of operative vs conservative management did not differ between the Christmas and the non-Christmas time of the year (80% and 76% operative management, respectively, $P = 0.7$). The daily incidence of penile fracture during Christmas was 0.78 compared to 0.54 during the non-Christmas time of the year. This resulted in an IRR of 1.43 (95% CI 1.05–1.95; $P = 0.02$) during holly jolly Christmas. If every day was like Christmas, 43% more penile fractures would have occurred in Germany from 2005 onwards. The daily distribution of penile fractures throughout the year and the daily distribution of patients undergoing surgery due to a penile fracture are depicted in Fig. 1. Interestingly, only 28 (0.82%) penile fractures occurred in the 51 days of the New Year's Eve period (31/12 to 02/01 from 2005 to 2021). This resulted in a daily incidence of 0.58 and an IRR of 0.98 (95% CI 0.69–1.5, $P = 0.98$) in the New Year's Eve period.

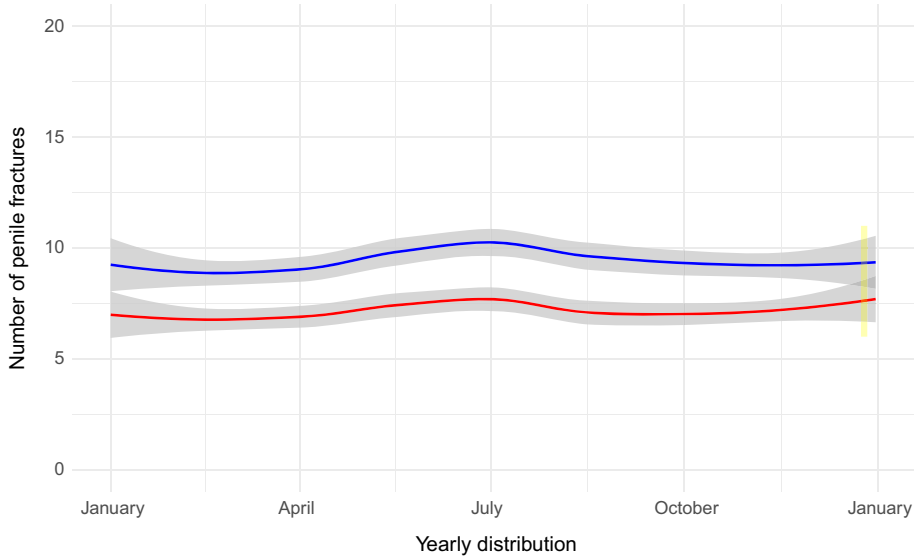
Seasonality and Effect of COVID-19 Pandemic on Penile Fractures

Most patients with a penile fracture were admitted to the hospital on a Sunday ($n = 757$ [22%]), followed by Saturday ($n = 565$ [17%]). For the weekend, the daily incidence of penile fractures was 0.75, and the IRR was 1.58 (95% CI 1.48–1.69, $P < 0.001$). A total of 929 (27%) cases occurred in summer (daily incidence of 0.59 and an IRR of 1.11 [95% CI 1.03–1.19]; $P = 0.008$). June had the highest incidence of penile fractures with a daily incidence of 0.62 and an IRR of 1.14 (95% CI 1.01–1.28, $P = 0.03$), whereas March had the lowest incidence of penile fractures with a daily incidence of 0.48 and an IRR of 0.86 (95% CI 0.76–0.98, $P = 0.02$). The number of penile fractures per day and month is presented in Fig. 2.

Table 1 Baseline characteristics of the included patients. Variables are presented as median (IQR) or frequencies with proportions. The Mann–Whitney was performed for comparisons between continuous variables and the chi-squared test for categorical variables.

Characteristic	Overall, *n* = 3421	Christmas, *n* = 40	Not Christmas, *n* = 3381	*P*
Age, years, median (IQR)	42 (32–51)	42 (34–49)	42 (32–51)	0.9
Obesity, *n* (%)	51 (1.5)	0 (0)	51 (1.5)	0.9
Hypertension, *n* (%)	253 (7.4)	0 (0)	253 (7.5)	0.14
Diabetes, *n* (%)	58 (1.7)	0 (0)	58 (1.7)	0.83
Hospital stay, days, median (IQR)	3 (2–5)	3 (2–4)	3 (2–5)	0.41
Inpatient costs, Euros, median (IQR)	2358 (1914–2629)	2079 (1919–2550)	2358 (1914–2629)	0.16
Operation for penile fracture, *n* (%)	2605 (76)	32 (80)	2573 (76)	0.7

Fig. 1 Daily distribution of penile fractures throughout the year. The blue line represents the number of patients with a penile fracture and the red line represents the number of patients that were operated upon. The grey part represents the 95% CIs and the highlighted part represents the Christmas period.



The incidence of penile fracture remained stable throughout the years, with 2016 being the year with most penile fractures (n = 239 [7%], daily incidence of 0.65 and an IRR of 1.2 [95% CI 1.05–1.37]; P = 0.007) and 2007 being the year with the fewest penile fractures (n = 168 [4.9%], daily incidence of 0.46 and an IRR of 0.83 [95% CI 0.71–0.97]; P = 0.02). Importantly, both the COVID-19 pandemic (n = 385 [11%], daily incidence of 0.58 and an IRR of 1.06 [95% CI 0.95–1.18]; P = 0.29) and its lockdown period (n = 93 [2.7%], daily incidence of 0.55 and an IRR of 1 [95% CI 0.82–1.23]; P = 0.96) did not affect the incidence of penile fractures (Table 2).

Discussion

Our findings demonstrate a seasonality in the occurrence of penile fractures. Christmas, weekends, and summer were associated with a statistically significant increase in the daily incidence of penile fractures. On the contrary, other national holidays near the Christmas period such as the New Year's Eve were not associated with higher incidence of penile fractures. Of note, Sunday was the day of the week with most patient admissions followed by Saturday, highlighting that men having sex on Saturday night are at the highest risk of penile fractures, followed by those having sex on Friday night. On the contrary, it seems that both the COVID-19 pandemic and its strict lockdown period did not impact the incidence of penile fractures in Germany. Additionally, the incidence of penile fractures seems to have remained stable during the last two decades in Germany. Importantly, no seasonality was detected in terms of penile fracture operations, suggesting that urologists are not affected by the Christmas spirit when deciding to operate on patients.

Based on our analyses, penile fractures occur in periods when couples are enjoying moments of relaxation such as Christmas, weekends, and summer. Even though we cannot, of course, recommend against having sex during these periods, our findings ring the alarm bell (and not the jingle bells). It should be highlighted that a recently published

Fig. 2 (**A**) Number of penile fractures/day. (**B**) Number of penile fractures/month.

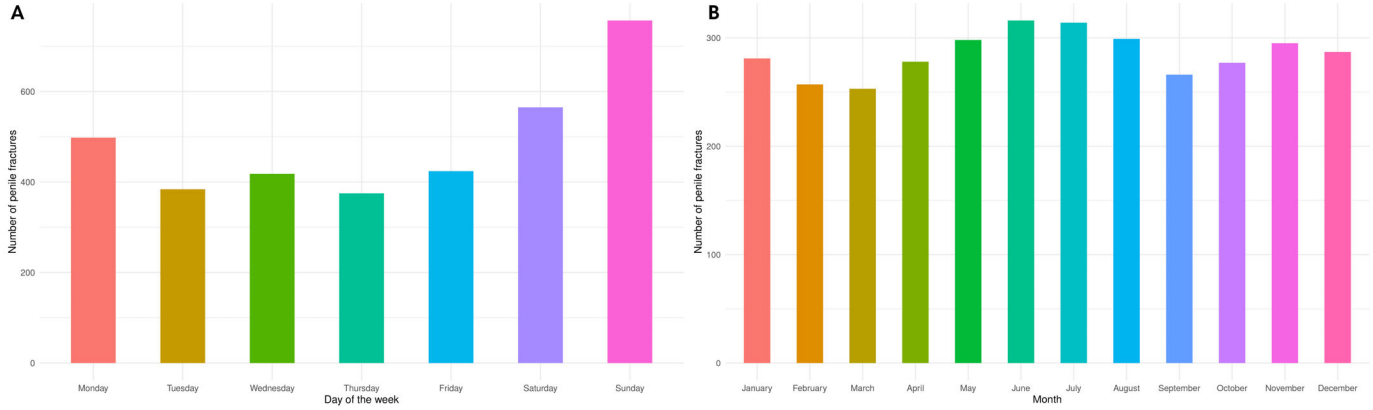


Table 2 The incidence of penile fractures.

Time period	Penile fractures, *n* (%)	Daily incidence	IRR (95% CI)	*P*
Christmas	40 (1.2)	0.78	1.43 (1.05–1.95)	**0.02**
New Year's Eve	28 (0.82)	0.55	0.98 (0.69–1.5)	0.98
Weekend	1322 (39)	0.75	1.58 (1.48–1.69)	**<0.001**
Season				
Winter	825 (24)	0.54	0.97 (0.9–1.05)	0.42
Spring	829 (24)	0.53	0.95 (0.88–1.03)	0.2
Summer	929 (27)	0.59	1.11 (1.03–1.19)	**0.008**
Autumn	838 (24)	0.54	0.98 (0.9–1.06)	0.57
Month				
January	281 (8.2)	0.53	0.96 (0.85–1.09)	0.57
February	257 (7.5)	0.54	0.97 (0.85–1.1)	0.63
March	253 (7.4)	0.48	0.86 (0.76–0.98)	**0.02**
April	278 (8.1)	0.55	0.99 (0.87–1.12)	0.85
May	298 (8.7)	0.57	1.03 (0.91–1.16)	0.64
June	316 (9.2)	0.62	1.14 (1.01–1.28)	**0.03**
July	314 (9.2)	0.6	1.09 (0.97–1.22)	0.15
August	299 (8.7)	0.57	1.03 (0.92–1.16)	0.6
September	266 (7.8)	0.52	0.94 (0.83–1.07)	0.35
October	277 (8.1)	0.53	0.95 (0.84–1.07)	0.41
November	295 (8.6)	0.58	1.05 (0.94–1.19)	0.38
December	287 (8.4)	0.54	0.99 (0.87–1.11)	0.84
Year				
2005	210 (6.1)	0.57	1.05 (0.91–1.2)	0.52
2006	179 (5.2)	0.49	0.88 (0.76–1.03)	0.11
2007	168 (4.9)	0.46	0.83 (0.71–0.97)	**0.02**
2008	181 (5.3)	0.49	0.89 (0.77–1.04)	0.13
2009	188 (5.5)	0.51	0.93 (0.8–1.08)	0.34
2010	185 (5.4)	0.5	0.92 (0.79–1.06)	0.24
2011	200 (5.8)	0.55	0.99 (0.86–1.15)	0.94
2012	194 (5.7)	0.53	0.96 (0.83–1.11)	0.58
2013	206 (6)	0.56	1.03 (0.89–1.18)	0.72
2014	185 (5.4)	0.51	0.92 (0.79–1.06)	0.23
2015	221 (6.5)	0.61	1.11 (0.96–1.27)	0.15
2016	239 (7)	0.65	1.2 (1.05–1.37)	**0.007**
2017	198 (5.8)	0.54	0.98 (0.85–1.14)	0.82
2018	228 (6.7)	0.62	1.14 (1–1.31)	0.051
2019	204 (6)	0.56	1.02 (0.88–1.12)	0.83
2020	223 (6.5)	0.61	1.11 (0.97–1.28)	0.12
2021	212 (6.2)	0.58	1.06 (0.92–1.22)	0.43
COVID-19 pandemic	385 (11)	0.58	1.06 (0.95–1.18)	0.29
COVID-19 lockdown	93 (2.7)	0.55	1 (0.82–1.23)	0.96

Bold cells indicate statistical significance.

systematic review rang the alarm bell about the endless stream of demands placed on health professionals to 'act now' without any obvious rationale [8]. Nevertheless, our findings place a demand on couples to reduce 'wild sex' during moments of relaxation to reduce the risk of penile fractures. Interestingly, the New Year's Eve period was not associated with increased risk of penile fractures. The latter might be attributed to the fact that New Year's Eve is not so widely celebrated in Germany. Besides, the Christmas markets close and the Christmas decorations are removed.

It should be highlighted that we provide the first study that suggests a seasonality in the incidence of penile fractures. Penile fractures may not only occur in unconventional scenarios but also in cases of increased sexual activity such as vacations. Indeed, both Christmas and summer are highly preferred among Germans for a vacation. Therefore, 'Home Alone' during Christmas and vacation seems, in this case, a good idea. On the contrary, our findings do not support Elvis Presley et al. stating that 'for if every day could be just like Christmas what a wonderful world this would be', as Christmas was associated with 43% more penile fractures. Furthermore, the mean age of 42 years amongst men with a penile fracture suggests that, despite prevailing public opinion, young men might be particularly prudent during sexual intercourse.

Even though we report, to our knowledge, the largest study in patients with penile fractures, it should be stressed that our findings were tempered by multiple limitations. Foremost, our results are based on administrative data, and, thus, are prone to coding misclassification or inconsistencies. Based on the previous notion, the date of admission might not always reflect the date of the penile fracture. The Research Data Center excluded groups with fewer than three baseline characteristics or inpatient complications to ensure anonymity. Therefore, further subgroup analyses in patients with penile fracture during Christmas could not be performed. Moreover, data about functional and other outcomes after hospital discharge, as well as follow-up information are not included in the GRAND study, restricting the extrapolation of our findings. Our study is further mitigated by the fact that its main findings are based on an extremely low number of 40 penile fractures (vs 3,421) over 17 years in a country of ~85 million inhabitants. Based on the previous notion, our study is only hypothesis generating and does not imply a causal association between Christmas and penile fractures [9]. Furthermore, it was beyond the scope of the present study to assess further German national holidays.

Conclusion

The present high-volume, high-quality, real-world data demonstrate that last Christmas penile fractures occurred more often. This year to save us from tears, we will NOT do something special (the new Christmas hit of the year).

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Disclosure of Interests

None declared.

Contributors

None of the authors has actively contributed to these data by experiencing a penile fracture. The authors have only participated in the drafting, writing, and editing of the manuscript. This year all authors promise to do nothing special.

Ethics Statement

Written informed consent from the participants, as well as ethical approval, was not required for the present study in accordance with the national legislation and institutional requirements.

References

1 **Rees RW, Brown G, Dorkin T et al.** British Association of Urological Surgeons (BAUS) consensus document for the management of male genital emergencies – penile fracture. *BJU Int* 2018; 122: 26–8
2 **Kominsky H, Beebe S, Shah N, Jenkins LC.** Surgical reconstruction for penile fracture: a systematic review. *Int J Impot Res* 2020; 32: 75–80
3 **Bozzini G, Albersen M, Otero JR et al.** Delaying surgical treatment of penile fracture results in poor functional outcomes: results from a large retrospective multicenter European study. *Eur Urol Focus* 2018; 4: 106–10
4 **Falcone M, Garaffa G, Castiglione F, Ralph DJ.** Current management of penile fracture: an up-to-date systematic review. *Sex Med Rev* 2018; 6: 253–60
5 **Hatzichristodoulou G, Dorstewitz A, Gschwend JE, Herkommer K, Zantl N.** Surgical management of penile fracture and long-term outcome on erectile function and voiding. *J Sex Med* 2013; 10: 1424–30
6 **Rodriguez D, Li K, Apoj M, Munarriz R.** Epidemiology of penile fractures in United States emergency departments: access to care disparities may Lead to suboptimal outcomes. *J Sex Med* 2019; 16: 248–56
7 **Kramer AC.** Penile fracture seems more likely during sex under stressful situations. *J Sex Med* 2011; 8: 3414–7
8 **Ford N, Brigden G, Ellman T, Mills EJ.** The time to act is now: pseudo-systematic review. *BMJ* 2020; 371: m4143
9 **Vickers AJ, Assel M, Dunn RL et al.** Guidelines for reporting observational research in urology: the importance of clear reference to causality. *BJU Int* 2023; 132: 4–8

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Abbreviations: GRAND, GeRmAn Nationwide inpatient Data; IQR, interquartile range; IRR, incidence rate ratio.